Human IT
Tidskrift för studier av IT
ur ett humanvetenskapligt perspektiv

Old Wine for New Bottles

Making the *Britannica CD* Multimedia Timelines

by Alex Soojung-Kim Pang

Abstract

Many authors see the development of new media as an event of great significance in the history of reading and writing. The works produced by commentators and theorists surveying the history and future of new media have several features. They assume that our ideas about authorship, copyright, and literary categories are at some level determined by the character of the printed word; and they believe that electronic works are as devoid of material constraints as printed works are defined by them. This article challenges both of these assumptions. It examines the making of multimedia timelines for the 1998 Encyclopaedia Britannica CD. The development process reveals that content, design, and programming are even more intimately connected in electronic media than in print. It also shows that literary genres developed in print can make the transition to new media, retaining their traditional functions and qualities even as they develop new properties and use.

Contents

---

1. Introduction

Everyone agrees that the development of multimedia and hypertext-- or new media, as the combination is increasingly called-- is an event of great significance in the history of reading and writing. The exact character of that development, however, is a matter of contention. Some commentators and critics draw a sharp boundary between printed and electronic publications. Books, this line of argument goes, are static and linear, freezing content in a specific pattern, and supporting outmoded ideas about authorship and author-reader relations. New media, in contrast, are infinitely malleable, fluid, and comprised of perfectly reproducible ones and zeros-- a kind of frictionless cognitive ether. CDs can present content in visually-dominant environments, while Web sites break the bonds of typographic convention and logocentric elite culture; both give readers the power to define their own paths through content, rather than follow the dictates of authors. [1] Opposite this school of thought and its trendy disdain for mere books is another group of writers who argue that contemporary structures of reading and understanding can persist in the digital age, and that there are as many significant continuities between old and new media as there are differences. This argument is built around the premise that while one can see many changes in authorship and writing in the shift from papyrus to codex, or from manuscript to printed book, there are also many things that remain stable or change very slowly. Indeed, the development of electronic publishing is but the latest in a series of technological shifts that include the invention of writing (and the shift from orality to literacy); the development of papyrus, parchment, and paper; the replacement of the scroll by the codex book; and invention of the printing press. [2]

The argument is not merely academic, nor are the implications confined to a segment of high culture. What is at stake is the future of print culture and the social institutions that have built up around or adjusted to books. Everything from modern notion of authorship, to the legal institutions of copyright and intellectual property, to the commercial world of bookselling, to the deeply subjective feeling of reading a favorite copy of Mansfield Park in a comfortable room could be affected by the fate of books. The most radical view holds that these all are endangered species. Copyright is impractical (and perhaps unenforceable) in an electronic world in which perfect copies of a work can be made at virtually no cost, and distributed around the world at the speed of light. The concept of individual literary works will be rendered archaic by a world that links all writing together in one vast, hyperlinked "docuverse." This digital New Atlantis will be the Roach Motel of the Author, who can no longer command payment-- or perhaps even much recognition-- for his or her work, and whose voice becomes part of a vast hypertextual chorus. It will also be a staging-ground for a revolution of the Reader, empowered by the capacity embodied within this new technological realm for interactivity, customization, and collaboration. No longer do you need to read the same end to Wuthering Heights or Moby Dick over and over again; instead, as Mark Leyner imagined, you could have a Mossad hit team blow up Heathcliff and Isabella in their carriage, or arrange a gruesome accident for the white whale. [3] Institutions like the library and university will fare no better. Instant access to the world's information will render libraries obsolete. The decentering quality of hypermedia will undermine traditional pedagogical models and render the professoriate redundant, while community colleges and universities alike will face stiff competition

from virtual institutions who can deliver instruction to (or from) anywhere in the world. For those who are passionate about books, literature, or the life of the mind (or who merely make a living in those trades) the question of whether the electronic world will conquer the realm of print is very important indeed.

Critics who forsee a world transformed by hypertext and hypermedia have some provocative ideas, and their predictions about the impact of hypertext on reading have already proved prescient. [4] But it has three critical features that are of particular interest here. First is the assumption that the electronic text is Word without form, that e-publications are as devoid of material constraints as books are defined by them. Second is the premise that the critical features of modern literature-- our ideas about authorship, copyright, the integrity of the written work, and familiar literary genres and categories-- are epiphenomena of print technology, and will not be able to make the transition to the digital world. Third and finally, the discussion has focused on "the future of the book" (to use the title of one collection of essays), with occasional attention to other canonical media objects, like film and photography. [5] But while books undoubtedly occupy the center of print culture, we live in a world supersaturated with texts, from newspapers to t-shirts to street signs, and all of them have the potential to be affected by the digitization of text, and to define how digital technology affects culture. Perhaps it is reasonable that no one laments the death of the parts catalog and inventory, frets over the digitization of technical documents, or worries about what the disappearance of the xeroxed course reader might do to the culture of the classroom. Still, there are useful things to be learned by looking beyond the center of a culture, and examining the fates of more marginal objects.

This article is a contribution to that history of marginal objects. Not only is it written with an eye to expanding our knowledge of the early history of digital media; I also hope to shed light on the questions of materiality and continuity in new media. It focuses on the development and use of an electronic version of an object very familiar to print culture: the timeline. I will focus on the timelines created for the Encyclopaedia Britannica's 1998 multimedia CD, the development of which I helped lead. [6] The history of the project shows how something developed for print can make the transition to the electronic realm, fulfill the traditional aims of the genre, and at the same time develop new ones. The article begins with a brief survey of the timelines genre. It then reviews the development of the Britannica CD subject timelines. [7] By closely examining the challenges involved in creating the timelines, we can see how technology, content, and design interact in the process of creating electronic content. This, in turn, will let us better judge the credibility of the assumption that digital content is devoid of a material dimension. It next compares how multimedia timelines function compared to their printed cousins. Even though multimedia timelines are complicated pieces of software, they fulfill admirably the purposes of printed timelines: the digitization of timelines marks the peak of the genre, not its end. At the same time, multimedia timelines develop a relationship with their accompanying texts that is quite different from what is possible in print.

(To the top)

2. Developing Britannica's timelines

Few forms of historical communication are as popular with general readers as timelines. Timelines have their origins in the tabulae and other visual representations that flourished during the Renaissance and provided readers with memorable outlines of the major branches of philosophy, theology, and history. The modern timeline appears to date from at least the Enlightenment, with projects like the Chart of Universal History and the Chronograph. [8] The Third Edition of the Encyclopaedia Britannica featured a hand-colored timeline of history designed by Adam Ferguson, professor of history and moral philosophy at the University of Edinburgh. Their popularity with encyclopedists and other general writers marks what appears to be a shift in the audiences who created and consumed timelines. Previously they were serious tools used by scholars for organizing their studies, but increasingly in the 19th and 20th centuries they became associated with pedagogical exercises and popular history. Today, they appear in textbooks, popular histories, slides and overhead transparencies, newspapers and magazines, and the thousands of chronologies and timelines published on the Web by students, amateur historians, and other nonprofessionals give powerful testimony to the genre's popularity. However, they are generally looked upon with disdain by academic historians, and are not used in scholarly monographs or articles.

So many different kinds of published objects are called "timelines" that it can be difficult to say with any specificity what a timeline is. The simplest timelines are little more than chronological lists of events. Others dazzle the reader with long lines, a broad palette of colors, and generous servings of pictures and tables. [9] At the very least, a timeline uses both text and graphics to communicate information about historical events or periods; very often it also uses spatial organization to provide yet more information. One of the most familiar type is arranged into a series of columns and rows (often representing civilizations, continents, or activities), subdivided into historical periods or dynasties. This allows for both synchronic and diachronic examination: one can see that the Egyptian New Kingdom and the Indian Aryan period both start in 1500 BC, or one can follow the history of China through two millennia. [10]

The Britannica CD timelines project commenced in the winter of 1996. [11] Its development has to be seen in the larger context of the company's history, and its efforts to produce its first low-cost multimedia CD. For the previous several years, Britannica had been weakened by a hard one-two punch. First, sales of printed encyclopedias had fallen dramatically as lower-cost multimedia encyclopedias appeared (indeed, this has proved to be a permanent, structural shift in the encyclopedia marketplace). Second, in this new market Britannica was seen as a laggard. Its first CD was much costlier than competitors' products, had fewer pictures and no video, audio, or animations, and was packaged with a dongle, a device to prevent copying. [12] The 1998 CD was going to signal that Britannica understood this new market, was prepared to compete seriously, and could produce multimedia as interesting as anything in the industry. Timelines were an important part of this strategy, as they had already been developed by competitors, and were seen by many reviewers and customers as de rigeur.

Several kinds of timelines were looked at in the project's earliest phase. The most intellectually ambitious was a world history timeline that would show the movement of peoples, rise and fall of civilizations, and other large scale events. Equally ambitious,

but for technical reasons, was a proposal to use a database of index and thesaurus terms to create "timelines on the fly" in response to user queries. (The notion of being able to say "on the fly" in press releases seemed especially appealing to Marketing.) The third proposal was the most conventional: to have timelines of various subjects, such as science, religion, technology, and the arts, viewed through an interface that let them be compared with each other. After experimenting with storyboards and estimating the amount of work required to produce each timeline, we decided that given time constraints it was best to concentrate on the subject timelines.

The work of creating the timeline engine-- the interface and tools that readers would use to access and manipulate the timeline data, and the underlying software that would sort and deliver the data-- was assigned to Tim Girvin Design, an advertising and multimedia development group based in Seattle. (Girvin would also work on creating a new look and feel for the CD, replacing the Web-like, Netscape Navigator interface of earlier versions.) The work of integrating the feature into Britannica CD was given to the Advanced Technology Group, a division of Britannica located in La Jolla, California. Editorial control over the content itself-- the choice of subjects, and the content of the entries-- remained in Chicago, at company headquarters.

Working from a set of basic functional specifications determined by Britannica, Girvin unveiled a preliminary design in May, 1997. At the center of the screen were two columns, each divided into five cells, which would contain the timeline's text entries and illustrations. Above each column was a pull-down menu which readers would use to select a subject. Entries from the two subjects would be displayed in chronological order: if subject A had entries for 1500, 1550, and 1600, and a subject B had entries for 1510, 1540, and 1590, the timeline would display A, B, B, A, B, A. A smaller third column, set between the two content columns, displayed the dates of events. This arrangement made it possible to compare what was happening in two different fields, and to see how developments in one might have influenced the other. Readers who didn't want to follow a comparative approach could leave the right column blank. (Mention of the same event in more than one timeline could show that important events have consequences that transcend individual fields.) On the far left of the screen was a slider bar and time scale, which readers could use to move backward and forward in time. Finally, the entries were hyperlinked to articles in the main Britannica CD database. For example, a reader who wanted to know more about the 1543 publication of Nicolas Copernicus' De Revolutionibus (mentioned in the science timeline) could click on the entry, and a pop-up window would appear over the timeline, containing the biography of Copernicus.

As with any software development project, this one had its share of challenges. The engine was written in Shockwave, a programming language developed by Macromedia. At a size of 4 MB, the timeline engine-- which controlled the interface-- pushed the envelope of the language's capabilities; having the basic engine operating on the edge meant that we couldn't count on being able to find programming solutions to other problems later. The timelines' content had to be developed in a very short period of time (by encyclopedia standards, anyway): about 60,000 words were commissioned, delivered, edited, and fact-checked in a few weeks. [13]

The program's specifications changed as programmers got to work. The pop-up

window, which was easy to imagine but proved fiendishly hard to program, was scrapped midway through development. In the final version, clicking on an entry called up a full-screen version of the article that replaced the timeline. Another early change strongly affected the content. The programmers concluded that it was imperative to have the timeline work only with discrete dates, rather than with ranges of dates-- i.e., 1939 rather than 1939-45. Combining ranges of dates was fiendishly complicated from a technical point of view, and was proving a challenge for the artists as well; but it meant significant revisions to the text. "Events," after all, can include things that happen in an instant (Mark McGwire breaking Roger Maris' home run record), are of a few days' or weeks' duration (D-Day or the Scopes Monkey Trial), or unfold over decades or centuries (the Renaissance, the Han Dynasty). The decision to program the engine to only accept single dates effectively hard-wired into Britannica's timelines a strong preference for discrete events (battles, historical "firsts," discoveries) over more amorphous ones. From a project management standpoint it was extremely wise, but history is much more than a chronology of firsts. Many of the most important historical events, like the Middle Ages or Scientific Revolution, don't have clear starting- and end-dates, and professional historians recoil at attempts to identify "exactly" when an historical age begins. Now, however, such events had to be represented not by a range of time, but through representative dates. One could not have an entry that talked in general terms about early Christianity between 100 and 500 AD, or the Age of Exploration, or the Industrial Revolution. Instead, it was necessary to use particular events-- the founding of Monte Cassino, Vasco da Gama's first voyage to India, and Matthew Boulton's invention of the steam engine-- to suggest these movements' character and extent.

Design choices forced additional limits on the length of entries, just as programming decisions led to the requirement that entries be confined to specific dates. One early issue was whether pictures would appear in the timelines alongside text entries. To a company traditionalist, having pictures illustrate only a few words might have seemed like a terrific extravagance, but the perception that Britannica's was the least multimedia-rich of the CD encyclopedias on the market, and a sense within company that "multimedia" was synonymous with lots of pictures, made it impossible to conceive of timelines that were not heavily illustrated. (Buying pictures in bulk, rather than one at a time, would also save time and money.) Ideally, one picture would be visible at any time; however, since the placement of pictures was defined by the ways timeline subjects worked in combination with each other, and since there were 45 different possible combinations, this was virtually impossible to guarantee. We finally concluded that having 50 pictures in each timeline-- 450 pictures overall-- gave us a good chance of having illustrations appear almost all the time. (To give some perspective, just over twice as many pictures were acquired for the 12-volume Micropaedia in the preceding decade.) The pictures had to be fit onto the main screen, which meant further scaling back on the text entries; after experimenting with screen size, fonts, and point sizes, the designers settled on a cell size that limited each entry to 200 characters, spaces and punctuation included. This worked out to about 25-28 words, or 2 to 3 short sentences: not enough to do anything more than a summary of an event and quick indication of its importance.

The creation of content meant only for electronic publication and reading raised issues of style as well as substance. Several timelines had multiple entries on individuals who

made several outstanding contributions to their fields, such as Beethoven or Newton. Other figures appeared in more than one timeline: Avicenna and Darwin appeared in the timelines of religion and science, Michelangelo and Vladimir Tatlin in architecture and visual art, Ptolemy in exploration and science. Traditional Britannica style rules (which could rival English canon law in their complexity and reliance on ancient precedents) dictated that a person's name be given in full the first time they were mentioned in an article, but only the surname in subsequent citations. Shouldn't that rule be applied to timelines? a copy editor asked. Maybe; but what constituted the "beginning" of the timelines? There was no implicit hierarchy to the subjects: science is not prior to architecture, nor does religion precede literature. Readers could look first at whatever subjects they wanted, and move through the remainder according their own interests. Within any individual subject, they could move forwards or backwards from any preferred starting date (or for that matter, one chosen completely at random). We could not guarantee that readers would start in one place, or with a particular subject. Our style rules, it turned out, depended on the implicit but absolutely critical assumption that we had complete control over how our content would be read, that we defined what constituted something as fundamental as the "beginning" of an article. The timelines offered a small but disturbing glimpse of a future in which that control could no longer be taken for granted. (I decided to use full names throughout.)

The routine conversion of the content as it moved from the author's hands to the program brought other problems. Our nine authors all used different (or different versions of the same) word processors, and their files had to be converted to a standard format. Once delivered to Girvin, they had to be "poured" into a Shockwave-compatible format that could be read by the timeline engine. Each change of state required review and cleanup, as italics disappeared, special characters turned into gibberish, and garbage characters appeared. The process had to be repeated several times, as the entire project evolved, content specs changed, and revisions were made to the master files in Chicago. In addition, the files acquired greater structure as they moved from first to final draft. Each timeline had about 250 entries, and each entry had up to five elements: the date, the text of the entry, a hyperlink to an article, a thumbnail picture, and a link from the thumbnail to the full-size picture. Managing this combination could only be achieved by turning relatively plain, flat text files into complex tables of text, images, and links.

The history of the Britannica CD timelines development shows that content, design, and technology are intimately connected at this stage in the history of multimedia.A change in the design can have an impact on programming and content: the need to incorporate pictures into the timeline raised challenges for programmers, and put limits on the space available for text. An alteration in the program could could have an impact on the content and design, as the decision to program the timeline engine to handle only discrete dates showed. Indeed, this example suggests that electronic content is even more strongly affected by software and design than printed books or magazines. Changing the typeface or layout of a book might reduce (or increase) the number of words a writer has, but it doesn't affect the way they can approach a subject. The switch from ranges to discrete dates, in contrast, definitely affected how the timelines represented history, and created a serious challenge for the writers and editors. Far from being a frictionless liquid poured into a single "metabottle," to use John Perry Barlow's evocative image, multimedia is more like the Tower of Babel, a meeting-place

that brings together workers of varied backgrounds and expectations, and a marketplace bringing together content in a vast number of different forms, languages, and standards.

This malleability and interconnectedness sometimes even made it difficult for participants to agree whether something was a "technical" problem, a "design" issue, or a "content" problem. For example, like all multimedia developers we worried constantly over loading speed. But performance could be improved in several ways: by rewriting the engine so that it was smaller and leaner, by getting rid of the pictures, or by reducing the text to a bare minimum. Likewise, a greater density of pictures could have been achieved by increasing the total number of illustrations, by more firmly fixing the way subjects appeared on the screen, or by cutting all the entries that couldn't be illustrated. The first was difficult to sell because of budget constraints; the second would have undermined some of the feature's interactivity; and the third was vigorously opposed on editorial grounds, since some of the hardest subjects to illustrate were also the most important. As should be clear, under these circumstances defining a problem one way or another was something of a political process. Representing a problem as "technical" made it the responsibility of programmers (which was good if you were a designer or editor). But this process was a two-edged sword: with responsibility sometimes came power, power to force changes in someone else's work, power to extend the schedule, power to get a new feature or suppress a troublesome change.

This process of negotiation is further complicated by the fact that programmers, artists, and editors bring a variety of skills and perspectives to the development process, and have very different ideas about what constitutes a good product. Using the metaphor of "teamwork" to describe multimedia development is somewhat misleading, as members of a team have similar backgrounds, play by the same rules, and have a common sense of what constitutes winning and losing. A similar diversity exists in multimedia itself, whose apparent seamlessness of text, image, and program is a piece of artifice highly dependent on human skill. Just as the most natural-looking scientific illustrations depend on artistic skill to erase the evidence of their human origins, and early Bauhaus designers needed skilled artisans to turn out models of furniture and housing that looked machine-made, making multimedia work requires tremendous investments of human energy, careful planning, and attention to detail. [14]

(To the top)

3. Electronic versus printed timelines

French cultural historian Roger Chartier makes the case in his The Order of Books that the meanings of texts can change as their formal qualities change, and as they are transferred from one literary form to another. The development of word spacing and adoption of modern forms of punctuation in the Middle Ages, and the increased use in the early modern period of paragraph breaks and indentations, Chartier notes, all had an effect on the ways people read books. [15] The impact of other innovations are even more striking when one examines specific texts. Peter Burke, in The Fortunes of the Courtier, showed how the addition of indexes, summary headings, and other organizational tools to various editions of Baldassare Castiglione's The Courtier

facilitated readings that shifted attention away from the witty dialogue that treated concepts of courtly life and behavior, and treated it more like an instruction manual on good manners. In a similar vein, John Locke decried the addition of verse numbering in the Bible, on the grounds that it would encourage schismatics and DIssenters to read the Good Book not as a book, but as a set of individual lines, a sort of commonplace or collection of aphorisms. Such a reading would give aid and comfort to heretical enemies, who would have an easier time finding in their Bibles specific passages to support their causes, and a harder time seeing the grandness and theological integrity of the whole. The move from print to digital publication is larger than any Chartier discusses, but the same basic questions one might ask of the history of early modern books can be asked of timelines as they move from print to electronic environments. Indeed, we can learn much by comparing how each is read: how the electronic timeline fulfills roles developed in print; and how it develops new functions in the electronic environment.

Since their invention and throughout their use in print, timelines have been created to serve several purposes. First, they are a form of entertainment. Whatever pedagogical and explanatory functions they may have-- and they can be considerable-- timelines have to be interesting to readers in ways that books (or more accurately, narrative texts) often are not. This helps explain their tremendous popularity on the Internet, and has been one of their defining qualities since the eighteenth century. Timelines also serve as pedagogical and mnemonic devices. Those timelines concerned with specific events or lives provide a visual means of remembering chronologies-- say, that Bach lived before Beethoven. Timelines dealing with longer historical periods present patterns and categories that readers can use to organize their understanding of, and provide context for, specific events or facts. Just as maps or diagrams sacrifice detail for the sake of structural clarity, eliminating specifics to reveal and highlight the big picture, timelines provide frameworks for remembering chronology, for placing specific events in larger contexts. This can work with or without reference to specific supporting texts: the fact that the 18th century chronograph was a stand-alone device was probably intended to make it more appealing to a wide variety of readers, who may have already had favorite history books and didn't need another.

Multimedia timelines succeed admirably as entertainment, and have proved themselves well suited to provide the same kind of mnemonic and contextualization functions as their printed counterparts. There are lots of eye-catching colors, lots to interact with (buttons, hot-spotted areas, preferences, pull-down menus, etc.), and new and unexpected things to learn. Readers of the Britannica CD timelines can alter the settings, move backward and forward in time, and move between timeline entries, pictures, and articles. A printed timeline also offers the puzzle of figuring out how it works: readers have to decode the artistic and intellectual rules behind its design to use it properly and understand its content. Multimedia and game designers have rediscovered this principle: part of the pleasure of exploring the CD version of The Way Things Work or Myst rests in discovering how the environment works, figuring out how to navigate through it, finding hidden features. Timelines fit easily into such a regime, and allow designers and viewers to apply already-developed skills at problem-building and -solving. (Indeed, they can be too entertaining for some historians, who worry that they are more distracting than informative, and that the entertainment value of the artifact will not spark an interest in real history. As a former history professor,

this was a prejudice I shared at the outset of this project.)

But when made electronic, and when integrated with an encyclopedia's database, timelines also take on new roles they didn't play-- indeed, which hardly existed-- in print. They become navigational tools, defining a path for readers through an article database, and helping them move in an orderly manner from one article to another.

One of the biggest problems confronting users of electronic publications is the absence or ambiguity of cues to organize their attention, refine search strategies, and find the content they were looking for. Deprived of page numbers and the ability to scan adjacent columns and pages, it becomes harder to tell where you are in an electronic article, especially a long one. Without some kind of overview, it's hard to be sure that the articles returned in a search constitute the most relevant materials available in that publication on a subject. (Encyclopedia readers even miss the highly subjective indicators that printed encyclopedias give of their overall size and complexity: the amount of shelf space an encyclopedia takes up is an imprecise but familiar measure of the amount of information it contains.) Tools for navigating electronic content-- for determining where you are and knowing how to get to some other place-- are, for all their technological sophistication, still pretty crude. They lack the intuitive character of page numbers and tables of contents (which aren't really intuitive, but so well-known as to be second nature), and often do not enlist familiar metaphors to make them more user-friendly. [16]

Timelines provide a means for navigating through at least part of the content of the encyclopedia. Britannica CD's multimedia timeline subjects provide a filtering and ordering device, a selected list of key article that effectively filters and orders a section of the database, while the hyperlinks provide readers with direct connections to articles. They bring together, and provide easy access to, a body of essential articles on a specific subject. Because they're hand-picked, their relevance is guaranteed, and once readers discern the editorial rules governing the kinds of articles that individual entries link to, it becomes fairly easy to figure out what kind of article will be at the other end of a link, and whether it's worth reading. After a little experimentation it becomes clear that an entry describing the invention of the steam engine will link to an article on the steam engine, not to articles in which the word "steam engine" appears (e.g., thermodynamics, mechanics, coal mining, or James Watt). In this case it isn't just the functional novelty that makes timelines valuable: the fact that they can put to use familiar visual cues and metaphors is what makes them work so well as navigational tools. Multimedia timelines represent what consultant Geoffrey Moore calls a "potential product," a high-technology product whose important properties are defined not only by its producers, but by imaginative users as well. [17]

This is not to argue for technological determinism, to claim that the simple fact of the multimedia timelines existing on a screen rather than the printed page accounts for their functioning the way I describe. The careful use of hyperlinks to the article database are what turns the timeline from an electronic curiosity into something truly useful. A timeline identical to Britannica CD's, but without an immense legacy database behind it, would be a very different thing. [18] Navigational instruments require not only points of reference, but places to direct users to and from; hyperlinks serve the first purpose, and the article database the second.

Timelines are not the only objects developed in print that have successfully made the transition to electronic media, and which have evolved to incorporate new functions and roles. Hotspotted maps can play a role similar to timelines. An electronic map of France that displays physical features or cities, and contains embedded links that connect the words "Seine" or "Paris" or "Normandy" to articles about those places, becomes something more than a visual representation of a physical place. It acquires a second life, or a second layer of signification, as a representation of a body of knowledge, an orderly collection of articles about the things on the map. In the cases of both timelines and interactive maps, a great deal of their power comes from the way they take familiar objects and give them new functionalities that seem to build on their existing properties, and capitalize on knowledge that readers already possess. Looking beyond the realm of encyclopedias, one can find a number of objects-- textual as well as visual-- that have successfully made the jump from print to electronic, and have also developed new services in the process. Online classified ads, for example, become easier to use with search engines, keywords, and filtering. The other great service online ads provide is an unprecedented access to information in other cities. Of course, this isn't a virtue that everyone needs-- someone in Minneapolis in the market for a used guitar may not have much to gain by searching classified ads in Phoenix-- but for people relocating to a new city, Web-based housing services and apartment listings make it possible to conduct a housing search in ways previously difficult, if not impossible. The addition of floor plans, virtual walk-throughs, and photographs-- which were either too costly or technically impossible to provide in print-- add more value to the service. Likewise, career sites that combine traditional want ads with other services. Like classified ads, they are national and even international in scope, making it possible for job-seekers in Wisconsin or Georgia to look for jobs in Washington or California (or both states, and Colorado and Utah as well). [19] Eventually, such Web sites may come to constitute a "marketspace," bringing together buyers and sellers of labor in an electronic bourse. [20]

All of these cases represent successful examples of relocating printed genres to the digital world. Each works well not because it is dramatically different, but because it does its traditional role better than in print, and adds new functionalities. Multimedia timelines fulfill the traditional roles of their printed ancestors, and Britannica's subject timelines also serve as navigational devices through the article database, providing an easy-to-follow path into the black box of the encyclopedic corpus. Moving back and forth within a multimedia timeline is easier than in print; with enough attention to design and navigational features, it's possible to jump across millennia, or across volumes and letters of the alphabet, without getting lost.

(To the top)

4. Conclusion

In Remediation: Understanding New Media, Jay David Bolter and Richard Grusin articulate a theory of the history and character of new media. [21] Since at least the Renaissance, they argue, the history of "new" media-- whether oil painting or engraving, photography, film, or the World Wide Web-- has been intimately, and inevitably, linked to the history of earlier media through a process they call "remediation." This

relationship exists on several levels. In many cases, aesthetics and artistic standards developed in one medium serve as the rules for another: the first movie versions of plays features single cameras pointed at a stage, while musical recordings tried to sound as much as possible like live performances. New media could also combine parts from various predecessors: Gothic cathedrals, for example, blend glass, sculpture, masonry, tapestry and wood-carving. Remediation is often carried out in the name of reforming older media: making still pictures move, for example. Computers can also employ strategies other media cannot: in particular, by using interactivity and giving viewers a greater degree of control over what and how they see, multimedia and games heighten viewers' feeling of immersion and immediacy.

Multimedia timelines are paradigmatic examples of remediation. Timelines enjoy enduring popularity in print: they appear in everything from newspapers to textbooks to science fiction series. Through their history, they have borrowed from other art forms, appropriating-- remediating, as Bolter and Grusin would say-- visual conventions and symbols freely (one 18th-century timeline even used the shorthand of astrological and alchemical symbols to represent the qualities and personalities of famous people). In recent decades have incorporated photographs and video stills, and have themselves been remediated onto the walls of museums and classrooms. Multimedia developers have sought to capitalize-- or leverage-- on their popularity, and nowhere more aggressively than in electronic encyclopedias. At Britannica we wanted to create a timeline that did all the things print timelines did, and more besides: the project was steeped in the rhetoric of media reform. To paraphrase Lenny Nero in Strange Days, our objective was to produce something like timelines, only better.

The logic of remediation also helps explain the consequences for readers of one of the programming decisions I described earlier. As I explained, the original design specified that when a user clicked on a timeline entry, an article would appear in a pop-up window. This feature was dropped in development, though both the interface designer and I argued strenuously for keeping it. I thought solving the problem was important enough to call for extra programming effort, or even a slip in the schedule-- always a politically risky position to take in the intensely competitive and schedule-conscious world of multimedia development. There was never any question that it would still be a great product; so why take such a position? The pop-up window provided a degree of seamlessness that would have contributed greatly to a sense of the timeline being less an object than a kind of space, a place readers went to rather than a thing they manipulated. (In the pecking order of new media spaces are almost always cooler than mere things.) Though we didn't phrase it this way, we wanted to create an interesting, functioning environment that, drew on readers' previous experience with timelines and computer games to seemed logical and intuitive. It wouldn't be "real" in any sense, any more than a computer game or science fiction world is real-- which is to say, plenty real. The timeline offered readers a high degree of choice and interactivity: they could choose topics and time periods, scroll backwards or forwards in time, jump by millennia, and follow their interests from entries to articles. The fact that it was connected to a huge database of articles convinced us that using the timeline could be an intellectually serious-- or at least rewarding-- activity. Forcing readers to leave the timeline whenever they accessed an article-- in effect, at the most important instant of the user's interaction-- would violate the logic of the environment, and deny readers the power to stay in the timelines: indeed, it make the illusion of seamlessness impossible to

sustain. To borrow from Bolter and Grusin, a hypermediated space that you have to exit and reenter would be less transparent, less intuitive-- less real-- than one you leave only voluntarily.

This issue, and the larger history of the Britannica CD multimedia timelines development, shows two important things. First, the development process reveals how closely connected content, technology, and design are at this early stage in the history of the medium. This challenges the view of electronic content as infinitely replicable, malleable, and interchangeable. To the degree that these are possible, things external to electronic content-- like the use of common standards, and heavy investments of hard work by designers and artists-- are responsible. Second, electronic timelines show how new media can fulfill traditional functions of printed media. They succeed in being entertaining, memorable, and useful as explanatory or mnemonic tools. At the same time, they acquire an important new feature in Britannica CD, serving as a tool to navigate through the article database. The ability of new media to build on or remediate its predecessors is as clearly visible in the case of timelines, which stand midway between the textual and the visual, as with more canonical media like text, photography, and film. The assumption that there is a gulf between print and electronic culture is false at several levels: the new remediates the old, even as it struggles to improve upon it. The history of marginal, mixed-media objects can greatly enrich our understanding of how that process works, and give us a more complete picture of how the future of media will unfold.

(To the top)

About the author

Alex Soojung-Kim Pang studied history of science and technology and taught at several universities before entering electronic publishing. Between 1996 and 1999 he worked as Deputy Editor of the Encyclopaedia Britannica, where he directed content revision and multimedia development, and worked on a number of Web sites and CD projects. He is now a Senior Computing Systems Analyst at Stanford University, where he manages Roaring Mouse, a multimedia history of Silicon Valley.

Roaring Mouse, Stanford University, Stanford, CA 94305

(To the top)

Notes

* Acknowledgements: Thanks to Tom Panelas and Heather Pang for their advice and encouragement; and to the Britannica CD development team-- Linda Andries, Bob Ciano, Jeannine Deubell, Letricia Dixon, Ellen Finkelstein, Tony Green, John McVey, Barbra Vogel, and Karen Wollins-- for their work on the project. Author's address: *Encyclopaedia Britannica*, 310 South Michigan Ave., Chicago IL 60604; apang@eb.com (Back to the text)

1. George Landow, Hypertext: The Convergence of Technology and Contemporary Critical Theory (Baltimore: Johns Hopkins University Press, 1992; revised edition, 1996) and Jay David Bolter, The Writing Space (NJ: Erleben, 1992) are among the two most influential books arguing that books and electronic media are fundamentally different. (Back to the

text)

2. Michael Hobart and Zachary Schiffman, Information Ages: Literacy, Numeracy and the Computer Revolution (Baltimore: Johns Hopkins University Press, 1998); Frederick Kilgour, The Evolution of the Book (Oxford: Oxford University Press, 1998); James O'Donnell, Avatars of the Word: From Papyrus to Cyberspace (Cambridge: Cambridge University Press, 1998); Brian Winston, Media Technology and Society: A History (London: Routledge, 1997). (Back to the text)
3. Mark Leyner, Tooth Imprints on a Corn Dog. (New York: Random House, 1995). (Back to the text)
4. The pros and cons of this literature are discussed at greater length in Alex Soojung-Kim Pang, "Hypertext, the Next Generation: A Review and Research Agenda." First Monday (November 1998), available online at http://www.firstmonday.dk/issues/issue3_11/pang/ ; and Pang, "The Book is Here to Stay," American Scholar (Winter 1998), 139-141. (Back to the text)
5. Geoffrey Nunberg (ed.), The Future of the Book (Berkeley: University of California Press, 1996). The term "literary technology" is borrowed from Steven Shapin, "Pump and circumstance: Robert Boyle's literary technology," Social Studies of Science 14 (1984), 481-520. (Back to the text)
6. The fact that the names "Encyclopaedia Britannica" or "Britannica" refer both to a company and a publication can lead to some confusion. Therefore throughout this article the former will be referred to in plain text, while the latter is underlined. (Back to the text)
7. The timelines have been praised by reviewers: Ron White called them "the most helpful and attractive I've seen." White, "Know it all," PC Computing (January 1999), 123-24, quote on 124. (Back to the text)
8. Tabulae and the chronograph are discussed in Stephen Ferguson, "System and Schema: Tabulae of the Fifteenth to Eighteenth Centuries," Princeton University Library Chronicle 49 (1987), 9-30; Ferguson, "The 1753 *Carte chronographique* of Jacques Barbeu-Dubourg," Princeton University Library Chronicle 49 (1987), 190-230. My thanks to Dr. Ferguson for his generosity in sharing both his published and unpublished work. (Back to the text)
9. Examples of chronologies posted on the Web include Stephen Payne's timelines of World War II (divided into the Pacific and European theatres), "Christy's Garden of History," (www.smokylake.com/Christy/History.htm) and Jacqueline Dana's "Timeline of Irish History"(wwwvms.utexas.edu/~jdana/history/timelines.html). All three are the creations of students; none required high-level programming skill. (Back to the text)
10. An online example is Michael D. Gunther's timeline of art history (www.dc.infi.net/~gunther/tl001.htm), which has several horizontal bars representing a major civilization or cultural complex (e.g. Egypt, Greece, Rome, China, etc.). (Back to the text)
11. The detail for the following narrative is based on a notebook I kept of the project. It includes notes from meetings, telephone conversations, etc., as well as my own reflections on the state of the project as it was unfolding. (Back to the text)
12. The recent history of Britannica is discussed more fully in my "The Work of the Encyclopedia in the Age of Electronic Reproduction," First Monday (September 1998), available online at http://www.firstmonday.dk/issues/issue3_9/pang/ (Back to the text)
13. Software development is admirably described in Frederick P. Brooks, The Mythical Man-Month (Academic Press, 1997), a classic in the field; Stephen O'Connell, Rapid Software Development (Seattle: Microsoft Press, 1998); Edward Youden, Death March. (Back to the text)
14. The tension between realism and intervention is explored in Alex Soojung-Kim Pang, " 'Stars should henceforth register themselves': The Rhetoric and Reality of Early Astrophotography," British Journal for the History of Science 31 (1997), 177-201; and Pang, "Victorian Observing Practices, Printing Technology, and Representations of the Solar Corona," Journal for the History of Astronomy, 25 (November 1994), 249-274; 26 (February 1995), 63-75. (Back to the text)
15. Roger Chartier, The Order of Books (Chicago: University of Chicago Press, 1995); on word spacing, see Paul Saenger, Spaces Between Words (Stanford: Stanford University Press, 1996); on Casiglione, see Peter Burke, The Fortunes of the Courtier (Pittsburgh: University of Pittsburgh press, 1992). (Back to the text)
16. My thinking on this subject has been heavily influenced by Donald Norman, The Psychology of Everyday Things (New York: Basic Books, 1988). (Back to the text)

17. Geoffrey Moore, Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers (New York: HarperBusiness, 1991), esp. chap. 4. (Back to the text)
18. This is not confined to Britannica: timelines in some other multimedia encyclopedias, as well as products like David Macaulay's The Way Things Work (Dorling Kindersley Multimedia, 1995) perform the same function. (Back to the text)
19. For more on the online job market, see Gina Imperato, "35 Ways to Land a Job Online" (www.fastcompany.com/online/16/webjobs.html), Fast Company (www.fastcompany.com) 16 (August 1998). (Back to the text)
20. The notion of "marketspace" comes from Jeffrey F. Rayport and John Sviokla, "Managing in the Marketspace," Harvard Business Review (November/December 1994), 141-150. (Back to the text)
21. Jay David Bolter and Richard Grusin, Remediation: Understanding New Media (MIT Press, 1999). (Back to the text)

Return to Human IT 1/1999