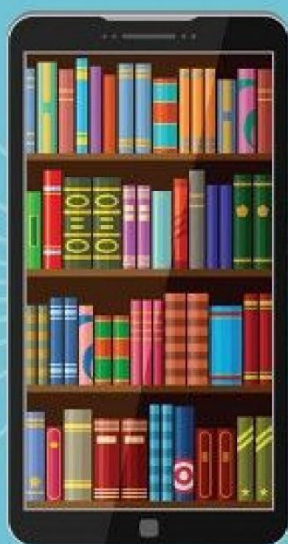


“If you call yourself a reader and want to keep on being one, this extraordinary book is for you.”—Alberto Manguel, author of *A History of Reading*

# READER, COME HOME

THE READING BRAIN IN  
A DIGITAL WORLD



## MARYANNE WOLF

AUTHOR OF *PROUST AND THE SQUID*

## Contents

*Cover*

*Title Page*

*Dedication*

*Epigraph*

Letter One: Reading, the Canary in the Mind

Letter Two: Under the Big Top: An Unusual View of  
the Reading Brain

Letter Three: Deep Reading: Is It Endangered?

Letter Four: “What Will Become of the Readers We  
Have Been?”

Letter Five: The Raising of Children in a Digital Age

Letter Six: From Laps to Laptops in the First Five  
Years: Don’t Move Too Fast

Letter Seven: The Science and Poetry in Learning (and  
Teaching) to Read

Letter Eight: Building a Biliterate Brain

Letter Nine: Reader, Come Home

*Credits*

*Acknowledgments*

*Notes*

*Index*

*About the Author*

*Also by Maryanne Wolf*

Copyright

About the Publisher



# Letter One

## Re Copyrighted image the Canary in the Mind

Fielding calls out<sup>1</sup> to you every few paragraphs as if to make sure you have not closed the book, and now I am summoning you up again, *attentive ghost*, dark silent figure standing *in the doorway of these words*.

—Billy Collins [my italics]

**D**ear Reader,

You stand at the doorway of my words; together we stand at the threshold of galactic changes<sup>2</sup> over the next few generations. These letters are my invitation to consider an improbable set of facts about reading and the reading brain, whose implications will lead to significant cognitive changes in you, the next generation, and possibly our species. My letters are also an invitation to look at other changes, more

subtle ones, and consider whether you have moved, unaware, away from the home that reading once was for you. For most of us, these changes have begun.

Let's begin with a deceptively simple fact that has inspired my work on the reading brain over the last decade and move from there: *human beings were never born to read.*<sup>3</sup> The acquisition of literacy is one of the most important epigenetic achievements of *Homo sapiens*. To our knowledge, no other species ever acquired it. The act of learning to read added an entirely new circuit to our hominid brain's repertoire. The long developmental process of learning to read deeply and well changed the very structure of that circuit's connections, which rewired the brain, which transformed the nature of human thought.

What we read, how we read, and why we read change how we think, changes that are continuing now at a faster pace. In a span of only six millennia reading became the transformative catalyst for intellectual development within individuals and within literate cultures. The quality of our reading is not only an index of the quality of our thought, it is our best-known path to developing whole new pathways in the cerebral evolution of our species. There is much at stake in the development of the reading brain and in the quickening changes that now characterize its current, evolving iterations.

You need only examine yourself. Perhaps you have already noticed how the quality of your attention has changed the more you read on screens and digital devices. Perhaps you have felt a pang of something subtle that is missing when you seek to immerse yourself in a once favorite book. Like a phantom limb, you remember who you were as a reader, but cannot summon that "attentive ghost" with the joy you once felt in being transported somewhere outside the self to that interior space. It is more difficult still with children, whose attention is continuously distracted and flooded by stimuli

that will never be consolidated in their reservoirs of knowledge. This means that the very basis of their capacity to draw analogies and inferences when they read will be less and less developed. Young reading brains are evolving without a ripple of concern by most people, even though more and more of our youths are not reading other than what is required and often not even that: “tl; dr” (too long; didn’t read).

In our almost complete transition to a digital culture we are changing in ways we never realized would be the unintended collateral consequences of the greatest explosion of creativity, invention, and discovery in our history. As I chronicle in these letters, there is as much reason for excitement as caution if we turn our attention to the specific changes in the evolving reading brain that are happening now and may happen in different ways in a few short years. This is because the transition from a literacy-based culture to a digital one differs radically from previous transitions from one form of communication to another. Unlike in the past, we possess both the science and the technology to identify potential changes in how we read—and thus how we think—before such changes are fully entrenched in the population and accepted without our comprehension of the consequences.

The building of this knowledge can provide the theoretical basis for changing technology to redress its own weaknesses, whether in more refined digital modes of reading or the creation of alternative, developmentally hybrid approaches to acquiring it. What we can learn, therefore, about the impact of different forms of reading on cognition and culture has profound implications for the next reading brains. Thus equipped, we will have the capacity to help shape the changing reading circuits in our children and our children’s children in wiser and better-informed ways.

I invite you into my collected thoughts on reading and the

evolving reading brain as I would a friend at my door—with equal parts anticipation and delight at our exchanges about what reading means, beginning with the story of how reading became so important to me. To be sure, when I was a child learning to read, I did not think about reading. Like Alice, I simply jumped down reading's hole into Wonderland and disappeared for most of my childhood. When I was a young woman, I did not think about reading. I simply became Elizabeth Bennet, Dorothea Brooke, and Isabel Archer at every opportunity. Sometimes I became men like Alyosha Karamazov, Hans Castorp, and Holden Caulfield. But always I was lifted to places very far from the little town of Eldorado, Illinois, and always I burned with emotions I could never otherwise have imagined.

Even when I was a graduate student of literature, I did not think very much about reading. Rather, I pored over every word, every encrypted meaning in the *Duino Elegies*<sup>4</sup> by Rilke and novels by George Eliot and John Steinbeck, and felt myself bursting with sharpened perceptions of the world and anxious to fulfill my responsibilities within it.

I failed my first round at the latter miserably and memorably. With all the enthusiasm a young, flimsily prepared teacher can have, I began a Peace Corps-like stint in rural Hawaii<sup>5</sup> along with a small and wonderful group of fellow would-be teachers. There I stood daily before twenty-four unutterably beautiful children. They looked at me with complete confidence, and we looked at each other with total, reciprocated affection. For a while those children and I were oblivious to the fact that I could change the circumstances of their life trajectories if I could help them become literate, unlike many in their families. Then, only then, did I begin to think seriously about what reading means. It changed the direction of my life.

With sudden and complete clarity I saw what would happen if those children could not learn the seemingly simple act of

passage into a culture based on literacy. They would never fall down a hole and experience the exquisite joys of immersion in the reading life. They would never discover Dinotopia, Hogwarts, Middle Earth, or Pemberley. They would never wrestle through the night with ideas too large to fit within their smaller worlds. They would never experience the great shift that moves from reading about characters like the Lightning Thief and Matilda to believing they could become heroes and heroines themselves. And most important of all, they might never experience the infinite possibilities within their own thoughts that emerge whole cloth from each fresh encounter with worlds outside their own. I realized in a whiplash burst that those children, all mine for one year, might never reach their full potential as human beings if they never learned to read.

From that moment on, I began in earnest to think about reading's capacity to change the course of an individual life. What I hadn't a clue about then was the deeply generative nature of written language and what it means—literally and physiologically—for generating new thoughts, not only for a child but for our society. I also had no glimpse of the extraordinary cerebral complexity that reading involves and how the act of reading embodies as no other function the brain's semi-miraculous ability to go beyond its original, genetically programmed capacities such as vision and language. That would come later, as it will in these letters. I revised my entire life plan, and moved from the love of written words to the science beneath them. I set out to understand how human beings acquire written words and use written language to great advantage for their own intellectual development and that of future generations.

I never looked back. Decades have passed since I taught the children of Waialua, now grown with children of their own. Because of them, I became a cognitive neuroscientist and a scholar of reading. More specifically, I conduct research on



what the brain does when it reads and why some children and adults have greater difficulty learning how to read than others do. There are many reasons, from external causes such as children's impoverished environments to more biological reasons such as differences in the brain's organization of language in the grossly misunderstood phenomenon of dyslexia. But these are themes in other directions of my work and will make only cameo appearances in this book.

These letters are concerned with a different direction of my work on the reading brain: the intrinsic plasticity that underlies it, with the unexpected implications that affect us all. My first inklings of the high stakes involved in the reading circuit's plasticity began more than a decade ago when I launched forth on what I thought would be a relatively circumscribed task: a researcher's account of reading's contributions to human development in *Proust and the Squid*.<sup>6</sup> *The Story and Science of the Reading Brain*. My original intention was to describe the great arc of literacy's development and provide a new conceptualization of dyslexia that would describe the cerebral riches that are often wasted when people do not understand individuals whose brains are organized for language in a different way.

But something unexpected happened as I wrote that book: reading itself changed. What I knew as a cognitive neuroscientist and developmental psychologist about the development of written language had begun to shift before my eyes and under my fingers and under everybody else's, too. For seven years I had studied the beginnings of Sumerian scripts and Greek alphabets and analyzed brain-imaging data with my own brain largely buried in research. When I finished, I lifted my head to look about me and felt as if I were Rip Van Winkle. In the seven years it had taken me to describe how the brain had learned to read over its close to six-thousand-year history, our entire literacy-based culture had begun its transformation into a very different, digitally

based culture.

I was gobsmacked. I rewrote the first, historical chapters of my book to reflect the striking parallels between our present cultural shifts to a digital culture and the similar transition from the Greeks' oral culture to their extraordinary written one. That was comparatively simple, thanks to a critical tutorial given to me by a very generous classicist colleague, Steven Hirsh.<sup>7</sup> It was anything but simple, however, to use research on the existing, expert reading brain to predict its next adaptation. And that is where I stopped in 2007. My self-appointed role as narrator of the research world's insights into reading's mind-changing capacities had moved out of my ken.

There was almost no research being conducted then on the formation of a digital reading brain. There were no significant studies about what was happening in the brains of children (or adults) as they learned to read while immersed in a digitally dominated medium six to seven hours a day (a figure that has since almost doubled for many of our youth). I knew how reading changes the brain and how the brain's plasticity enables it to be shaped by external factors such as a particular writing system (e.g., English versus Chinese). Unlike scholars in the past such as Walter Ong<sup>8</sup> and Marshall McLuhan, I never focused on the influences of the medium (e.g., book versus screen) upon this malleable circuit's structure. By the end of writing *Proust and the Squid*, however, I changed. I became consumed with how the circuitry of the reading brain would be altered by the unique characteristics of the digital medium, particularly in the young.

The unnatural, cultural origin of literacy—the first deceptively simple fact about reading—means that young readers do not have a genetically based program for developing such circuits. Reading-brain circuits are shaped and developed by both natural and environmental factors, including the medium in which reading is acquired and

developed. Each reading medium advantages certain cognitive processes over others. Translation: the young reader can either develop all the multiple deep-reading<sup>9</sup> processes that are currently embodied in the fully elaborated, expert reading brain; or the novice reading brain can become “short-circuited” in its development; or it can acquire whole new networks in different circuits. There will be profound differences in how we read and how we think, depending on which processes dominate the formation of the young child’s reading circuit.

This leads us to the present moment and the difficult, more specific questions that arise for children raised within a digital milieu, and ourselves. Will new readers develop the more time-demanding cognitive processes nurtured by print-based mediums as they absorb and acquire new cognitive capacities emphasized by digital media? For example, will the combination of reading on digital formats and daily immersion in a variety of digital experiences—from social media to virtual games—impede the formation of the slower cognitive processes such as critical thinking, personal reflection, imagination, and empathy that are all part of deep reading? Will the mix of continuously stimulating distractions of children’s attention and immediate access to multiple sources of information give young readers less incentive either to build their own storehouses of knowledge or to think critically for themselves?

In other words, through no intention on anyone’s part, will the increasing reliance of our youth on the servers of knowledge prove the greatest threat to the young brain’s building of its own foundation of knowledge, as well as to a child’s desire to think and imagine for him- or herself? Or will these new technologies provide the best, most complete bridge yet to ever more sophisticated forms of cognition and imagination that will enable our children to leap into new worlds of knowledge that we can’t even conceive of in this

moment of time? Will they develop a range of very different brain circuits? If so, what will be the implications of those different circuits for our society? Will the very diversity of such circuits benefit everyone? Can an individual reader consciously acquire various circuits, much like bilingual speakers who read different scripts?

Systematically examining—cognitively, linguistically, physiologically, and emotionally—the impact of various mediums on the acquisition and maintenance of the reading brain is the best preparation for ensuring the preservation of our most critical capacities both in the young and in ourselves. We need to understand the present expert brain’s profoundly important cognitive contributions, as we add new cognitive and perceptual dimensions to its circuitry. No binary approach to either the formation or the preservation of the expert reading brain will be sufficient to meet the needs of the next generation or our own. The issues involved cannot be reduced simply to differences between print- and technology-based mediums. As the futurists Juan Enriquez<sup>10</sup> and Steve Gullans wrote in *Evolving Ourselves: How Unnatural Selection and Nonrandom Mutation Are Changing Life on Earth*, we have choices to make in our evolution that will be more human-driven than nature-driven. These choices will be clear only if we stop to understand exactly what is involved with any important change. With you as my partner in dialogue, I seek to create within these letters a moment out of time to attend to the issues and choices we have before us, before the changes to the reader’s brain are so ingrained that there is no going back.

Perhaps counterintuitively, I have chosen a rather odd, even anachronistic genre from the past, a book of letters, to address issues about a future that is changing moment by moment. I do so for reasons that spring from my experiences both as reader and as author. Letters invite a kind of cerebral pause in which we can think with each other and, if very



fortunate, experience a special kind of encounter, what Marcel Proust called the “fertile miracle of communication”<sup>11</sup> that occurs without ever moving from your chair. More specific to this genre, when I was young, Rainer Maria Rilke’s *Letters*<sup>12</sup> to a Young Poet influenced me greatly. As I grew older, however, it was not his lyrical language in those letters that touched me most, but the example of his consummate kindness toward an aspiring poet he had never met: Franz Xaver Kappus, a person whom he grew to care for only through letters. I have no doubt that both were changed through their exchanges. What better definition for a reader? What better model for an author? I hope the same for us.

Italo Calvino’s *Six Memos for the Next Millennium*<sup>13</sup> affected me similarly, even though his memos transcend any conventional notion of “letter” and were, to all our loss, unfinished. Both letters and memos are genres that bring Calvino’s emphases on “lightness” to issues whose great weight might otherwise make their discussion too heavy for many to confront. Letters allow thoughts that, even when as urgent as some of the ones to be described, contain those ineffable aspects of lightness and connection that provide the basis of a true dialogue between author and reader—all accompanied by an impetus for new thoughts in you that will go in different directions from my own.

In a curious way, I have been involved in such a dialogue for some time. After I wrote *Proust and the Squid*, I received hundreds of letters from readers in every walk of life: famous literary figures concerned about their readers; neurosurgeons worried about their medical students in teaching hospitals in Boston; high school students forced to read a passage from my book on the Massachusetts state exam! It was heartwarming to me that the students were surprised to encounter my worry for their generation. Those letters showed me that what had begun as a book on the story and science of reading had become a cautionary tale about issues

that have now become reality. The act of reflecting upon the major themes that my letter writers wrestled with prepared me for selecting the themes of each letter in this book and also for choosing this genre.

With this book I hope to go much further than I have in all my past work. That said, each letter will be informed by everything I have done before, particularly the research from my most recent articles and books, all found in the extensive notes at the end of the book that expand some of the issues encountered here. Letter Two is based on the largest body of that research, but it is also the most lighthearted of my letters to you, with its unapologetically whimsical overview of present knowledge about the reading brain. I hope to illuminate there both why the plasticity of the reading-brain circuit underlies the growing complexity of our thought and why and how this circuit is changing. In Letter Three I lead you into the essential processes that compose deep reading—from the reader’s empathic and inferential abilities to critical analysis and insight itself. These first three letters provide a shared base from which to consider how the characteristics of various mediums, specifically print and screen reading, have begun to be reflected not only in the malleable networks of the brain’s circuitry but also in *how and what* we now read.

The implications of our reading brain’s plasticity are neither simple nor transient. The connections between how and what we read and what is written are critically important to today’s society. In a milieu that continuously confronts us with a glut of information, the great temptation for many is to retreat to familiar silos of easily digested, less dense, less intellectually demanding information. The illusion of being informed by a daily deluge of eye-byte-sized information can trump the critical analysis of our complex realities. In Letter Four I confront these issues head-on and discuss how a democratic society depends on the undeterred use of these critical capacities and how quickly they can atrophy in each

of us unnoticed.

In Letters Five to Eight, I morph into a “reading warrior” for the world’s future children. Here I describe a range of concerns, from preserving the different roles that reading plays in their intellectual, social-emotional, and ethical formation, to worries about the vanishing aspects of childhood. Given their more particular worries, many parents and grandparents have asked me the equivalent of Kant’s three questions<sup>14</sup>: What do we know? What should we do? What can we hope? In Letters Six through Eight I provide a developmental proposal in which I describe my best thoughts about each of these questions, culminating in a rather unexpected plan for building a biliterate reading brain.

Toward that end, there will be no binary solutions proffered in any part of this book. One of the most important current outgrowths of my research involves working toward global literacy<sup>15</sup>, where I publicly advocate and help in the design of digital tablets as one means of ameliorating nonliteracy, particularly for children with no schools or in inadequate ones. Do not think that I am against the digital revolution. Indeed, it is of utmost importance to be informed by the growing knowledge on the impact of different media if we are to prepare all our children, wherever they live, to read deeply and well, in whatever medium.

All of these letters will prepare you, my reader, to consider the many critical issues involved, beginning with yourself. In the last letter I ask you to think about who the true “good readers” are in our changing epoch and to reflect for yourself on the immeasurably important role they play in a democratic society—never more so than now. Within these pages the meanings of good reader have little to do with how well anyone decodes words; they have everything to do with being faithful to what Proust once described as the heart of the reading act, going beyond the wisdom of the author to discover one’s own.

There are no shortcuts for becoming a good reader, but there are lives that propel and sustain it. Aristotle wrote that the good society<sup>16</sup> has three lives: the life of knowledge and productivity; the life of entertainment and the Greeks' special relationship to leisure; and finally, the life of contemplation. So, too, the good reader. In the final letter I elaborate how this reader—like the good society—embodies each of Aristotle's three lives, even as the third life, the life of contemplation, is daily threatened in our culture. From the perspectives of neuroscience, literature, and human development I will argue that it is this form of reading that is our best chance at giving the next generation the foundation for the unique and autonomous life of the mind they will need in a world none of us can fully imagine. The expansive, encompassing processes that underlie insight and reflection in the present reading brain represent our best complement and antidote to the cognitive and emotional changes that are the sequelae of the multiple, life-enhancing achievements of a digital age.

Thus, in my last and most personal letter, you and I will face ourselves and ask whether we possess each of the three lives of the good reader, or whether, barely noted by us, we have lost the ability to enter our third life and, in so doing, have lost our reading home. Within that act of examination, I will suggest that the future of the human species can best sustain and pass on the highest forms of our collective intelligence, compassion, and wisdom by nurturing and protecting the contemplative dimension of the reading brain.

Kurt Vonnegut compared the role of the artist in society to that of the canary in the mines: both alert us to the presence of danger. The reading brain is the canary in our minds. We would be the worst of fools to ignore what it has to teach us.

You won't agree with me all the time, and that is as it should be. Like St. Thomas Aquinas, I look at disagreement as the place where "iron sharpens iron."<sup>17</sup> That is my first goal



Copyr. Copyrighted image :

READER, COME HOME. Copyright © 2018 by Maryanne Wolf. All rights reserved under International and Pan-American Copyright Conventions. By payment of the required fees, you have been granted the nonexclusive, nontransferable right to access and read the text of this e-book on-screen. No part of this text may be reproduced, transmitted, downloaded, decompiled, reverse-engineered, or stored in or introduced into any information storage and retrieval system, in any form or by any means, whether electronic or mechanical, now known or hereafter invented, without the express written permission of HarperCollins e-books.

*Cover design by Milan Bozic*  
*Cover illustration by Daniel Bejar*

FIRST EDITION

Library of Congress Cataloging-in-Publication Data has been applied for.

Digital Edition AUGUST 2018 ISBN: 978-0-06-238879-7

Version 08282019

Print ISBN: 978-0-06-238878-0