THE END OF THE
END OF THE BOOK: DEAD BOOKS,
LIVELY MARGINS,
AND SOCIAL COMPUTING

The End of the Book

As suggested by the title of this symposium (Bookishness: The New Fate of Reading in the Digital Age), the best way to think about the book in the digital age may well be to focus on bookishness. From the point of view of the digital, the book has already gone away. So the remaining question is "what happens to bookishness?" Or, again, "where does bookishness go?"

This question will make sense if we look at three advanced, online reading environments developed by scholars originally trained in the culture of the book:

Collex is a scholarly digital reading environment—an integrated platform of data resources, protocols, and architecture, with an interface for researching texts—created by the NINES (Nineteenth-Century Scholarship Online) organization. Collex allows users to search distributed repositories of library, journal, digital archive, and other resources peer-reviewed for inclusion in the system. Depending on the nature of the original sources, queries produce citations or full-text access that can be managed in a number of ways—"folksonomically" tagged for organization (and also to help discover similar works tagged by others), aggregated in personal collections, and so on (figures 1, 2).¹

Open Journal Systems (OJS) is a complete, open-source platform for publishing online journals developed by the Pub-
Figure 1. Collex (search view)
Figure 2. Collex (collection view)
Figure 3. Example of journal published through the Open Journal Systems. Reading tools in the sidebar (shown in expanded view to the right) include links to automatically harvested related studies, reviews, social science data, databases, online forums, government policy, media reports, et cetera.
lic Knowledge Project, a consortium of researchers in several Canadian and US universities. OJS allows editors with minimal technical skills to generate customized, well-designed journals. Even more compelling, its content management system migrates the whole cycle of editorial work—article submission, peer reviewing, editing, metadata indexing, and subscription—online. The end result, from the reader’s perspective, is clean, transparent access to articles supplemented by a sophisticated set of search assistants called Reading Tools that harvest related online materials, like additional works by an author, related studies, book reviews, online forums (figure 3).2

Finally, PreE is a “professional reading environment” currently at a functional demonstration stage at the University of Victoria’s Electronic Textual Cultures Lab, where it is matched up for testing with the “REKn” repository of approximately thirteen thousand primary and one hundred thousand secondary Renaissance literary resources. Like Collex, PreE allows users to search materials and aggregate results on “bookshelves” in their personal “My Library” (figure 4).3 But like OJS, too, PreE includes algorithmic reading tools (exceeding those in OJS) that draw on the TAPoR (Text Analysis Portal for Research) toolkit. Future plans for PreE also call for incorporating next-generation digital-humanities applications developed by the SEASR (Software Environment for the Advancement of Scholarly Research) initiative.4 With TAPoR and SEASR analytics populating the PreE sidebar, for example, readers studying a text will be able to trigger on-demand text analysis, data mining, pattern discovery, and visualization.

Other scholarly or professional online reading environments might be mentioned, as well as some more broadly used open-source or proprietary mainstream applications that have recently evolved functions making them resemble full-fledged research platforms, like Zotero or Google Books Search. But the three scholarly environments I have described are enough to show exactly how, even under the care of humanists bred up in libraries, the digital today makes books go away.

To begin with, the digital makes large forms in general go
Figure 4. PreE (Professional Reading Environment). Screenshot from a proof-of-concept prototype showing a search result being dragged into “My Library” in the sidebar. (Image courtesy of the Electronic Textual Cultures Lab, University of Victoria.)
away. This is because the digital subordinates books, films, music, and anything else to a focus on documents (or, equivalently, files). Once we wrote or read books, stories, and poems, that is, but today—no matter the genre—everyone just writes and reads documents. What’s a document? Rich answers might be gleaned from such recent studies as John Guillory’s “The Memo and Modernity” (2004), Cornelia Vismann’s Files: Law and Media Technology (2008), Sven Spieker’s The Big Archive: Art from Bureaucracy (2008), and—a predecessor work—JoAnne Yates’s Control through Communication (1989). But for present purposes I offer just a short, if paradoxical, definition. Documents are deformational forms. On the one hand, documents conform to strict rhetorical and technical protocol—standard salutations (“To,” “From,” “Re,” “cc”), paper sizes, data or transmission formats, and so on. On the other hand, documents are deformational because they atomize molar structures into modular, remixable components geared to industrial efficiency and postindustrial flexibility. From the invention of the vertical file and Frederick Winslow Taylor’s work-process forms to today’s computer files and folders, the document is of a piece with the great digital dissolve that now unbundles such aggregated forms as albums, shows, and books into tracks, clips, samples, and other modular ejecta perfect for such reaggregators as iTunes or Google.

Beyond this general digital effect, however, Collex, OJS, and PreE—precisely because they are not iTunes or Google but instead research environments devoted to the thoughtful online use of books—ironically provide even more advanced ways of making books go away. To understand why, we need to differentiate between research and mainstream digital environments by thinking closely about what “thoughtful online use” in the above sentence means.

I will build up the case axiomatically as follows. Posit first that the array of online data structures can be represented most simply as a single, ranked scale of data-structure “size” (figure 5). Data packets are at the micro-end of the scale (here visualized logarithmically), while network-level structures (everything from local network domains through the Internet) are at the macro-end. Next, posit the following, simplified us-
ability formula: scope (roughly, how much a user gets to see of a resource) plus tractability (a user's ability to manipulate resources) equals operability (a more useful notion than the now clichéd interactivity).

Given these axioms, we can define online use (thoughtful or otherwise) as operability specific to the level of data structure or, holistically, the overall topography of operability versus data structure.

This definition then allows me to hypothesize that mainstream and research digital environments can be differentiated into two distinct topographies of operability versus data structure:

Mainstream digital environments, I surmise, produce a graph of operability versus data structure approximately as seen in the solid line in figure 6. What this graph visualizes
Comparison of Mainstream and Research Digital Environments

(Hypothetical Use Topography)

Figure 6. Hypothetical comparison of mainstream and research online environments

is the hypothesis that mainstream environments are all about browsing, navigating, and searching the page and the site (which, depending on the size and complexity of individual pages and sites, bracket between them the traditional scale of the book). At the level of the page and site, operability spikes—even if the relative proportions of scope and tractability within such operability can be quite variable. For instance, run-of-the-mill sites aim for moderately high quotients of both scope and tractability, while Apple and Google create their famous zen of simplicity through highly asymmetrical operability: they ramp scope way up (gigantic playlists or result lists) but throttle back tractability (so that only in-house programmers and, to a lesser extent, third-party developers working through APIs can tweak the scope, order, grouping, inner relations, external connections, formatting, and other fine intelligence of the system). At the lower and higher levels of data structure immediately flanking the page and site (for example, at the levels of excerpts
on a page or collections), mainstream environments then permit only limited operability. However, that is about as far as the mainstream phenomenological horizon extends. Beyond—at the extremes of the scale of data structures—all is mystery to the user. *Network* is structureless infinity. For example, how actually do local networks link up through nodes and trunks into the inter-network of the Internet? Or, how does Google's PageRank algorithm structure the Googleverse? So, too, all the lower data infinitesimals are structureless. Only developers, for instance, usually see down to the discrete HTML, CSS, PHP, or ASP, image, and other files that generate today's dynamic Web pages by means of templates. And even lower strata are operated only by programmers: database tables and fields (equivalently, XML schemas); then data packets, assembly language, and bits; ultimately, electrical phenomena.

By contrast, I surmise that research digital environments such as Collex, OJS, and PreE produce a graph of operability versus data structure roughly as seen in the dashed line in figure 6. There is a trough at the levels of the page and site due to the fact that few scholarly or other limited-audience environments can rival Google, Amazon, et cetera, in total scope of resources or state-of-the-art tractability at those levels. However, this trough is compensated for by the fact that advanced research environments tend to provide scope and tractability across more levels of digital structure. That is, they allow the user to traverse from end to end of the hierarchy of data structures with a greater area-sum of operability. Specifically, searching, tagging, data mining, text analysis, and other procedures in environments like Collex, OJS, and PreE encourage users to manipulate low-level textual events in order to control high-level heuristics of aggregation and pattern recognition, which in turn recursively suggest additional low-level tweaks, which then generate even more interesting or meaningful high-level phenomena, and so on.

Now we can understand what *research* in online environments—or, what I earlier termed thoughtful online use—means. By comparison with mainstream digital environments focused only on navigation and search, we might say, it means
giving the user more control over the computational actions that literalize the *re-* in *research*: recursion, redirection, resampling, reprocessing, et cetera. And that can happen only if the user is afforded some measure of operability—perception coupled with hands-on action—over both the low and high ends of the data-structure hierarchy.

And so, from the point of view of the digital, we reach the end of the book. Mainstream environments are most impressive at the scale of pages and sites, where, however, they produce documents that are generally anything other than books. Meanwhile, research environments such as Collex, OJS, and PreE are all about books. But, actually, books qua books are their least interesting feature. Really, Collex, OJS, and PreE accelerate what might be described—adapting Jean Baudrillard’s apocalyptic vocabulary—as a “precession” to the “astral” (in this case, digital) extremes, leaving in the middle a silicon “desert of the real” pristine of books.

The End of the End of the Book

But, wait. Didn’t the book already end, beginning in the age of the book itself—beginning, indeed, at the origin of books? From a certain point of view—that of the history of the book and the history of reading (research fields that in recent years have amounted to another mode of media theory)—the digital may be the end of the book, but the book actually got to the end of the book first and was digital *avant la lettre*.

I’m not a specialist in the history of the book and the history of reading. So I can only report on some main findings. These begin with the fact that the codex book displaced the classical and Jewish scroll in the early Christian epoch for both symbolic and practical reasons. *Symbolically*, the codex was *not* the classical or Jewish scroll; it was the signature medium of a new civilization. In this regard, the Bible was the paradigmatic codex. *Practically*, meanwhile, the codex was more efficient and flexible. After all, the lower middle classes that first adopted Christianity had long been accustomed to having about them in daily life little, portable codices used for ordinary accounts, lists, memoranda, and so on.
What was the connection between such notebooks and the Bible? The answer lies in the way the symbolic truth of the Bible was actually practiced: in modular, random-access, and remixable (today, we would say digital) fashion. Peter Stallybrass is eloquent about this in his "Books and Scrolls: Navigating the Bible" (2002). How did Christians read the Bible in medieval and early modern times, Stallybrass asks? They read it (or had it read to them) in daily modules regulated by the chronology of the liturgical year. To put it in iPod terms, however, that reading had to shuffle the story. The shuffling began at the very start of each year, Stallybrass notes, when "Genesis chapter 1, verse 1, Matthew chapter 1, verse 1, and Romans chapter 1, verse 1" was pushed back to January 2 due to the inconvenient fact that January 1 commemorated the Feast of the Circumcision, which remembered that "Christ was a Jewish boy." And so it goes: remixings of the story of humanity throughout the year, culminating in the frantic December shuffle of feast days descended from different historical origins. Even during a single service or reading, Stallybrass points out, good Bible practice meant having to keep open multiple locations in the good book and ancillary books (missals, psalters, and so on). It was multitasking and multiple windows all the way down. Christianity, Stallybrass observes with explicit allusion to digital media, was a "long history . . . of systematic methods of discontinuous reading."13

Not surprisingly, we can add, it was precisely the Bible and other canonical Christian texts that motivated the invention of all the concordance, search, book marking, and other unbundling and remixing apparatuses ancestral to today's digital reading (if for no other reason than to navigate the de facto hypertext of the two Testaments and four Gospels). The Q.E.D. of this argument is the fact that the now common digital Keyword in Context (KWIC) method of presenting search results originated not just generically in print concordances of the Bible but specifically in IBM technical assistance on what is now commonly referred to as the beginning of humanities computing: the Index Thomisticus digital concordance to St. Aquinas's works started in 1946 by Father Roberto Busa, S.J.14

Apocalyptic pronouncements about the "end of the book,"
we might say, pale in comparison with the original apocalypse of the Bible (Revelation, after all, is about as proto-hypertextual as it is possible to be). From its beginning, the book was already the end of the book. The digital is just the end of the end of the book.

**Bookishness Today**

If the book goes away in the digital age and, in fact, went away as long ago as the age of the book itself, then whither bookishness—meaning, roughly, the idea, psychology, sociology, value, and culture (if not also cult and religion) of the book? An analogy from physics may be useful. According to string theory, there are not just three dimensions of space and one of time. There are eleven or more dimensions, most of which are not perceptible or tractable because they are tightly furled at the Planck-constant scale. To visualize the mathematics of these other dimensions, physicists practice a hermeneutics of reduced dimensions: they represent the manifold of dimensions in just 2D. Similarly, we can say that bookishness goes into another dimension orthogonal to the axis—not to mention, the axiology and teleology—of such ultimately sacred notions as the “beginning” and “end” of the book. We can gain the most explanatory power if we say (in 2D terms) that bookishness goes marginal.

I privilege marginal among the possible extra dimensions of the book because it is the most concrete description of where bookishness ends up not just in the digital humanities but in the following predecessor intellectual movements (each premised on decentralizing the book): deconstruction, cultural criticism, media theory, and history of the book. Deconstruction focused on what Derrida called “the end of the book and the beginning of writing.” The book went away, but then beamed sideways into another galaxy of language called “textuality,” which sometimes manifested in literally marginal forms (as in Derrida’s Glas). Similarly, cultural criticism made the book go away by looking sideways (“anamorphically”) to “context.” Whether textual, pictorial, architectural, or otherwise, “representations” of context—as in the 1980s-vintage journal of that name—brought into view
Figure 7. "Bookshelf" page on early website of the UC Santa Barbara Transcriptions Project (Literature and the Culture of Information)
cultural "marginality." So, too, media theory expunged what McLuhan called the "Gutenberg Galaxy" of the book, replacing it—as demonstrated in McLuhan's own asteroidal prose—with elliptical sound bites zooming in sideways from the global media village. In the 1960s when McLuhan had his heyday, that media village was broadcasting the great twentieth-century marginal culture (by the standards of high culture) in which both the mainstream masses and "far out" youth had common ground: popular culture. And, finally, the history of the book field in its post-media-theory phase (witness Elizabeth Eisenstein's salute to McLuhan in the preface to her The Printing Revolution in Early Modern Europe) has lately advanced a cutting-edge research agenda focused on a dimension of the book that hardly used to matter but that recently seems to be all that matters: the materiality of the book.19 Today, progressive book historians study paper, cloth, bindings, the book trade, et cetera as witnesses of ephemera—i.e., material forms of writing and reading that, however physically long-lived, do not have the metaphysical permanence of language or meaning. Most cutting-edge, perhaps, is book-history research that is literally about the edges—or margins—of the book. Witness, for instance, Ann Blair, who specializes in the evolution of historical annotation practices that include literal instances of the marginal (e.g., acts of inscribing and otherwise paratextually marking book margins).20 From deconstruction through cultural criticism and media theory to the history of the book, in sum: it is the same move to the margins.

Where, then, does bookishness go in the digital age? Take another look at the sidebar of the reading interface in the PreE environment, with its "bookshelves" and "My Library" (figure 4). Or, as an early indicator, look at the sidebar of the "bookshelf" I myself helped create in 2000 for book reviews on the site of the NEH-funded Transcriptions Project I then led (figure 7).21 (I took those photographs of books myself and composit ed them as a virtual bookshelf masking what I was really concentrating on at the time: the database-to-Web functions camouflaged beneath.) Evidently, scholars bred up in the culture of the book need to look at "documents" in the main window of their digital reading environments. But they
want to create in the sidebar a retreat or cloister of bookishness.

In the end, though, that is too cloistered a view of the sidebar in advanced, research-oriented digital environments. Here, I come to my post-bookish conclusion. Riddle me this: what kind of “bookshelf” or “my library” in an online sidebar is able to transcend the passivity of a container or support structure to boldly go where no bookshelf has gone before—to trek actively in quest of the furthest galaxies of knowledge and beam them hypertextually back to the user? Just as the character Data in the series Star Trek: The Next Generation makes data an agent rather than mere object of quest (otherwise known as “search result”), so the “bookshelves” and “my libraries” of the new research online reading environments are a bit too lively, too full of semi-autonomous agency, to sit still like well-behaved bookish furniture or buildings. They exceed the constraints of outmoded metaphors that tell them to behave like a good shelf or library (not to mention the whole complement of bookish metaphors that digital humanists have been straining under, including such wildly inadequate notions as digital “archives” and “editions”). In general, there is an excess of agency in the sidebars of advanced online environments that causes them to overstep the bounds of the limited actions originally provided by Web sidebars: holding, indexing, organizing, and navigating. Like the door or speed bump in Bruno Latour’s analysis, the sidebar in today’s online environments epitomizes the kind of shared human/machinic agency that is the paradigm of actor-network theory (ANT) in science-technology studies.

In sum, the sidebar of bookish digital environments like Collex, OJS, and PreE is not a cloistered retreat. It is where the bookish are being drawn out by the new media to meet up (even “friend”) the unbookish now assembling in that very same sidebar. Consider the following blog post, which is emblematic of Web 2.0 (figure 8). The actual post in the main document window is minimal (and, in fact, does no more than link to a document elsewhere: “A good post on trust, gaming and social networking!”). The real action is in the sidebar that unfurls—as if from hidden dimensions—a long blogroll with links to other blogs in the relevant social universe.
Figure 8. Post of 4 September 2007 from Robin Hunicke's blog, gewgaw. The full, scrollable length of this post, including the whole sidebar, is here split in two for static display. (Reproduced with permission of Robin Hunicke.)
Clearly, what used to be the margin of the book and today is the sidebar of digital environments is not just bookish. That margin is where bookishness is meeting up with social computing. It is in social computing that the agency behind the greatest structure of knowledge today is collecting: not “bookshelf” or “library” but society. A study of books and bookishness adequate to the new media age, it may be suggested, will require reinventing the sociology of literature.

But that is the start of another tale (the essence, indeed, of the Transliteracies Project on online reading practices that I direct). Extreme or fringe scholarly digital environments such as CommentPress (an extension of the WordPress blog platform) have already tried to adapt mainstream Web 2.0 social applications for research purposes. Advancing further in the same direction, the Transliteracies Project is currently collaborating with the developers of PreE to add to their “professional reading environment” a full-fledged social-networking technology called ProSE (professional social environment) based on the unique premise that for the purposes of professional research there is no essential difference between dead and living people, with the consequence that the social network of knowledge must include the whole historical reach of authors, readers, and media forms as part of living agency—as the intellectual equivalent of “friends.” And, at the scale of library systems, the DELOS Network of Excellence on Digital Libraries has begun imagining what Rich Gazan calls (in his article of this title) “Social Annotations in Digital Library Collections.” The 2007 DELOS Digital Library Reference Model thus argues that the “digital library” has “moved from a content-centric system that simply organizes and provides access . . . to a person-centric system . . . Its main role has moved from static storage and retrieval of information to facilitation of communication, collaboration, and other forms of interaction among scientists, researchers, or the general public.”

But, again, those are all new tales to be told. The moral of the tale, however, is already clear: Books, and bookishness, can be new media to the extent that they are what they have always been: social media—even if all the discourses, practices, and institutions that once mediated expert and mainstream knowledge through the technology of the book today
require the invention of a new media technology beyond the end of the end of the book.

NOTES


3PreE (Professional Reading Environment), under development at the Electronic Textual Cultures Lab (ETCL), University of Victoria. Figure 4 shows a slide from a PowerPoint presentation by James Dixon, Angelsea Saby, Michael Elkink, Ray Siemens, Karin Armstrong, and Cara Leitch titled “Social Networking and Online Collaborative Research with REKn and PReE” (courtesy of Ray Siemens, Director of ETCL).


7I emphasize that I am here framing simplified hypotheses only, and my graphs are intended only to visualize those hypotheses. Experimental confirmation from usability research would only be possible if the terms of
study were made considerably more complex—so that, for example, operability is defined as some function (not just addition, as I simplify here) of scope, tractability, and other factors, each of which would then have to be defined more carefully as a configuration of subfactors and aligned with the standard terms and methods of usability research defined in such documents as ISO 9241-11, “Guidance on Usability” (part of the overall ISO 9241, “Ergonomics of Human System Interaction”), which addresses how to measure such usability factors as “effectiveness,” “efficiency,” and “satisfaction” for various usability objectives. (See ISO 9241-11, International Organization for Standardization, retrieved 26 July 2009, <http://www.idempiere.id.tue.nl/g.w.m.rauterberg/lecturenotes/ISO9241part11.pdf>.)

3At the lower end of structure, extra fields in a search form might thus let the user jigger an underlying database to re-sort Keyword in Context (KWIC) excerpts on a page (or similar-sized chunks of content made dynamically manipulable through Web 2.0 AJAX methods). And at the higher end of structure (collections and repositories), every mainstream environment gives a sense of an overall family of related resources—Google apps, iTunes Store products, Yahoo services, etc cetera.


5Online research environments of the sort I mention, for example, often allow the user to choose among databases, see and filter by more database fields or metadata, select from a fuller set of analytic tools (for example, the almost overwhelming variety of text analysis tools and task “recipes” in the TAPoR suite), et cetera. All these lower-end choices allow for iterative control over higher-end results in the kind of back-and-forth rhythm of experimentation that Willard McCarty theorizes under the rubric of “modeling” in his Humanities Computing (Basingstoke: Palgrave MacMillan, 2005).


informed by the works of scholars in the digital humanities fields, including, for example, Jerome J. McGann, *Radiant Textuality: Literature after the World Wide Web* (New York: Palgrave, 2001); and Johanna Drucker, "The Virtual Codex from Page Space to E-space," in *A Companion to Digital Literary Studies*, available online at <http://www.digitalhumanities.org/companion/DLS/>.

18Stallybrass, pp. 49, 47, 73–74. Stallybrass adds that the codex accommodated "the combination of the ability to scroll with the capacity for random access." Realistically, the codex was "a technology of discontinuity" (42)/(73).


