

The Selfish Bit

Do we rule information, or does it rule us?

BY DAVID SHENK

IN 1848, ON A TOUR OF EUROPE, RALPH Waldo Emerson met, and was taken with, the restless English mathematician and inventor Charles Babbage. He learned of Babbage's ambitious plans for his "Difference Engine" calculating device and its symbolic processing successor, the "Analytical Engine." These were enormous and intricate machines—or, rather, plans for such—requiring innumerable customized gears and pins that, when fit together, would perform fantastic calculations at an inhuman pace. While neither machine could actually be built in Babbage's era, their conception uncannily anticipated the creation of digital computers a century later. In 1870, a year before Babbage died, Emerson wrote of Babbage's work and its import: "Steam is an apt scholar and a strong-shouldered fellow, but has not yet done all its work. . . . It is yet coming to render many higher services of a mechanico-intellectual kind."

Higher services of a mechanico-intellectual kind. It's a gorgeous phrase, partly because it hints at the nebulous space between what Emerson could see and what he could not even hope to see. This strange gap points to the first of three grand ideas in James Gleick's important new book, *The Information*. It is reasonably easy to look back in human history and learn how a string of visionaries laid the groundwork for discoveries that made possible future innovation. But, as Gleick reminds us, it is much harder for us to understand how their pre-innovation minds actually worked. As he writes, "Every new medium transforms the nature of human thought."

This is far from a shocking notion in 2011, but what Gleick does in this book, over and over again to a remarkably satisfying degree, is show exactly how it is true. How did the written word actually mark the beginning of logic and consciousness (and what was it like to think before logic existed)? How could the telegraph radically shift perceptions of time, space, and weather (and how did people consider the world before they had a sense of connectedness to other regions)? The book begins in the pre-literate age and marches through the most significant information technology leaps, helping us view each age through its pre-discovery prism.

Gleick devotes a fair amount of space to Babbage not simply because his is a pow-

erful story of curiosity and perseverance, but also because of Babbage's almost incomprehensible place in the time-idea continuum. He was so far ahead of his own era that he couldn't possibly understand the greater implications of his ideas. (Nor, of course, could anyone else: the English government terminated its support for the Difference Engine after ten years because it saw no potential use for the device.) "Babbage's interests," Gleick writes, "straying so far from mathematics, seeming so miscellaneous, did possess a common thread that neither he nor his contemporaries could perceive. His obsessions belonged to no category—that is, no category yet existing. His true subject was information: messaging, encoding, processing."

There are dozens of such observations in this book, some of which are undoubtedly not original to Gleick but all of which he conveys with exceptional clarity and economy. Indeed, when collected together into this coherent historical narrative, they do feel "revelatory," as his publisher claims. (Disclosure: Both Gleick's publisher, Pantheon, and my publisher, Doubleday, are imprints of Knopf.) They give you a sweeping sense of how much the world has changed, not just in the tools we use and the toys we play with, but in how we think. Gleick is wrestling with truly profound material, and so will the reader. This is not a book you will race through on a single plane trip. It is a slow, satisfying meal.

Who will make the time? Who will actually read the whole thing? I don't mean this as a knock on Gleick; he's a pleasure to read. But as he himself notes in an earlier book, *Faster*, we have become a "multitasking, channel-flipping, fast-forwarding citizenry." Having built a civilization on precise data and big ideas, we now whirl so quickly through it that even serious minds show less patience for the slow, the uninterrupted, the long-form. (Even two-paragraph e-mails these days seem to qualify as long-form; I am astounded by the number of intellectuals who regularly fail to read anything beyond the first sentence or two of e-mails they receive. Even for them, the thrill of keeping up with information too often replaces the satisfaction of experiencing it.) We also show signs of splintering ourselves into hope-

lessly specialized info-spheres. To my chagrin, Gleick doesn't dwell on speed or fragmentation in this book, though he does review the history and meaning of information glut at some length.

Gleick's second big idea in *The Information* is that "information is what our world runs on: the blood and the fuel, the vital principle." This might at first seem either grandiose or utterly mundane, depending on how closely you've followed the musings of the "digerati," but here it is conveyed as a substantial idea. We're all used to referring to data as a conduit for more vital elements—biology, music, ideas, and so on. Gleick takes pains to convince us that the data is not just the vehicle, but also the underlying element itself. He writes:

Where is Beethoven's Piano Sonata in E minor? Is it in the original handwritten score? The printed sheet music? Any one performance—or perhaps the sum of all performances, historical and potential, real and imagined?

The quavers and crotchets inked on paper are not the music. Music is not a series of pressure waves sounding through the air; nor grooves etched in vinyl or pits burned in CDs; nor even the neuronal symphonies stirred up in the brain of the listener. The music is the information.

So it goes throughout the book, with Gleick painting information as the core of, well, everything. "The whole universe," he writes, "is thus seen as a computer—a cosmic information-processing machine." It is a powerful idea, but also slightly oppressive in Gleick's unwavering formulation. For it would be just as valid to say that music exists *only* in the living experience of the listener, or the shared experience of a group, or that it can be defined *only* as a collective journey from the mind of the composer through bits and eyes and ink and air and circuits and neurons. To say that music, or anything, can be reduced utterly to information doesn't feel right to me. (I say this with humility, rejecting the imperious book review model where the reviewer's off-the-cuff reaction is positioned as superior to the author's long-considered work.)

I offer the same hesitancy in response to Gleick's third and final major theme, his even more ambitious proposal that

information is an independent organism. This is, as far as I can tell, not meant as a metaphor or a thought exercise. He means it literally. Information exists independently of the corporeal forces that use it and act upon it. It has its own agency. "In the long run," Gleick writes, "history is the story of information becoming aware of itself." In this formulation, information is not a mere tool of humans, but its own autonomous force—the "infosphere" as distinguished from the biosphere.

Most of the biosphere cannot see the infosphere; it is invisible, a parallel universe humming with ghostly inhabitants. But they are not ghosts to us—not anymore. . . . We are aware of the many species of information. We name their types sardonically, as though to reassure ourselves that we understand: *urban myths* and *zombie lies*. We keep them alive in air-conditioned server farms. But we cannot own them. When a jingle lingers in our ears, or a fad turns fashion upside down, or a hoax dominates the global chatter for months and vanishes as swiftly as it came, who is master and who is slave?

This is one of those ideas that cannot sound like anything other than wild exaggeration when first encountered, but which slowly takes root in the reader's consciousness under Gleick's deft hand. The idea clearly extends directly from Richard Dawkins's notion that genes serve themselves rather than their living hosts. One way to understand Gleick's book is as a successor and companion to Dawkins's 1976 book *The Selfish Gene*. Gleick quotes Dawkins:

[A gene] is no more likely to die when it is a million years old than when it is only a hundred. It leaps from body to body down the generations, manipulating body after body in its own way and for its own ends, abandoning a succession of mortal bodies before they sink in senility and death.

By the same token, argues Gleick, we can see that all of information is trying to replicate itself, and using our world merely as a host. He quotes philosopher Daniel Dennett, who quips, "A scholar is just a library's way of making another library."

I only wish Gleick would take one baby step back from his total embrace of autonomy and causality. Genes are an interesting case study here. In his chapter on genes, he conveys an awful lot of the complexity very well, explaining, for example, that there can't be any such thing as a "gene for" any particular trait because genes interact with other genes. ("There is no gene for long legs; there is no gene for a leg at all. To build a leg requires many genes, each issuing instructions in the form of proteins, some making raw materials, some making timers and on-off switches.") But then he lapses, omitting the critical factor of gene-environment interaction, or what is now commonly referred to as epigenetics. Thus it's not quite true when he insists, "The genetic message is independent and impenetrable: no information from events outside can change it." DNA is stable, but epigenetic signals will impact a gene's message. A trait will emerge, as McGill University's Michael Meaney writes, "only from the interaction of gene and environment." (This genetic critique I offer with less humility, as it is the subject of my own recent book.)

Of course, it is possible to contain both genetics and the environment within Gleick's infosphere paradigm: environmental signals are information too, even if they aren't seen as clearly as DNA. But my small pushback against Gleick is that he's not just being somewhat gene-centric; he's also set on depicting a world as filled with conscious, deterministic forces, while it might be better understood as being a creature of interaction. Just as a marriage only exists in the space between the two people, and humor exists only in the interaction between humorist and audience, it seems to me that genes and information are not any more in charge of our world than rabbits or carrots or carbon dioxide levels. The infosphere seems more interesting when seen neither as a mere tool of sentient beings nor as an omniscient, omnipotent being itself. There is no master and there is no slave. We're all in this together. **CJR**

DAVID SHENK is the author of six books, including *Data Smog: Surviving the Information Glut and, most recently, The Genius in All of Us: New Insights Into Genetics, Talent, and IQ. He lives in Brooklyn.*