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THE DEEPENING PAGE

When people first began writing things down, they'd scratch their marks on anything that happened to be lying around—smooth-faced rocks, scraps of wood, strips of bark, bits of cloth, pieces of bone, chunks of broken pottery. Such ephemera were the original media for the written word. They had the advantages of being cheap and plentiful but the disadvantages of being small, irregular in shape, and easily lost, broken, or otherwise damaged. They were suitable for inscriptions and labels, perhaps a brief note or notice, but not much else. No one would think to commit a deep thought or a long argument to a pebble or a potsherd.

The Sumerians were the first to use a specialized medium for writing. They etched their cuneiform into carefully prepared tablets made of clay, an abundant resource in Mesopotamia. They would wash a handful of clay, form it into a thin block, inscribe it with a sharpened reed, and then dry it under the sun or in a kiln. Government records, business correspondence, commercial receipts, and legal agreements were all written on the durable tablets, as were lengthier, more literary works, such as historical and religious sto-

ries and accounts of contemporary events. To accommodate the longer pieces of writing, the Sumerians would often number their tablets, creating a sequence of clay “pages” that anticipated the form of the modern book. Clay tablets would continue to be a popular writing medium for centuries, but because preparing, carrying, and storing them were difficult, they tended to be reserved for formal documents written by official scribes. Writing and reading remained arcane talents.

Around 2500 BC, the Egyptians began manufacturing scrolls from the papyrus plants that grew throughout the Nile delta. They would strip fibers from the plants, lay the fibers in a crisscross pattern, and dampen them to release their sap. The resin glued the fibers into a sheet, which was then hammered to form a smooth, white writing surface not all that different from the paper we use today. As many as twenty of the sheets would be glued end to end into long scrolls, and the scrolls, like the earlier clay tablets, would sometimes be arranged in numbered sequences. Flexible, portable, and easy to store, scrolls offered considerable advantages over the much heavier tablets. The Greeks and the Romans adopted scrolls as their primary writing medium, though parchment, made of goat or sheep hide, eventually replaced papyrus as the material of choice in making them.

Scrolls were expensive. Papyrus had to be carted in from Egypt, and turning skins into parchment was a time-consuming job requiring a certain amount of skill. As writing became more common, demand grew for a cheaper option, something that schoolboys could use to take notes and write compositions. That need spurred the development of a new writing device, the wax tablet. It consisted of a simple wooden frame filled with a layer of wax. Letters were scratched into the wax with a new kind of stylus that had, in addition to the sharpened writing tip, a blunt end for scraping the wax clean. Because words could be erased easily from the tablets, students and other writers were able to use them over and over again, making them far more economical than scrolls. Though not a very

sophisticated tool, the wax tablet played a major role in turning writing and reading from specialized, formal crafts into casual, everyday activities—for literate citizens, anyway.

The wax tablet was important for another reason. When the ancients wanted an inexpensive way to store or distribute a lengthy text, they would lash a few tablets together with a strip of leather or cloth. These bound tablets, popular in their own right, served as a model for an anonymous Roman artisan who, shortly after the time of Christ, sewed several sheets of parchment between a pair of rigid rectangles of leather to create the first real book. Though a few centuries would pass before the bound book, or codex, supplanted the scroll, the benefits of the technology must have been clear to even its earliest users. Because a scribe could write on both sides of a codex page, a book required much less papyrus or parchment than did a one-sided scroll, reducing the cost of production substantially. Books were also much more compact, making them easier to transport and to conceal. They quickly became the format of choice for publishing early Bibles and other controversial works. Books were easier to navigate too. Finding a particular passage, an awkward task with a long roll of text, became a simple matter of flipping back and forth through a set of pages.

Even as the technology of the book sped ahead, the legacy of the oral world continued to shape the way words on pages were written and read. Silent reading was largely unknown in the ancient world. The new codices, like the tablets and scrolls that preceded them, were almost always read aloud, whether the reader was in a group or alone. In a famous passage in his *Confessions*, Saint Augustine described the surprise he felt when, around the year AD 380, he saw Ambrose, the bishop of Milan, reading silently to himself. “When he read, his eyes scanned the page and his heart explored the meaning, but his voice was silent and his tongue was still,” wrote Augustine. “Often, when we came to see him, we found him reading like this in silence, for he never read aloud.” Baffled by such peculiar behavior,

Augustine wondered whether Ambrose “needed to spare his voice, which quite easily became hoarse.”¹

It’s hard for us to imagine today, but no spaces separated the words in early writing. In the books inked by scribes, words ran together without any break across every line on every page, in what’s now referred to as *scriptura continua*. The lack of word separation reflected language’s origins in speech. When we talk, we don’t insert pauses between each word—long stretches of syllables flow unbroken from our lips. It would never have crossed the minds of the first writers to put blank spaces between words. They were simply transcribing speech, writing what their ears told them to write. (Today, when young children begin to write, they also run their words together. Like the early scribes, they write what they hear.) The scribes didn’t pay much attention to the order of the words in a sentence either. In spoken language, meaning had always been conveyed mainly through inflection, the pattern of stresses a speaker places on syllables, and that oral tradition continued to govern writing. In interpreting the writing in books through the early Middle Ages, readers would not have been able to use word order as a signal of meaning. The rules hadn’t been invented yet.²

The lack of word separation, combined with the absence of word order conventions, placed an “extra cognitive burden” on ancient readers, explains John Saenger in *Space between Words*, his history of the scribal book.³ Readers’ eyes had to move slowly and haltingly across the lines of text, pausing frequently and often backing up to the start of a sentence, as their minds struggled to figure out where one word ended and a new one began and what role each word was playing in the meaning of the sentence. Reading was like working out a puzzle. The brain’s entire cortex, including the forward areas associated with problem solving and decision making, would have been buzzing with neural activity.

The slow, cognitively intensive parsing of text made the reading of books laborious. It was also the reason no one, other than the

odd case like Ambrose, read silently. Sounding out the syllables was crucial to deciphering the writing. Those constraints, which would seem intolerable to us today, didn't matter much in a culture still rooted in orality. "Because those who read relished the mellifluous metrical and accentual patterns of pronounced text," writes Saenger, "the absence of interword space in Greek and Latin was not perceived to be an impediment to effective reading, as it would be to the modern reader, who strives to read swiftly."⁴ Besides, most literate Greeks and Romans were more than happy to have their books read to them by slaves.

NOT UNTIL WELL after the collapse of the Roman Empire did the form of written language finally break from the oral tradition and begin to accommodate the unique needs of readers. As the Middle Ages progressed, the number of literate people—cenobites, students, merchants, aristocrats—grew steadily, and the availability of books expanded. Many of the new books were of a technical nature, intended not for leisurely or scholarly reading but for practical reference. People began to want, and to need, to read quickly and privately. Reading was becoming less an act of performance and more a means of personal instruction and improvement. That shift led to the most important transformation of writing since the invention of the phonetic alphabet. By the start of the second millennium, writers had begun to impose rules of word order on their work, fitting words into a predictable, standardized system of syntax. At the same time, beginning in Ireland and England and then spreading throughout the rest of western Europe, scribes started dividing sentences into individual words, separated by spaces. By the thirteenth century, *scriptura continua* was largely obsolete, for Latin texts as well as those written in the vernacular. Punctuation marks, which further eased the work of the reader, began to become common too. Writing, for the first time, was aimed as much at the eye as the ear.

It would be difficult to overstate the significance of these changes.

The emergence of word order standards sparked a revolution in the structure of language—one that, as Saenger notes, "was inherently antithetical to the ancient quest for metrical and rhythmical eloquence."⁵ The placing of spaces between words alleviated the cognitive strain involved in deciphering text, making it possible for people to read quickly, silently, and with greater comprehension. Such fluency had to be learned. It required complex changes in the circuitry of the brain, as contemporary studies of young readers reveal. The accomplished reader, Maryanne Wolf explains, develops specialized brain regions geared to the rapid deciphering of text. The areas are wired "to represent the important visual, phonological, and semantic information and to retrieve this information at lightning speed." The visual cortex, for example, develops "a veritable collage" of neuron assemblies dedicated to recognizing, in a matter of milliseconds, "visual images of letters, letter patterns, and words."⁶ As the brain becomes more adept at decoding text, turning what had been a demanding problem-solving exercise into a process that is essentially automatic, it can dedicate more resources to the interpretation of meaning. What we today call "deep reading" becomes possible. By "altering the neurophysiological process of reading," word separation "freed the intellectual faculties of the reader," Saenger writes; "even readers of modest intellectual capacity could read more swiftly, and they could understand an increasing number of inherently more difficult texts."⁷

Readers didn't just become more efficient. They also became more attentive. To read a long book silently required an ability to concentrate intently over a long period of time, to "lose oneself" in the pages of a book, as we now say. Developing such mental discipline was not easy. The natural state of the human brain, like that of the brains of most of our relatives in the animal kingdom, is one of distractedness. Our predisposition is to shift our gaze, and hence our attention, from one object to another, to be aware of as much of what's going on around us as possible. Neuroscientists have discovered primitive "bottom-up mechanisms" in our brains that, as the authors of a 2004

article in *Current Biology* put it, “operate on raw sensory input, rapidly and involuntarily shifting attention to salient visual features of potential importance.”⁸ What draws our attention most of all is any hint of a change in our surroundings. “Our senses are finely attuned to change,” explains Maya Pines of the Howard Hughes Medical Institute. “Stationary or unchanging objects become part of the scenery and are mostly unseen.” But as soon as “something in the environment changes, we need to take notice because it might mean danger—or opportunity.”⁹ Our fast-paced, reflexive shifts in focus were once crucial to our survival. They reduced the odds that a predator would take us by surprise or that we’d overlook a nearby source of food. For most of history, the normal path of human thought was anything but linear.

To read a book was to practice an unnatural process of thought, one that demanded sustained, unbroken attention to a single, static object. It required readers to place themselves at what T. S. Eliot, in *Four Quartets*, would call “the still point of the turning world.” They had to train their brains to ignore everything else going on around them, to resist the urge to let their focus skip from one sensory cue to another. They had to forge or strengthen the neural links needed to counter their instinctive distractedness, applying greater “top-down control” over their attention.¹⁰ “The ability to focus on a single task, relatively uninterrupted,” writes Vaughan Bell, a research psychologist at King’s College London, represents a “strange anomaly in the history of our psychological development.”¹¹

Many people had, of course, cultivated a capacity for sustained attention long before the book or even the alphabet came along. The hunter, the craftsman, the ascetic—all had to train their brains to control and concentrate their attention. What was so remarkable about book reading was that the deep concentration was combined with the highly active and efficient deciphering of text and interpretation of meaning. The reading of a sequence of printed pages was valuable not just for the knowledge readers acquired from the author’s words but for the way those words set off intellectual vibra-

tions within their own minds. In the quiet spaces opened up by the prolonged, undistracted reading of a book, people made their own associations, drew their own inferences and analogies, fostered their own ideas. They thought deeply as they read deeply.

Even the earliest silent readers recognized the striking change in their consciousness that took place as they immersed themselves in the pages of a book. The medieval bishop Isaac of Syria described how, whenever he read to himself, “as in a dream, I enter a state when my sense and thoughts are concentrated. Then, when with prolonging of this silence the turmoil of memories is stilled in my heart, ceaseless waves of joy are sent me by inner thoughts, beyond expectation suddenly arising to delight my heart.”¹² Reading a book was a meditative act, but it didn’t involve a clearing of the mind. It involved a filling, or replenishing, of the mind. Readers disengaged their attention from the outward flow of passing stimuli in order to engage it more deeply with an inward flow of words, ideas, and emotions. That was—and is—the essence of the unique mental process of deep reading. It was the technology of the book that made this “strange anomaly” in our psychological history possible. The brain of the book reader was more than a literate brain. It was a literary brain.

The changes in written language liberated the writer as well as the reader. *Scriptura continua* wasn’t just a nuisance to decipher; it was a trial to write. To escape the drudgery, writers would usually dictate their works to a professional scribe. As soon as the introduction of word spaces made writing easier, authors took up pens and began putting their words onto the page themselves, in private. Their works immediately became more personal and more adventurous. They began to give voice to unconventional, skeptical, and even heretical and seditious ideas, pushing the bounds of knowledge and culture. Working alone in his chambers, the Benedictine monk Guibert of Nogent had the confidence to compose unorthodox interpretations of scripture, vivid accounts of his dreams, even erotic poetry—things he would never have written had he been required to dictate them to a scribe. When, late in his life, he lost his sight and

had to go back to dictation, he complained of having to write "only by voice, without the hand, without the eyes."¹³

Authors also began to revise and edit their works heavily, something that dictation had often precluded. That, too, altered the form and the content of writing. For the first time, explains Saenger, a writer "could see his manuscript as a whole and by means of cross-references develop internal relationships and eliminate the redundancies common to the dictated literature" of the earlier Middle Ages.¹⁴ The arguments in books became longer and clearer, as well as more complex and more challenging, as writers strived self-consciously to refine their ideas and their logic. By the end of the fourteenth century, written works were often being divided into paragraphs and chapters, and they sometimes included tables of contents to help guide the reader through their increasingly elaborate structures.¹⁵ There had, of course, been sensitive and self-conscious prose and verse stylists in the past, as Plato's dialogues elegantly demonstrate, but the new writing conventions greatly expanded the production of literary works, particularly those composed in the vernacular.

The advances in book technology changed the personal experience of reading and writing. They also had social consequences. The broader culture began to mold itself, in ways both subtle and obvious, around the practice of silent book reading. The nature of education and scholarship changed, as universities began to stress private reading as an essential complement to classroom lectures. Libraries began to play much more central roles in university life and, more generally, in the life of the city. Library architecture evolved too. Private cloisters and carrels, tailored to accommodate vocal reading, were torn out and replaced by large public rooms where students, professors, and other patrons sat together at long tables reading silently to themselves. Reference books such as dictionaries, glossaries, and concordances became important as aids to reading. Copies of the precious texts were often chained to the library reading tables. To fill the increasing demand for books, a publishing industry

started to take shape. Book production, long the realm of the religious scribe working in a monastery's scriptorium, started to be centralized in secular workshops, where professional scribes worked for pay under the direction of the owner. A lively market for used books materialized. For the first time in history, books had set prices.¹⁶

For centuries, the technology of writing had reflected, and reinforced, the intellectual ethic of the oral culture in which it arose. The writing and reading of tablets, scrolls, and early codices had stressed the communal development and propagation of knowledge. Individual creativity had remained subordinate to the needs of the group. Writing had remained more a means of recording than a method of composition. Now, writing began to take on, and to disseminate, a new intellectual ethic: the ethic of the book. The development of knowledge became an increasingly private act, with each reader creating, in his own mind, a personal synthesis of the ideas and information passed down through the writings of other thinkers. The sense of individualism strengthened. "Silent reading," the novelist and historian James Carroll has noted, is "both the sign of and a means to self-awareness, with the knower taking responsibility for what is known."¹⁷ Quiet, solitary research became a prerequisite for intellectual achievement. Originality of thought and creativity of expression became the hallmarks of the model mind. The conflict between the orator Socrates and the writer Plato had at last been decided—in Plato's favor.

But the victory was incomplete. Because handwritten codices remained costly and scarce, the intellectual ethic of the book, and the mind of the deep reader, continued to be restricted to a relatively small group of privileged citizens. The alphabet, a medium of language, had found its own ideal medium in the book, a medium of writing. Books, however, had yet to find their ideal medium—the technology that would allow them to be produced and distributed cheaply, quickly, and in abundance.

SOMETIME AROUND 1445, a German goldsmith named Johannes Gutenberg left Strasbourg, where he had been living for several years, and followed the Rhine River back to the city of his birth, Mainz. He was carrying a secret—a big one. For at least ten years, he had been working covertly on several inventions that he believed would, in combination, form the basis of an altogether new sort of publishing business. He saw an opportunity to automate the production of books and other written works, replacing the venerable scribe with a newfangled printing machine. After securing two sizable loans from Johann Fust, a prosperous neighbor, Gutenberg set up a shop in Mainz, bought some tools and materials, and set to work. Putting his metalworking skills to use, he created small, adjustable molds for casting alphabetical letters of uniform height but varying width out of a molten metal alloy. The cast letters, or movable type, could be arranged quickly into a page of text for printing and then, when the job was done, disassembled and reset for a new page.¹⁸ Gutenberg also developed a refined version of a wooden-screw press, used at the time to crush grapes for wine, that was able to transfer the image of the type onto a sheet of parchment or paper without smudging the letters. And he invented the third critical element of his printing system: an oil-based ink that would adhere to the metal type.

Having built the letterpress, Gutenberg quickly put it to use printing indulgences for the Catholic Church. The job paid well, but it wasn't the work Gutenberg had in mind for his new machine. He had much greater ambitions. Drawing on Fust's funds, he began to prepare his first major work: the magnificent, two-volume edition of the Bible that would come to bear his name. Spanning twelve hundred pages, each composed of two forty-two-line columns, the Gutenberg Bible was printed in a heavy Gothic typeface painstakingly designed to imitate the handwriting of the best German scribes. The Bible, which took at least three years to produce, was Gutenberg's triumph. It was also his undoing. In 1455, having printed just two hundred copies, he ran out of money. Unable to pay the interest on his loans, he was forced to hand his press, type, and ink over to Fust and aban-

don the printing trade. Fust, who had made his fortune through a successful career as a merchant, proved to be as adept at the business of printing as Gutenberg had been at its mechanics. Together with Peter Schoeffer, one of Gutenberg's more talented employees (and a former scribe himself), Fust set the operation on a profitable course, organizing a sales force and publishing a variety of books that sold widely throughout Germany and France.¹⁹

Although Gutenberg would not share in its rewards, his letterpress would become one of the most important inventions in history. With remarkable speed, at least by medieval standards, movable-type printing "changed the face and condition of things all over the world," Francis Bacon wrote in his 1620 book *Novum Organum*, "so that no empire or sect or star seems to have exercised a greater power and influence on human affairs."²⁰ (The only other inventions that Bacon felt had as great an impact as the letterpress were gunpowder and the compass.) By turning a manual craft into a mechanical industry, Gutenberg had changed the economics of printing and publishing. Large editions of perfect copies could be mass-produced quickly by a few workers. Books went from being expensive, scarce commodities to being affordable, plentiful ones.

In 1483, a printing shop in Florence, run by nuns from the Convent of San Jacopo di Ripoli, charged three florins for printing 1,025 copies of a new translation of Plato's *Dialogues*. A scribe would have charged about one florin for copying the work, but he would have produced only a single copy.²¹ The steep reduction in the cost of manufacturing books was amplified by the growing use of paper, an invention imported from China, in place of more costly parchment. As book prices fell, demand surged, spurring, in turn, a rapid expansion in supply. New editions flooded the markets of Europe. According to one estimate, the number of books produced in the fifty years following Gutenberg's invention equaled the number produced by European scribes during the preceding thousand years.²² The sudden proliferation of once-rare books struck people of the time "as sufficiently remarkable to suggest supernatural intervention,"

reports Elizabeth Eisenstein in *The Printing Press as an Agent of Change*.²³ When Johann Fust carried a large supply of printed books into Paris on an early sales trip, he was reportedly run out of town by the gendarmes on suspicion of being in league with the devil.²⁴

Fears of satanic influence quickly dissipated as people rushed to buy and read the inexpensive products of the letterpress. When, in 1501, the Italian printer Aldus Manutius introduced the pocket-sized octavo format, considerably smaller than the traditional folio and quarto, books became even more affordable, portable, and personal. Just as the miniaturization of the clock made everyone a timekeeper, so the miniaturization of the book helped weave book-reading into the fabric of everyday life. It was no longer just scholars and monks who sat reading words in quiet rooms. Even a person of fairly modest means could begin to assemble a library of several volumes, making it possible not only to read broadly but to draw comparisons between different works. "All the world is full of knowing men, of most learned Schoolmasters, and vast Libraries," exclaimed the title character of Rabelais' 1534 best seller *Gargantua*, "and it appears to me as a truth, that neither in Plato's time, nor Cicero's, nor Papinian's, there was ever such conveniency for studying, as we see at this day there is."²⁵

A virtuous cycle had been set in motion. The growing availability of books fired the public's desire for literacy, and the expansion of literacy further stimulated the demand for books. The printing industry boomed. By the end of the fifteenth century, nearly 250 towns in Europe had print shops, and some 12 million volumes had already come off their presses. The sixteenth century saw Gutenberg's technology leap from Europe to Asia, the Middle East, and, when the Spanish set up a press in Mexico City in 1539, the Americas. By the start of the seventeenth century, letterpresses were everywhere, producing not only books but newspapers, scientific journals, and a variety of other periodicals. The first great flowering of printed literature arrived, with works by such masters as Shakespeare, Cervantes, Molière, and Milton, not to mention Bacon and Descartes, entering the inventories of booksellers and the libraries of readers.

It wasn't just contemporary works that were coming off the presses. Printers, striving to fill the public's demand for inexpensive reading material, produced large editions of the classics, both in the original Greek and Latin and in translation. Although most of the printers were motivated by the desire to turn an easy profit, the distribution of the older texts helped give intellectual depth and historical continuity to the emerging book-centered culture. As Eisenstein writes, the printer who "duplicated a seemingly antiquated backlist" may have been lining his own pockets, but in the process he gave readers "a richer, more varied diet than had been provided by the scribe."²⁶

Along with the high-minded came the low-minded. Tawdry novels, quack theories, gutter journalism, propaganda, and, of course, reams of pornography poured into the marketplace and found eager buyers at every station in society. Priests and politicians began to wonder whether, as England's first official book censor put it in 1660, "more mischief than advantage were not occasion'd to the Christian world by the Invention of Typography."²⁷ The famed Spanish dramatist Lope de Vega expressed the feelings of many a grandee when, in his 1612 play *All Citizens Are Soldiers*, he wrote:

So many books—so much confusion!
All around us an ocean of print
And most of it covered in froth.²⁸

But the froth itself was vital. Far from dampening the intellectual transformation wrought by the printed book, it magnified it. By accelerating the spread of books into popular culture and making them a mainstay of leisure time, the cruder, crasser, and more trifling works also helped spread the book's ethic of deep, attentive reading. "The same silence, solitude, and contemplative attitudes associated formerly with pure spiritual devotion," writes Eisenstein, "also accompanies the perusal of scandal sheets, 'lewd Ballads,' 'merry bookes of Italie,' and other 'corrupted tales in Inke and

Paper.”²⁹ Whether a person is immersed in a bodice ripper or a Psalter, the synaptic effects are largely the same.

Not everyone became a book reader, of course. Plenty of people—the poor, the illiterate, the isolated, the incurious—never participated, at least not directly, in Gutenberg’s revolution. And even among the most avid of the book-reading public, many of the old oral practices of information exchange remained popular. People continued to chat and to argue, to attend lectures, speeches, debates, and sermons.³⁰ Such qualifications deserve note—any generalization about the adoption and use of a new technology will be imperfect—but they don’t change the fact that the arrival of movable-type printing was a central event in the history of Western culture and the development of the Western mind.

“For the medieval type of brain,” writes J. Z. Young, “making true statements depended on fitting sensory experience with the symbols of religion.” The letterpress changed that. “As books became common, men could look more directly at each other’s observations, with a great increase in the accuracy and content of the information conveyed.”³¹ Books allowed readers to compare their thoughts and experiences not just with religious precepts, whether embedded in symbols or voiced by the clergy, but with the thoughts and experiences of others.³² The social and cultural consequences were as widespread as they were profound, ranging from religious and political upheaval to the ascendancy of the scientific method as the central means for defining truth and making sense of existence. What was widely seen as a new “Republic of Letters” came into being, open at least theoretically to anyone able to exercise, as the Harvard historian Robert Darnton puts it, “the two main attributes of citizenship, writing and reading.”³³ The literary mind, once confined to the cloisters of the monastery and the towers of the university, had become the general mind. The world, as Bacon recognized, had been remade.

THERE ARE MANY kinds of reading. David Levy, in *Scrolling Forward*, a book about our present-day transition from printed to electronic documents, notes that literate people “read all day long, mostly unconsciously.” We glance at road signs, menus, headlines, shopping lists, the labels of products in stores. “These forms of reading,” he says, “tend to be shallow and of brief duration.” They’re the types of reading we share with our distant ancestors who deciphered the marks scratched on pebbles and potsherds. But there are also times, Levy continues, “when we read with greater intensity and duration, when we become absorbed in what we are reading for longer stretches of time. Some of us, indeed, don’t just *read* in this way but think of ourselves as *readers*.”³⁴

Wallace Stevens, in the exquisite couplets of “The House Was Quiet and the World Was Calm,” provides a particularly memorable and moving portrayal of the kind of reading Levy is talking about:

The house was quiet and the world was calm.
The reader became the book; and summer night

Was like the conscious being of the book.
The house was quiet and the world was calm.

The words were spoken as if there was no book,
Except that the reader leaned above the page,

Wanted to lean, wanted much most to be
The scholar to whom his book is true, to whom

The summer night is like a perfection of thought.
The house was quiet because it had to be.

The quiet was part of the meaning, part of the mind:
The access of perfection to the page.

Stevens' poem not only describes deep reading. It demands deep reading. The apprehension of the poem requires the mind the poem describes. The "quiet" and the "calm" of the deep reader's attentiveness become "part of the meaning" of the poem, forming the pathway through which "perfection" of thought and expression reaches the page. In the metaphorical "summer night" of the wholly engaged intellect, the writer and the reader merge, together creating and sharing "the conscious being of the book."

Recent research into the neurological effects of deep reading has added a scientific gloss to Stevens' lyric. In one fascinating study, conducted at Washington University's Dynamic Cognition Laboratory and published in the journal *Psychological Science* in 2009, researchers used brain scans to examine what happens inside people's heads as they read fiction. They found that "readers mentally simulate each new situation encountered in a narrative. Details about actions and sensation are captured from the text and integrated with personal knowledge from past experiences." The brain regions that are activated often "mirror those involved when people perform, imagine, or observe similar real-world activities." Deep reading, says the study's lead researcher, Nicole Speer, "is by no means a passive exercise."³⁵ The reader becomes the book.

The bond between book reader and book writer has always been a tightly symbiotic one, a means of intellectual and artistic cross-fertilization. The words of the writer act as a catalyst in the mind of the reader, inspiring new insights, associations, and perceptions, sometimes even epiphanies. And the very existence of the attentive, critical reader provides the spur for the writer's work. It gives the author the confidence to explore new forms of expression, to blaze difficult and demanding paths of thought, to venture into uncharted and sometimes hazardous territory. "All great men have written proudly, nor cared to explain," said Emerson. "They knew that the intelligent reader would come at last, and would thank them."³⁶

Our rich literary tradition is unthinkable without the intimate exchanges that take place between reader and writer within the cru-

cible of a book. After Gutenberg's invention, the bounds of language expanded rapidly as writers, competing for the eyes of ever more sophisticated and demanding readers, strived to express ideas and emotions with superior clarity, elegance, and originality. The vocabulary of the English language, once limited to just a few thousand words, expanded to upwards of a million words as books proliferated.³⁷ Many of the new words encapsulated abstract concepts that simply hadn't existed before. Writers experimented with syntax and diction, opening new pathways of thought and imagination. Readers eagerly traveled down those pathways, becoming adept at following fluid, elaborate, and idiosyncratic prose and verse. The ideas that writers could express and readers could interpret became more complex and subtle, as arguments wound their way linearly across many pages of text. As language expanded, consciousness deepened.

The deepening extended beyond the page. It's no exaggeration to say that the writing and reading of books enhanced and refined people's experience of life and of nature. "The remarkable virtuosity displayed by new literary artists who managed to counterfeit taste, touch, smell, or sound in mere words required a heightened awareness and closer observation of sensory experience that was passed on in turn to the reader," writes Eisenstein. Like painters and composers, writers were able "to alter perception" in a way "that enriched rather than stunted sensuous response to external stimuli, expanded rather than contracted sympathetic response to the varieties of human experience."³⁸ The words in books didn't just strengthen people's ability to think abstractly; they enriched people's experience of the physical world, the world outside the book.

One of the most important lessons we've learned from the study of neuroplasticity is that the mental capacities, the very neural circuits, we develop for one purpose can be put to other uses as well. As our ancestors imbued their minds with the discipline to follow a line of argument or narrative through a succession of printed pages, they became more contemplative, reflective, and imaginative. "New thought came more readily to a brain that had already learned how

to rearrange itself to read," says Maryanne Wolf; "the increasingly sophisticated intellectual skills promoted by reading and writing added to our intellectual repertoire."³⁹ The quiet of deep reading became, as Stevens understood, "part of the mind."

Books weren't the only reason that human consciousness was transformed during the years following the invention of the letterpress—many other technologies and social and demographic trends played important roles—but books were at the very center of the change. As the book came to be the primary means of exchanging knowledge and insight, its intellectual ethic became the foundation of our culture. The book made possible the delicately nuanced self-knowledge found in Wordsworth's *Prelude* and Emerson's essays and the equally subtle understanding of social and personal relations found in the novels of Austen, Flaubert, and Henry James. Even the great twentieth-century experiments in nonlinear narrative by writers like James Joyce and William Burroughs would have been unthinkable without the artists' presumption of attentive, patient readers. When transcribed to a page, a stream of consciousness becomes literary and linear.

The literary ethic was not only expressed in what we normally think of as literature. It became the ethic of the historian, illuminating works like Gibbon's *Decline and Fall of the Roman Empire*. It became the ethic of the philosopher, informing the ideas of Descartes, Locke, Kant, and Nietzsche. And, crucially, it became the ethic of the scientist. One could argue that the single most influential literary work of the nineteenth century was Darwin's *On the Origin of Species*. In the twentieth century, the literary ethic ran through such diverse books as Einstein's *Relativity*, Keynes's *General Theory of Employment, Interest and Money*, Thomas Kuhn's *Structure of Scientific Revolutions*, and Rachel Carson's *Silent Spring*. None of these momentous intellectual achievements would have been possible without the changes in reading and writing—and in perceiving and thinking—spurred by the efficient reproduction of long forms of writing on printed pages.

LIKE OUR FOREBEARS during the later years of the Middle Ages, we find ourselves today between two technological worlds. After 550 years, the printing press and its products are being pushed from the center of our intellectual life to its edges. The shift began during the middle years of the twentieth century, when we started devoting more and more of our time and attention to the cheap, copious, and endlessly entertaining products of the first wave of electric and electronic media: radio, cinema, phonograph, television. But those technologies were always limited by their inability to transmit the written word. They could displace but not replace the book. Culture's mainstream still ran through the printing press.

Now the mainstream is being diverted, quickly and decisively, into a new channel. The electronic revolution is approaching its culmination as the computer—desktop, laptop, handheld—becomes our constant companion and the Internet becomes our medium of choice for storing, processing, and sharing information in all forms, including text. The new world will remain, of course, a literate world, packed with the familiar symbols of the alphabet. We cannot go back to the lost oral world, any more than we can turn the clock back to a time before the clock existed.⁴⁰ "Writing and print and the computer," writes Walter Ong, "are all ways of technologizing the word"; and once technologized, the word cannot be de-technologized.⁴¹ But the world of the screen, as we're already coming to understand, is a very different place from the world of the page. A new intellectual ethic is taking hold. The pathways in our brains are once again being rerouted.