



Transmitting know-how: A 4,000 year-old North African cave painting. Erich Lessing—Art Resources

The Web We Weave

We've had the Internet in many forms over the centuries, creating a collective mind that thinks faster and faster.

By

ROBERT WRIGHT

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In the middle of the 19th century, Ralph Waldo Emerson registered a lyric about the oppressive force of material goods: "Web to weave and corn to grind; Things are in the saddle and ride mankind."

Talk about your sensitive poets. If Emerson found such modest machinery as corn grinders dehumanizing, how would he handle the end of this century? Today we are more than ever slaves of technology, tethered to computers and cell phones and beepers. Meanwhile, we have to cope with unprecedented change. Things are riding us faster and faster.

And the more tethered we become, the faster things change, because the tethers are plugging people into the very social collaboration that drives the change. Science, technology, music, politics--flux in all these realms is hastened by the new electronic synergy. The Internet and allied technologies make us neurons in a vast social brain, a brain that keeps enticing us into making it bigger, stronger, faster. We have, you might say, a Web to weave.

What are we to make of all this in practical terms, philosophical terms, even spiritual terms? How to comprehend an age in which, suddenly, we find ourselves enmeshed in a huge information-processing system, one that seems almost to have a life of its own and to be leading us headlong into a future that we can't clearly see yet can't really avoid?

The first step is to delete the word suddenly from that last sentence. For this giant social brain has been taking shape, and hastening change, for a long, long time. Not just since Emerson's day, when the telegraph--sometimes called the "Victorian Internet"--made long-distance contact instantaneous, but since the very dawn of the human experience. For tens of thousands of years, technology has been drawing humanity toward the epic, culminating convergence we're now witnessing.

This fact is best seen from a perspective that flourished more than a century ago, as Emerson was fading from the intellectual scene. In the wake of Darwin's theory of natural selection, some anthropologists started viewing all human culture--music, technology, religion, whatever--as something that evolves rather as plants and animals evolve. "In the mental sphere the struggle for existence is not less fierce than in the physical," observed the British anthropologist Sir James Frazer. "In the end the better ideas carry the day."

Lately, this view, "cultural evolutionism," has been revived and given a new vocabulary. "Meme"--a word chosen to stress the parallel with "gene"--is the label for packets of cultural information: technologies, songs, beliefs and so on. Just as those genes most conducive to their own replication are the ones that prevail, those memes best at getting themselves transmitted from human to human are the ones that come to form the human environment.

From the very beginning, cultural evolution was a social enterprise, mediated by what you could loosely call a social brain. One person invents, say, a flint hand ax; the idea creeps across the landscape, gets improved here and there, and finally, in a distant land, stimulates a whole new idea: axes with handles conveniently attached.

That it took hundreds of thousands of years to get from hand ax to ax with handle suggests that as of 50,000 B.C., during the Middle Paleolithic, the social brain was not humming very vibrantly. There were only 2 million or 3 million "neurons"--a.k.a., people--scattered across the whole planet, and lacking fiber optics or even postal service, they weren't exactly in constant contact.

Still, even back then, the social brain, through positive feedback, was maturing. With each advance in subsistence technology, survival grew more secure, hastening population growth; and as population grew, the advances came more quickly. By the Mesolithic Age, around 10,000 B.C., with the neuronal

population up to around 4 million, the rate of advance had moved from one major innovation per 20,000 years to a sizzling one per 200--including such gifts to posterity as combs and beer.

It was around this time that, as the economist Michael Kremer has noted, Mother Nature happened to conduct an experiment that underscored the value of large social brains. Melting polar ice caps severed Tasmania from Australia and the New World from the Old World. Thereafter, just as you would expect, the larger the landmass and hence the population, the faster subsistence technology progressed. The people of the vast Old World invented farming before the people of the smaller (and, at first, thinly populated) New World. And the Aborigines of yet smaller Australia never farmed. As for tiny Tasmania, modern explorers, on contacting the Tasmanians, found them lacking such Australian essentials as fire, bone needles and boomerangs.

Farming, which took shape in the Old World around 8,000 B.C. and in the New World a few millenniums later, is a much misunderstood meme. Anthropologists sometimes call it an "energy technology," since food does, after all, energize us; but farming may have originally mattered more as a kind of information-processing technology. By radically increasing the human population that a given acre could support, farming sped up the synergistic exchange of cultural information, lubricating innovation; it packed lots of neurons together, raising both the size and the efficiency of social brains.

The results were epoch making. In both the New World and the Old World, within a mere 5,000 years of the inception of farming, there were dazzling technological advances, including monumental temples, big dams and, above all, a whole new information technology: writing.

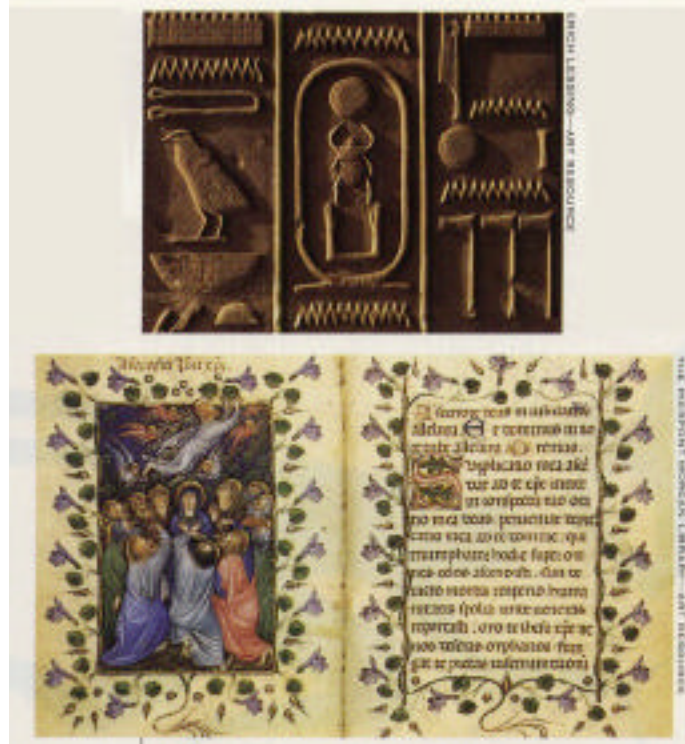
Early writing didn't spur invention the way writing does now. There were no technical journals to convey news of inventions, no patents to file. No, the main

service of writing, like that of farming, was to permit bigger, faster social brains; to allow neurons to be packed more densely still, further boosting intellectual synergy. After all, it was via writing that royal bureaucracies kept large cities functioning. And writing also meant clear, precise legal codes, which kept urban life peaceful, even though people now lived cheek by jowl with lots of other people who were neither friends nor family.

For example, the code of the Mesopotamian city of Eshnunna in the early second millennium B.C., developed a century before the more famous code of Hammurabi, left no doubt what would happen if you punched a man in the face: a fine of 10 shekels of silver (a bargain compared with the levy for biting off his nose, which would cost 60). As long as people could go about their business without fear of getting their noses bitten off, the social brain could productively throb.

As distant cities became linked through commerce (much of it orchestrated by written contract), culture acquired a kind of disaster insurance. Any valuable meme--the concept of the chariot or of coins--would spread so fast from city to city that it could survive any catastrophes that afflicted its birthplace. The world's data-processing system was getting better at making backup copies.

That's why so much Roman culture survived the disintegration of the Western Empire. The most prolific memes had long since spread to Byzantium if not beyond, and would keep replicating themselves even as Western Europe struggled to regroup. Thus the astrolabe would eventually be reintroduced to the area via Islamic culture, which thrived during the early Middle Ages. Meanwhile, in Asia, key memes would arise--the spinning wheel, even printing--and some would migrate all the way to Europe.



Slow Tech: Hieroglyphics and illuminated manuscripts nevertheless helped

The movable-type printing press, up and running in Europe by the mid-15th century, was by far the most Internet-like technology in history. Eventually, it would convey detailed news of inventions, allowing people in distant lands who would never meet to collaborate, in effect, on new technologies. "James Watt's steam engine" was actually lots of people's steam engine, including the Frenchman who had first shown that steam could move a piston.

The economic historian Joel Mokyr, stressing this sort of international synergy, has attributed Europe's Industrial Revolution to "chains of inspiration" by which one idea sparked another. But, as we've seen, chains of inspiration had been vital to the whole history of technical advance, even the glacial process by which the hand ax inspired the inventor of the hafted ax. What was new was how fast the chains were being forged, even across great distances.

In the early 19th century, the coming of the railroad train further sped things up. Paired with increasingly smooth local postal service, the train meant that people thousands of miles apart were separated by only days. With chains of inspiration sprouting wildly, the multinational technical community became an almost unified consciousness. Increasingly, good ideas were "in the air."

Witness how often the same basic innovation was made independently by different people in different places at roughly the same time. And witness-as testament to the impetus behind easing communication--how often those independent breakthroughs were in information technology itself: the telegraph (Charles Wheatstone and Samuel F.B. Morse, 1837); color photography (Charles Cros and Louis Ducos du Hauron, 1868); the phonograph (Charles Cros--again!--and Thomas Edison, 1877); the telephone (Elisha Gray and Alexander Graham Bell, 1876)--and so on, all the way up to the microchip (Jack Kilby and Robert Noyce, 1958).

And each such advance--by easing the transmission of data, whether by sound, print or image--only raised the chances of further advances. Via endless positive feedback, the technological infrastructure for a mature global brain was, in a sense, building itself. And so it had been, ever since the Middle Paleolithic: the story of humankind is faster and vaster data processing.

So where does this cosmic perspective leave us? Inspired? Depressed? As helpless in the face of technology's onslaught as ever?

For starters, if you equate nature with beauty--as Emerson and other transcendentalists tended to--then there is a kind of beauty in the unfolding of technology. It is a process of natural evolution, and may deserve the tribute that Darwin paid to organic evolution: "There is grandeur in this view of life."

Indeed, if you believe, as I do, that intelligent, culture-generating animals were a likely outcome of biological evolution, then you might even say the first

great evolutionary process naturally spawned the second, which has since taken over as the great molder of the material world. In this view, the kind of global brain now taking shape has been in the cards not just since the Stone Age but since the primordial ooze; it has been, in some sense, life's destiny.

This aura of inexorability has led some people to wax poetic about cosmic purpose. The Jesuit theologian Pierre Teilhard de Chardin, writing at mid century, long before the Internet, nonetheless discerned a "thinking envelope of the earth" that he dubbed the "noosphere." This was the divinely ordained outcome of the two evolutions, and would lead to "Point Omega," where brotherly love would reign supreme.



What end to the meme? Cybercafes are another link to the global brain.

Now, nearly a half-century after Teilhard's death, we have cause to be less sanguine about this noosphere business. Viewing the noosphere up close and personal--from the inside--we can see that its potential for good and evil is about equal. The Internet can unite people across distance, but it is indifferent to whether they are chess players, crusading environmentalists or neo-Nazis.

And, for all the benefits that keep us plugging into the Internet, it can be alienating. (Is it just me, or is e-mail a much poorer substitute for face-to-face contact than a phone call is? And if so, why am I letting e-mail crowd out my phone calls?) There is indeed the sense sometimes that, like neurons, we subordinate ourselves to the efficiency of the larger whole--that technology wins in the end, that culture trumps biology. As Emerson put it, "There are two laws discrete, Not reconciled,--Law for man, and law for thing; The last builds town and fleet, But it runs wild, And doth the man unking."

Yet, in the end, we are free to use the technology however we want, even if it takes real effort, inspired by a touch of resentment toward our would-be technological master. We can in theory follow Emerson's advice: "Let man serve law for man; Live for friendship, live for love." Maybe all along it was the destiny of our species to be enmeshed in a web that would give us the option to exercise either amity or enmity over unprecedented distance, with unprecedented power. There are worse fates than to have a choice like that.

Robert Wright is the author of *The Moral Animal*. His new book, *Nonzero: The Logic of Human Destiny*, comes out January 2000.