Blown to Bits

Your Life, Liberty, and Happiness After the Digital Explosion

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After the Explosion

Bits Lighting Up the World

In Greek mythology, Prometheus stole Zeus's fire and brought it from Olympus to Earth, along with the useful arts of civilization. Zeus retaliated for Prometheus's trickery by visiting upon humanity the ills and evils that beset us. We have been trying to make the best of things ever since.

The Prometheus myth is about technology. Technology, like fire, is neither good nor bad—its value depends on how we use it. And once we start using a technology, society itself changes. It is never the same again.

Information technologies spark a special kind of fire. Bits are the atomic particles of the information flames. With our information tools, we can do things, both good and bad, that we could not have done unassisted. For better or worse, these technologies enable us to think, reason, create, express, debate, compromise, learn, and teach in ways never before possible. They connect people across physical space, both in pairs and in groups. They extend the reach of our voices and the range of our hearing. They also amplify our capacity to frighten, harass, and hate other people, and to misrepresent ourselves to others. They enable us to earn and to spend money without going anywhere, and also to steal money from the comfort of our homes.

So central was Prometheus, the fire-bringer, to the Greek conception of humanity that in later retellings of the myth, he is credited with creating the human species itself. What changes to society will information technologies

yield, in a decade or two, when the ongoing digital explosion has unimaginable power?

We don't know, of course. But if things go on changing as they are changing today, there are likely to be dramatic changes to three distinctive aspects of human culture: our sense of personal identity and privacy, our capacity for free speech, and the creativity that drives human progress.

Privacy and Personhood

As the digital explosion was beginning, the struggle over privacy seemed to be a war. Individuals wanted to protect themselves from invasive forces. Institutions, both corporations and government, wanted the benefit of information that individuals would rather not reveal.

In actual practice, things have turned out to be much more complicated.

Technologies improved so that data gathering became easier and less annoying. Modest incentives induced individuals to sacrifice their personal privacy—often before they understood what they were giving up. Relatively few people today worry about stores keeping track of their purchases. Even without loyalty cards, a credit card swipe, together with bar code scans at the cash register, link a customer's name to his preferences in candy and condoms. You have to give up many conveniences to protect your privacy, and most people are not willing to do it.

The next generation may not even see the loss of privacy as a sacrifice. Socrates said that the unexamined life was not worth living, but people who have grown up with Gmail and MySpace may find life fully exposed to public view simply normal. As Sun Microsystem CEO Scott McNealy quipped: "You have zero privacy anyway. Get over it."

Yet getting over it is not so simple when social interactions happen through the computer screen. When most personal interactions were face-to-face or over the telephone, we mistrusted people claiming to represent our bank and trusted people we felt we had gotten to know. In the electronic world, we do the opposite—we trust our bank's web site with large sums of our money, but we have to be reminded that close electronic friends may be impostors. Where is the border for children between the personal and the public? Will we need laws about fraudulent friendships?

As electronic privacy becomes lost in the cloud of bits and caution gives way to social networking, what societal structures will break down? What will evolve to replace them? Society as we know it functions because of a web of trusting relationships between parties who are independently responsible

for their own actions. What will replace that if the concept of personal identity becomes meaningless? Will the very notions of privacy and identity be destroyed in the explosion?

What Can We Say, and Who Will Be Listening?

The digital explosion revolutionizes human communication. Earlier technologies for disseminating text, spoken words, and images also changed the world—but all included choke points. A million eyes might read your book, but only if you could get it published. You might discover a scandal that would bring down a government, but only if you could get a newspaper to expose it to public view. A million ears might hear your speeches, but only if you could control a radio station.

No longer are speakers bound by the whims of those who control the loudspeakers and printing presses. In the U.S., anyone can say anything, without permission from church or state, and be audible to millions. No one has to listen, but it is easy to put the message where millions can hear it.

An Earlier Information Revolution

It is the mother of revolution. It is the mode of expression of humanity which is totally renewed; it is human thought stripping off one form and donning another; it is the complete and definitive change of skin of that symbolical serpent which since the days of Adam has represented intelligence. —Victor Hugo, of printing (from *The Hunchback of Notre Dame*).

And yet there is a cost. Not a financial cost—web sites are cheap, and email is even cheaper. The cost is that the speaker relies on many intermediaries to handle the messages, and so there are many opportunities for eavesdropping, filtering, and censoring. The choke points have multiplied and become more diffuse, but they have not disappeared. The very technological miracles that have created the communication revolution have also created a big-brother revolution. With speech recognition and language understanding improving every year, we have to expect that, before long, every email, telephone call, blog, and television show may be monitored by the technological equivalent of a human listener. Machines will be waiting attentively for someone to say the "wrong" thing—whatever that is deemed to be.

Governments eavesdrop to protect national security, political opposition, and public morality. Communication companies want to listen to what their networks are being used for, so that they can tailor their service to the

content in the most profitable way—a soft form of corporate censorship, in which unwanted communications are slowed down or made costly. Service providers want to listen in so they can add advertising to the content they deliver.

In spite of the unimaginable expansion of communications over the past quarter-century, the jury is still out on whether speech will be freer or less free in the future than it was in the past, even in the U.S. with its uncompromising First Amendment. And like the tree falling in the forest, of what use will free speech be if no one is listening? The dramatic pluralism of our information sources threatens to create a society where no one learns anything from people with whom they disagree. It is simply too easy for people to decide whom they want to hear and to ignore everyone else. Will the digital explosion in fact make information more limited?

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A Creative Explosion, or a Legal Explosion?

In the same letter quoted in Chapter 1 Thomas Jefferson wrote, *He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me*. Will the digital explosion be used to enlighten the world, or to create illusions and to blind us to the truth?

The digital explosion has started a legal revolution. In the past, teenagers were not routinely threatened with federal criminal charges. Today, such warnings about downloading music and movies are commonplace. In the past, if a political advertisement included a few seconds of video of a candidate debating his opponents, he did not fear the wrath of the television network that broadcast the debate. But Fox News Channel went after John McCain in the fall of 2007 for doing exactly that. If you want to silence your critics under the new legal regime, you may threaten to sue them simply for showing that you said something. That's what Uri Geller, the "paranormalist," did when prominent skeptic James Randi debunked Geller's powers in a YouTube clip that included eight seconds of Geller's activities. Even universities misuse copyright law to stanch the flow of information. A widely reported public statement by Harvard's president (Figure 4.3) could not be shown in this book because the university denied the publisher's request to print it.

Patent and copyright laws in the U.S. were designed to promote individual creativity in the interest of the progress of society. The law struck a balance between providing financial incentive to the creator and high social benefit to the population at large. The term for which artists and inventors maintained exclusive control over their creations was designed to be long enough to provide a financial return and short enough to provide an incentive for continued creativity. And there was a high threshold on what could be protected at all, so that the system did not encourage lawyerly inventiveness rather than artistic and engineering creativity.

As mechanical tools have been supplanted by information-processing tools, and all manner of writing, music, and art have gone digital, the rules of the game have changed. The parties who receive the strongest protections are now major corporations, rather than the original creators or the ultimate consumers. At a time where information technology promises disintermediation—getting rid of the middle-man—those middle-men are becoming more powerful, not less.

The legal power of the powerful intermediaries, protecting their economic interests, has increased at the same time as new technologies have empowered the creators to reach their consumers directly.

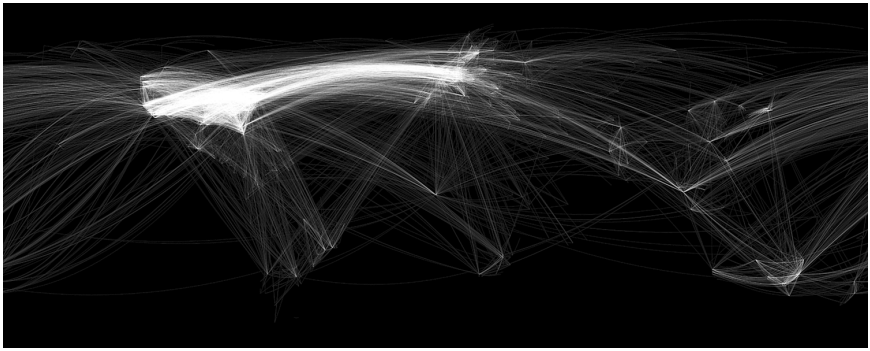
Similar tensions are visible in the world of invention. The antitrust actions against Microsoft by the European Union stem from a fear that a software monopoly will stifle the creativity that might be shown by other software creators, were they able to survive. The power of the incumbent radio and television broadcast industries to exclude newcomers from the airwaves restrains both speech and invention, limiting radio communications and keeping useful devices off the market.

Will the United States move toward being an information democracy or an information oligarchy? Whose hands will be on the controls that regulate the way we produce and use bits in the future?

A Few Bits in Conclusion

The worldwide bits explosion is lighting up the world (see Figure C.1). Most of the illumination today is in Europe and North America, but it is growing brighter almost everywhere. There is no physical reason it can't continue to grow. Bits are not like oil or coal. They take almost no raw materials to produce, and only tiny amounts of electricity. They flow through glass fibers in astonishing numbers, and they radiate through space, over short distances and long. With our cameras and computers, we produce them at will, in unintelligibly larger numbers every year. Existing dark spots—North Korea, for

example—may remain black for a time, but eventually even these regions may glow brighter. And all that data and thought-stuff, all those atoms of light, can be captured and stored on disk for eternity.



Chris Harrison, Human-Computer Interaction Institute, Carnegie Mellon University.
www.chrisharrison.net/projects/InternetMap/high/worldBlack.png.

FIGURE C.1 A map of the world, showing the number of Internet connections between routers. At present, the U.S. and Europe are heavily interconnected. If the volume of data transmissions were depicted instead (giving more prominence, for example, to areas with heavily used Internet cafés), Africa, Asia, and South America might show more prominently.

The explosion happened through technological inventions supported by political and economic freedoms. Gutenberg laid the foundation when he invented the printing press, and Morse's telegraph, Bell's telephone, and Edison's phonograph were all precursors. Claude Shannon was the bits Prometheus. After the Second World War, his mathematical insights lit the flame of communication and computing technologies, which have now illuminated the earth with bits.

The bits explosion is not over. We are in the middle of it. But we don't know whether it will be destructive or enlightening. The time for deciding who will control the explosion may soon be past. Bits are still a new phenomenon—a new natural resource whose regulatory structures and corporate ownership are still up for grabs. The legal and economic decisions being made today, not just about bits but about everything that depends on bits, will determine how our descendants will lead their lives. The way the bits illuminate or distort the world will shape the future of humanity.