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Dreams of a Final Theory: The Search for the Fundamental Laws of Nature — Steven Weinberg. From a Nobel laureate and author of *The First Three Minutes* comes an updated look at where theorists stand in their quest for a "Grand Unification Theory": the answer to all physical science. Weinberg defines the concept of a final theory and expounds on the quest for it — past, present, future — and ponders the potential effects on mankind of finding an answer. Finally, he devotes a chapter to the pros and cons of the \$8 billion Superconducting Super Collider, which some people feel will be the necessary link to a final theory. In this book, the narrative, background, and author's case for his own theories and conclusions are intermingled in a manner that the general reader can comprehend and enjoy. Extensive endnotes explain certain aspects of the book at a higher level. Pantheon, 1992, 334 p., hardcover, \$25.00.

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Eight Little Piggies: Reflections in Natural History — Stephen Jay Gould. A collection of 31 essays from Gould's regular feature in *NATURAL HISTORY* magazine comprise Gould's sixth volume in a continuing series. Specific topics detail the importance of preserving the Mount Graham red squirrel and the effect of the extinction of land snails that inhabited the island of Moorea on a man who devoted his life to studying them. The title refers to the discovery of eight digits on each hand of the first land vertebrates, which defeated the belief that five is better. Gould's fans certainly will enjoy his latest opus of reflections. Norton, 1993, 479 p., illus., hardcover, \$22.95.

The Enigma of Suicide — George Howe Colt. Between 1 and 2 percent of Americans die by suicide, according to Colt. Determined to dispel the cultural taboo surrounding the subject, he embarks on a comprehensive exploration of suicide's social, cultural, and legal history; suicide-related research, ranging from genetics to psychoanalytic theory to the effects of television; preventive efforts and support resources for bereaved relatives; "right-to-die" issues; and what suicide may mean in the minds of people who decide to kill themselves. This compassionate account is based on hundreds of interviews with survivors of suicide attempts, friends and relatives struggling to cope with suicide losses, and professionals who work with suicidal individuals. Originally published in hardcover in 1991. Touchstone Bks, 1992, 575 p., paperback, \$14.00.

Life, Death, and in Between: Tales of Clinical Neurology — Harold L. Klawans. A neurologist recounts life-and-death experiences and medical dilemmas faced by ordinary people in this fascinating look at decisions and predicaments we hope never to face. Klawans outlines his often frustrating role as consultant and researcher and discusses ethical and philosophical predicaments such as the removal of life support, the importance of death at home, and experimental drugs and treatments. People profiled include a paralysis victim whom Klawans was able to diagnose but on whom no surgeon was willing to undertake pioneering surgery. Klawans had to wait until his patient died to do an autopsy and prove himself right. He published his findings, and now that corrective surgery is commonplace. Paragon Hse., 1992, 270 p., hardcover, \$21.95.

Reversing Memory Loss: Proven Methods for Regaining, Strengthening, and Preserving Your Memory — Vernon H. Mark with Jeffrey P. Mark. The authors, a former chief of neurosurgery at Boston City Hospital and a coauthor of *Brain Power*, outline new tests, diagnoses, and treatments for memory loss. They emphasize that as many as 30 percent of the cases diagnosed as Alzheimer's disease may instead trace to other, treatable problems. They also cite depression, stress, substance abuse, and overmedication as increasingly common causes of memory loss and discuss cases of brain damage or disease that can be helped, if not completely reversed. Originally published in hardcover in 1992. HM, 1992, 244 p., paperback, \$9.95.

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opium-like compounds manufactured by the human brain. At that time, researchers also had evidence that opiate receptors existed. Yet their search for the structure of such receptors remained unsuccessful until late last year, when peptide chemist Christopher J. Evans of the University of California, Los Angeles, and his colleagues finally obtained a detailed picture of one type of opiate receptor. They published their finding in the Dec. 18 *SCIENCE*.

The endorphins and enkephalins are similar to opium, heroin, and morphine, drugs derived from the seeds of the poppy plant *Papaver somniferum*. Evans and his co-workers have identified and described the messenger RNA that carries the genetic blueprint for one type of opiate receptor from the DNA of a cell's nucleus to the receptor's production site.

Why did it take so long? Evans says the messenger RNA for opiate receptors is very rare and difficult to isolate. But once they had the messenger RNA, the team could determine the amino acids that make up the receptor.

After years of searching for one of these elusive receptors, a second team has also characterized an opiate receptor—almost certainly the same one as Evans' group. In the Dec. 15 *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES*, Brigitte L. Kieffer of

the Ecole Supérieure de Biotechnologie in Strasbourg, France, and her co-workers describe an opiate receptor that looks remarkably similar to the one the U.S. team nabbed.

The opiate receptor and the THC receptor belong to a family of proteins that do their work via molecules called G-proteins. Evans says such receptors work this way: An opiate or THC-like drug binds with the receptor on the outer surface of the cell. Once activated, the receptor acts on G-proteins inside the cell, a process that leads to a cascade of biochemical reactions — and a feeling of euphoria.

The U.S. and French investigators identified the delta opiate receptor, a type of receptor that binds with enkephalins. In the future, researchers hope to find several other types of opiate receptors, a goal that should be easier now that a map of the delta receptor exists. Evans believes that a handful of genes probably direct the production of a host of opiate receptors, including this one.

Neuroscientist Gavril W. Pasternak of the Memorial Sloan-Kettering Cancer Center in New York City predicts that the mapping of an opiate receptor will "revolutionize" the field of opiate research. Knowing the structure of this receptor (and others, once they are mapped), drug designers can begin to fashion new opiate compounds, perhaps

ones that fulfill the age-old promise of relief from pain without ill effects.

How is it that the brain evolved to manufacture compounds that resemble drugs of abuse?

Some scientists speculate that as organisms evolved from single-celled creatures to complex ones, they needed a system to regulate a welter of interrelated physiological functions. Thus, humans and other creatures developed neurotransmitters, chemical messengers that allow nerve cells to communicate with one another in the brain and with other cells in the body.

Like anandamide, the endorphins and enkephalins play a role in the healthy brain and are probably involved in immune function, motor control, and pain relief, Evans speculates.

Such brain chemicals also play a part in an organism's response to danger, a throwback to the time when immediate pain relief meant animals could flee from an attacker without delay. Most modern humans don't have to worry much about tiger attacks, but stress remains ubiquitous. As neuroscientists learn more about anandamide, the endorphins, and their protein receptors, they will begin to compile a much better picture of the way these feel-good chemicals influence human behavior. □