Boats at Newlyn. Wood engraving by Alistair Bell

THE
ENDURING
PRINTED BOOK

Richard McKay

HE future role of books in a library workplace increasingly given over to online resources is not a new debate topic. Another familiar controversy, this one posed by campus administrators to library administration, is the question of the relative importance of servicing the print collection with dollars that could be better spent on automation. Automation spending is sometimes leveraged with matching funds from the institution, making computer spending seem even more attractive. Budgeting is a zero-sum game. Money spent on automated bibliographic resources can't also be spent on books and magazines. Justifying the expensive maintenance and upkeep of a print collection when faced with a corresponding expense for automation that accomplishes more new wonders each year can discourage a budgeting librarian from considering books and magazines to be as important a budget item as automation. This condition can affect the quality of an argument for funding for books and magazines. It can also encourage administrators far removed from the library and its concerns to denigrate print resources in favor of automation. It may even in a worst case encourage thinking that automation is able to do a better job of providing information than traditional print. Let's look at print technology in a new way, to arrive at a new appreciation of its continuing importance to our mission as librarians.

Our method is to predict future activity by looking at the outcomes of similar activities in the past. We assume coherence in the affairs that we observe, and that events, in their unfolding, will conform to knowable laws. Using this notion, for instance, it is possible for us to predict the behavior of atmospheric disturbances on other planets by our knowledge of the behavior of storms on Earth. This method of prediction based on comparison of a current trend with similar happenings in the past can be used to make reliable predictions about technology. In order to find our way in the seeming antagonism between the book and the computer, we will construct a theory that predicts how competing technologies will affect each other, test it by looking at model technologies of the past, and then use the theory to predict the relationship of current technologies to each other. We'll call it the theory

of terminal technology. The theory has three component ideas: That terminal technologies tend to resist change from competing technologies; and that new technologies that eventually supplant an existing technology tend, at their introduction, to imitate the technologies they supplant. We might express this idea by saying that predator technologies imitate their prey. Thirdly, a corollary to the theory is that new technologies tend to redefine the usefulness of the technologies they compete against. We'll see examples of this, and relate them to the situation between books and computers.

The Theory of Terminal Technology

To understand the theory of terminal technology we need to accept the idea that some technologies resist change brought about by new, competing technologies because of the simplicity and basic usefulness of their design, or their "terminality." The word itself suggests an object at or close to the end point, or terminus, of its design evolution. The design is at an end-point if, in our judgment, it doesn't require or admit of major alterations in order to improve what it does. Terminal technologies will fill some simple, basic need. They tend to be single-function, and give straightforward results. We can think of examples; for instance, pots and pans, fishhooks, knives, combs, rulers, vases, shovels, the stapler, coins, and scissors would be terminal technologies. Terminal technology tends to persist, or resist change. It may or may not be a coincidence that many terminal technologies happen to come down to us from antiquity, in some cases from the Paleolithic era, practically unchanged in design. They persist because of their terminality, or the basic usefulness and simplicity of their design. This persistence is a trait of terminal designs. Our general preoccupation with technology, especially electronics, blinds us to the scope of the contributions that old and useful designs make to our lives. For a better understanding of terminal technology, imagine that a skilled artisan from first-century Rome were to appear at your door asking for a tour of your house or apartment. Of course there'd be things that you'd have to explain carefully, for instance, the microwave, and many things powered by electricity, but there'd be other things he'd recognize right away. The things he'd recognize at once are highly terminal technologies.

Tree Group. Wood engraving by Caven Atkins

He'd probably not only be at ease with but actually recognize many of the tools you use constantly, certainly most of the tools in your kitchen drawers, and many of the tools in your garage or workroom. He'd never have seen your books, of course, but would understand their use and their importance with little prompting, even if he were illiterate himself. He'd understand their use because their design has a high degree of terminality. Books, of course, are straightforward technologies, obviously related to a basic human need to receive information and enjoyment.

Terminal technologies or designs tend to resist change despite the influence of new technology, and they resist change in proportion to their terminality. Think of what happened in the case of the microwave oven and pots and pans, for instance. We didn't throw out our pots after we bought microwave ovens; pots and pans are still too useful to us. The true impact of the microwave is that we can now choose when to use the saucepan. The microwave simplified food preparation, and coincidentally redefined our experience of pots and pans. Instead of being a sine qua non for the preparation of cooked food, they are now only necessary if we don't own a microwave oven. With the microwave easily accessible, we're more likely to turn to the saucepan for enjoyment, or to express creativity in the kitchen. Similarly, the VCR didn't supplant the movie theater, and the movie theater didn't supplant the live theater. In each of those instances, the old technology maintained its design and usefulness in the face of a newer technology. They were redefined by the newer technology, but not essentially changed by it, and the redefinition involved an increase in the leisure function of the older technology. We'll use the idea of newer technologies forcing a redefinition of an older technology to understand one of the outcomes of the effect of the computer on books.

Technological Upheavals of the Past

Now let's look at the theory of terminal technology applied to two technological upheavals of the past, the inventions of moveable type and the automobile. We'll understand the dynamics of the computer's impact on print technology by comparing the results of similar technological impacts that

have already occurred. Two of the most celebrated innovations of the past are the invention of moveable type in the 1450s and the invention of the horseless carriage in the late 1800s. Moveable type imitated the look of the existing technology almost exactly, and, as we know, displaced the manuscript copyist as a means of book production. The automobile also imitated the existing buggy design almost exactly, with the predictable result of displacing the horse-drawn vehicle as a primary transportation. According to our methodology, if the computer will have a similar power to displace existing technology that these inventions had, we'll expect the computer's relationship to books to be similar to the relationship that those technologies had with the technologies they displaced. Let's take a look.

Although moveable type was first used in book production in the early 1450s, hand lettering, or manuscript production, was still used in book production at the start of the sixteenth century. A common page format was two columns of *textura quadrata,* a script sometimes erroneously called "Old English," standard in books of the middle ages and early Renaissance. It became one of the hands of choice at the time because it permitted a relatively quick and uniform rendering of legible letters with styli, writing surfaces, and inks of uneven quality. The *textura quadrata* lettering, and its relatives, characterized the manuscript page. Early printed books retained the look of the manuscript, so that incunabula, or books printed within fifty years of the invention of moveable type, bear a more than passing semblance to the manuscripts whose technology of manufacture they supplanted. Compare a page of early printing with a page of manuscript, and note that in design they are often nearly identical. The new product had to resemble the old, or readers would have found the new product difficult to use. It would have been easier for the artisans cutting the type used in the late 1400s to chisel letters in the Helvetica or sans serif typefaces, as they have less surface space and are less angular than the old letters with their elaborate serifs. Had the printer chosen one of those typefaces and produced a book set in one of them, his readers would most probably have complained that the words were hard to read, because the letters were hard to distinguish from each other. As it happens, that is a comment modern readers are likely to make about *textura quadrata* and its kin. So new technology that has the power to

displace existing technology imitates the technology it displaces. In this case, the imitation was proportional to moveable type's power to transform calligraphy from a necessary step in the production of the book to an art that is today practiced chiefly for enrichment.

The early automobiles resembled buggies for a similar reason of convenience. In the late nineteenth century the premier mode of personal vehicular transportation was the carriage. Vehicle manufacturers had their production tools set up to make a wheeled vehicle pulled by a horse. The earliest prototype automobiles had to use the easiest available platform for their engines, and that was the carriage. Designing an innovative "dream car" was out of the question for early automobile designers, as there existed no manufacturing base to support any but an existing carriage design. So the similarity between the new technology and the existing technology was very nearly complete in this example. Almost literally, all that was missing from the horseless carriage was the horse. In this case the new technology imitates the existing technology it displaces so closely that, without the accompanying horse and its traces, it is difficult to tell the difference between a carriage and an early auto.

Books and Computers

Let's return to our examination of books and computers, and use the "terminal" idea that new technologies tend to imitate the technologies they change. We can say that computer technology mimics, to a certain extent, print technology. We have Web *pages*, virtual *libraries*, *PowerBooks*, and *bookmarks*, so we'll expect computers to affect books and libraries somewhat, but these are surface similarities. There is more dissimilarity than kinship between the book and the computer. Look, for instance, to the book's low power requirements, its low requirement for ancillary technology, its stability over time, its portability and the low technical demands it makes on its users. Computer technology doesn't mimic book technology to a great extent, so we suppose that it won't completely supplant it, but rather redefine its present use. Libraries and books have terminality in them, and that terminality will mitigate the extent to which they will be changed by computer technol-

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Old Barn with Windmill. Wood engraving by Leonard Hutchinson, c. 1935

ogy. Print's "terminalness" will help us predict the extent of the computer's influence on libraries and books. A highly terminal technology will resist outside change. We'll speculate on the extent of the expected change shortly.

Regarding the terminality of books, current humor can help us understand books' actual value. Who hasn't heard the line about how difficult it is to curl up in bed with a computer, or read one in the bathtub or at the beach? Humor's value in highlighting an overlooked truth is proverbial. Each of these quips emphasizes the terminality of the book. Even when it becomes easy to make notes in the margin of an electronic text, your notes will be irretrievable without technology of equal or greater sophistication than that in the machine you use now, and the software will need to be compatible, also. Anyone who's had problems using current software to access files even only a couple of years old can understand the trouble likely to accompany that enterprise. Books are good at transmitting information to a large audience, with very little dependence on technology for their success. The information in books remains intact, also, unaffected by distance or time. Books are simple to use, and don't require mastery of a complex skill set. Each of these conditions is an aspect of terminality, underscores the book's value as an information tool, and ensures its persistence as a technology.

Conclusions

New technologies, at least for convenience's sake, resemble the older technologies they eventually replace, as we saw in the case of the moveable type page imitating the manuscript. A powerful new technology also not only tends to imitate the old technology it eventually displaces, it affects older technology in another way as well. It will have a creative effect, not just a seemingly destructive one, on older technologies, because it will force a re-evaluation of the usefulness of the older technology, even when it doesn't supplant the older technology. This is what we saw happen with the microwave oven and pots and pans. The computer's power to redefine the book will be in proportion to its power to supplant it, and we already know that the book is highly terminal. The computer simply won't obliterate the book, and by the same token, it won't be significantly redefined, certainly not out

of existence, as the horse and buggy and the hand-lettered manuscript were. The effect of computers on books is more likely to be creative, as we saw in the instance of the microwave and the saucepan. Computers have already had a creative effect in helping to redefine the use of books.

Print resources will always be essential to the library, but will no longer characterize the library to the exclusion of electronic resources. Computer technology will redefine and narrow the use of print. For example, print will certainly still be the copy of record, or the archival copy, because of its terminality. Print copies will tend to survive, and a low-tech archive is more likely than a digitized one to remain easily useable in the distant future. The "leisure" aspect of books will probably increase, if we extrapolate from the effect of the rifle on the bow and arrow, for instance, or the effect of the microwave on the saucepan. A new technology's effect on the existing technology is to redefine it, sometimes redefining it so drastically as to challenge its continued existence. Often the redefinition has the effect of making the older technology into a leisure activity. The cap-lock rifle was a technologically sophisticated weapon before the mid-nineteenth century. It was made obsolete by the breech-loading rifle, the manually-operated bolt, and finally by the automatic-loading rifle. Yet we may still buy a muzzle-loading rifle today, although we must go to a sporting goods store to do it. It was once high technology, and it was redefined by competing technology into an instrument of leisure. Other persuasive examples from our experience might be chosen; for instance, the sailboat, the fountain pen, the kerosene lamp, and the candle. Each was once a daily necessity now used, when they are used at all, for enjoyment. We can see a hint of this dynamic in the content of bookstores. They trade mostly in enrichment and enjoyment, not workplace tools. Think for a moment of what your reaction would be on being shown a new acquaintance's bookshelves. Even without looking carefully at the titles it would be a safe bet that the books dealt in one way or another with some aspect of the liberal arts and, perhaps, certain of the social sciences, and that the books were leisure reading pursued for intellectual cultivation, and not job-related.

For those who doubt that there is much of a future for print media, remember that books have a lot of terminality to them. They hold a message,

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literally as well as figuratively. A book printed in the late fifteenth century is five hundred years old, and is still as good a tool of information storage and retrieval as it was when first printed. The book will persist. It's a terminal technology.

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Boats. Linocut by Julius Griffith, 1933