The Stories of Possibility

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THERE ARE THREE things that future generations may never experience: the smell of books, the sound of a computer, and the sanctuary of privacy. And, as computer scientists, it's our fault.

Bibliophilia

Back in Colorado, my all-time favorite bookstore is the Tattered Cover, one of the few independent booksellers left in America whose business is still thriving. Blackwell's in Oxford, Malaprop's in North Carolina, and Rizzoli in New York City are a few of the others around the world where I've spent many an hour roaming the stacks until a book would find me. I have a particular affinity for the Tattered Cover: a few years ago, it successfully resisted the release of a list of customers' purchases to law enforcement, based on First Amendment rights. This is a bookstore with a solid moral center.

For me, a bookstore is more than just a storehouse of information; it's a sensual experience. When I first enter one of these stores, I'll pause and draw in a deep breath, taking in the scent of leather and paper and bindings, all whispering the stories of possibility.

Now, I'm admittedly old school when it comes to books: you can take my books away from me when you pry them from my cold, dead hands. I like to hold a physical book, because there's something about that form factor that cannot be reproduced in an electronic reader, especially if that book has considerable images in it.

This life choice does have consequences, however. My office is overflowing with books, and when I travel, it's always difficult to decide which ones to take and which ones to leave behind because physical books have a mass and therefore take up space and weigh a great deal.

My wife is decidedly new school. She'll mock me with my overflowing luggage containing just a few books in relation to her lightweight reader containing a few thousand books. I respect that. But then, I'll mock her back when the airplane doors are closed and the announcement is made to turn off all electronic devices, pointedly and loudly turning a page in my device-that-needs-no-electricity, also known as a book. Still, I know that my smugness is fleeting; it's likely that the FAA will change its draconian rules about such devices, and so I'll have one less edge in the books versus ebooks debate.

For me, a collection of physical books offers visual cues of possibility and association that don't yet exist in electronic books. It may take me longer to search for a particular passage, but the journey will lead me to things for which I wasn't even searching. Amazon Remembers aside, serendipitous connections are something that physical books easily provide but that electronic books have yet to master.

Still, I respect my wife's point of view. Being able to carry a large selection of the world's literature in your pocket is rather empowering. So, I know that I am among the last of a dying breed. A generation has been born that will never set foot in a bookstore, much less a library. They'll never know nor long for the smell of a book.

We of the generations who have created the technology that makes electronic books possible must take responsibility for this unintended consequence for the reader as well as for the industry of booksellers and authors. I suppose that the emergence of ebooks was inevitable. This is yet another example of how we coevolve with computing technology, and as such, I'm confident we'll find the right balance between the physical and the virtual.

Sound Cues

The sense of sound is also something that I miss, especially as a programmer. There are many memoirs from the days of the Colossus at Bletchley Park, or the ENIAC, or even the IBM 360, in which programmers would lovingly speak of

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the sounds of their machines and what cues those sounds would offer as to the execution of their programs.

Indeed, a considerable subculture of sound grew up around the IBM 1401. Built back when shielding electromagnetic emissions wasn't a major design consideration, the 1401 had the unintentional behavior of spewing out signals in the AM band. Computer operators took advantage of this feature by putting an AM radio nearby and listening to the sounds that signalled where their programs were in execution and when they had finished their run. (If you happen to be in Mountain View, Calif., visit the 1401 Restoration Project at the Computer History Museum, and you can hear it for yourself.)

I entered computing after the days of the 1401, but my personal machines had tape drives and large external hard disks of their own, so I could still tell what my program was doing by the sound of these peripherals. A particular pattern of whir-click-click-click-whir was as informative to me as a debug trace, because I could tell when my program was reading or writing to a file or accessing memory for some routine.

Virtual memory changed those subtle cues a bit, but at least I could get some sense of my program's activity. As disk drives got quieter, I might have had to place my ear closer, but I could still sense that something was happening. Even now, when my laptop is slow to boot, I'll listen for disk activity as if it were the very heartbeat of my machine. Sometimes, if my machine's fan starts running nonstop, I'll use other diagnostic tools to see what's the matter.

By the way—and speaking from experience—putting your ear down to your laptop while on an airplane can make the people sitting next to you very nervous. The advent of solid-state drives will change all this for my large machines.

Of course, our smartphones and tablets already merrily compute away in si-lence. In a way, these sounds of silence are also inevitable: our move from personal computing to ambient computing (www.wirfs-brock.com/allen/posts/74) is drawing us into devices that operate quietly in the very fabric of our lives.

Private Moments

And now the issue of privacy. I respect that this is an incredibly personal and emotional topic, especially in light of Edward Snowden's disclosure of what we all have suspected for some time regarding the existence of pervasive surveillance. Still, this loss of privacy may also be inevitable. Facebook's Mark Zuckerberg once declared, "Privacy is no longer a social norm" (www.huffingtonpost.com/2010/01/11/facebooks-zuckerberg-the_n_417969.html). Similarly, Google's Eric Schmidt has observed, "If you have something that you don't want anyone to know, maybe you shouldn't be doing it in the first place" (http://video.cnbc.com/gallery/?video=1372176413&play=1).

No matter where you land on the issue, the reality is that our sense of what privacy should be and what technology does to that sanctuary is changing. I entered the world with a strong sense of personal privacy; the current generation has entered a very different world and has different expectations.

One can make the case that the sense of privacy my generation expects is actually an aberration in the long history of humanity. Diana Webb, in *Privacy and Solitude in the Middle Ages*, traces the changing nature of privacy, observing that privacy as we know it today emerged as a consequence of the middle class of the middle ages, who had the time and the space to pursue more personal intellectual activities. The growth of cities led to the rise of anonymity, wherein one could preserve a bubble of privacy in an ocean of people.

History suggests that this sense of privacy was good in many ways, but there has always been a problem balancing anonymity and privacy. In a small community, everyone would know what everyone else was doing. This was good for public safety, but it also served as an inhibitor of innovation. The group quickly noticed strangers—or strange behavior—with the result that new things were embraced slowly.

The Web flourished partly because it permitted a new world of anonymity, but even that is changing. We now have the technology to build systems that never forget and that analyze the simple actions we take hundreds of times a day, connecting them in ways beyond our choice to create a remarkably accurate picture of who and where we are, what we think, and what we do.

Computing has simultaneously created the potential for unique forms of privacy as well as the technology to shatter it. How we shall evolve to attend to our sense of privacy is something that will take time for humanity to metabolize. But again, I'm confident that we will find a balance.

Earlier, I blamed all these societal changes on us, the makers of computing technology. Well, I accept that it isn't all our fault. But we must also accept that we have made these changes possible. Software is the invisible writing that whispers the stories of possibility to our hardware. It is these stories that will be told by—and that will define—the lives of future generations. ⬙

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