

An Educator's Guide to Books on the Brain

Fascinating books on the recent advances in our knowledge of the brain can provide educators with fresh insights into teaching and learning.

Recent dramatic advances in the neurosciences and in cognitive psychology are moving us toward a clearer understanding of the three-pound human brain that is the focus of our profession, and a number of excellent books outline these developments in terms the layperson can grasp.

The 32 informative (and at times controversial) books selected for this list provide functional explanations of brain mechanisms and processes and introduce the reader to the fascinating and competitive world of cognitive research. Written by respected scientists and science writers, all books have been published since 1983, many in paperback. Most include helpful illustrations.

General/Introductory Information

Several books provide excellent overviews of the cognitive sciences. Michael Gazzaniga's *Mind Matters: How the Mind and Brain Interact to Create Our Conscious Lives* (1988, Houghton Mifflin, available in paperback) is an excellent nontechnical introduction to the basic brain/mind questions that affect educators. The Diagram Group's *The Brain: A User's Manual* (1987, Putnam, available in paperback) and Robert Ornstein and R. Thompson's *The Amazing Brain* (1984, Houghton Mifflin, available in paperback) provide clearly written explanations of basic brain mechanisms/processes—with delightfully imaginative "Amazing Brain" illustrations by David Macaulay. Marion Diamond, A.

Scheibel, and L. Elson's *The Human Brain Coloring Book* (1985, Harper and Row) uses the tactile experience of coloring diagrams to help non-neuroscientists grasp brain relationships. *The Science of Mind* (1989 MIT Press), by Kenneth Klivington, is a beautifully illustrated coffee-table-size book that synthesizes recent research.

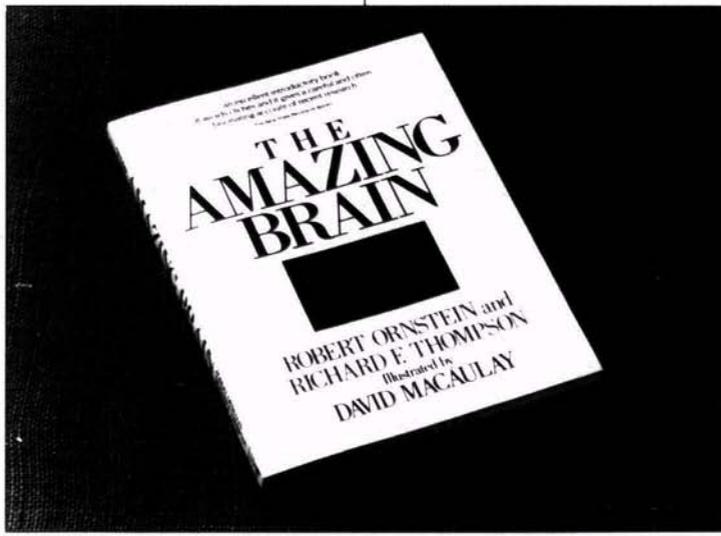
Three fine books emerged from the excellent PBS-TV series on the brain. Richard Restak's *The Brain* (1984, Bantam, available in paperback) and *The Mind* (1988, Bantam) contain easily read chapter discussions that expand upon the content of individual TV pro-

grams. Floyd Bloom, A. Larson, and L. Hofstadter's comprehensive *Brain, Mind, and Behavior* (1985, Freeman) is the more technical textbook accompanying the TV series.

Daniel Kimble's *Biological Psychology* (1988, Holt) is a basic college text on the brain, and its excellent organization and clear writing and illustrations also make it a fine reference work for educators.

Specific Research Areas

Several books focus on specific brain research developments (all have educational significance) and on the coop-



erative/competitive (and sometimes gossipy) human side of that area of research.

Susan Allport's *Explorers of the Black Box: The Search for the Cellular Basis of Memory* (1986, Norton) discusses the extensive work on sea slugs that led to the discovery of what happens within individual neurons when learning occurs. Michael Gazzaniga's *The Social Brain: Discovering the Networks of the Mind* (1985, Basic Books, available in paperback) and Sally Springer and G. Deutsch's *Left Brain, Right Brain*, (1989, Freeman, available in paperback) discuss the history of split-brain research and the discoveries that captivated educators, initiated the learning styles movement, and led to the currently dominant modular theory of brain organization and localized memory.

Howard Gardner develops this theory further for educators in *Frames of Mind: The Theory of Multiple Intelligences* (1983, Basic Books, available in paperback). Conversely, *The Invention of Memory: A New View of the Brain*, by Israel Rosenfeld (1988, Basic Books), and *Remembering and Forgetting: Inquiries into the Nature of Memory* by Edmund Bolles (1988, Walker) argue against the theory of modular memory storage, contending that the brain creatively generates memory out of experience. And so the argument on transfer, with all of its educational implications, continues.

William Allman's *Apprentices of Wonder: Inside the Neural Network Revolution* (1989, Bantam) moves the discussion further, into recent developments in brain/machine research.

Jon Franklin's *Molecules of the Mind: The Brave New World of Molecular Psychology* (1987, Atheneum) describes the discovery of endorphins, which led to our current understanding of the molecular basis of neural activity. Charles Levinthal's account of endorphin research, *Messengers of Paradise: Opiates and the Brain* (1988, Doubleday) relates the endorphin research to Paul MacLean's Triune Brain Model, a paradigm familiar to many educators.

Robert Julien's *A Primer of Drug Action* (1985, Freeman, available in paperback) and Solomon Snyder's *Drugs and the Brain* (1986, Scientific American Library) provide useful

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background information. Nancy Andreasen's *The Broken Brain: The Biological Revolution in Psychiatry* (1984, Harper and Row, available in paperback) is a fine nontechnical introduction to the new biological perspectives of mental illness and the use of drugs in its treatment.

Jeremy Campbell's lively *Winston Churchill's Afternoon Nap: A Wide-Awake Inquiry into the Human Nature of Time* (1986, Simon and Schuster) and J. A. Hobson's *Sleep* (1989, Scientific American Library) describe recent research in body/brain rhythms and cycles that can affect educational performance, among many other aspects of human life. Richard Bergland's *The Fabric of Mind: A Radical New Understanding of the Brain and How It Works* (1985, Viking) describes the development of the new wet-brain theory, with its audacious proposal that the brain is essentially one of the endocrine glands. Robert Ornstein and D. Sobel's *The Healing Brain: Breakthrough Discoveries About How the Brain Keeps Us Healthy* (1987, Simon and Schuster, available in paperback), further explores relationships between our brain and our endocrine/immune systems.

Enriching Heredity: The Impact of the Environment on the Anatomy of the Brain by Marian Diamond (1988, Free Press) explains the educationally pertinent research on factors that affect post-birth brain development.

For Advanced Readers

The books listed below are intellectually demanding, but educators who venture into their pages will be rewarded with expanded professional vision.

Jean Pierre Changeux's *Neuronal Man: The Biology of Mind* (1985, Pantheon) presents a thought-provoking brain/mind synthesis. Humberto Maturana and F. Varela's *Tree of Knowledge: The Biological Roots of Human Understanding* (1987, New Science Library) offers an inspiring, unified scientific conception of mind/matter/life. Patricia Smith Churchland's *Neurophilosophy: Toward a Unified Science of Mind/Brain* (1986, The MIT Press) is a fine introduction to philosophy for those interested in neuroscience and a fine introduction to neuroscience for those interested in philosophy.

The Society of Mind by Marvin Minsky (1986, Simon and Schuster, available in paperback) combines what we know about brains and computers into a truly mind-boggling book organized by the author according to the model he proposes to represent the brain's organization.

Finally, Sarah Friedman, K. Klivington, and R. Peterson's *The Brain, Cognition, and Education* (1986, Academic Press) moves us into issues in our own professional world. It is a sometimes technical but always thoughtful examination of the educational implications of research in the neurosciences and cognitive psychology. It's an excellent update to the pioneering 1978 National Society for the Study of Education Yearbook, *Education and the Brain*. It's exciting to note how much has been discovered during the past decade, sobering to realize how much more ground needs to be covered.

Start reading somewhere in this list, continue as your time and interest dictate, and discover our profession's exciting future. And if you don't understand something you read, look it up in *The Oxford Companion to the Mind* (1987, Oxford), edited by Richard Gregory. This is an excellent, comprehensive, and relatively inexpensive reference book for general readers. □

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