ereign independence of this planet's 140 local states will have to be subordinated to a world government. . . . Can these necessary reforms be carried out by any regime that is not armed with dictatorial powers? I believe this is the really big political question that confronts us now." (*Surviving the Future*, 1971, pp. 111-114.)

For an insightful and productive discussion of the problem of terrorism and war, I suggest *Modern Irregular Warfare*, by Prof. Friedrich August Frhr. von der Heydte.

The human mind is not a computer

by Warren J. Hamerman

From Message to Mind: Directions in Neurobiology
edited by S.S. Easter, Jr., K.F. Barald, and B.M. Carlson
Sunderland: Sinauer Associates Inc., 1988
368 pages, paperbound $35.00, hardbound $55.00

Neuroelectric Systems
by Sid Deutsch and Evangelia Micheli-Tzanakov
New York: New York University Press, 1987
479 pages

These two books are part of the ongoing scientific publishing explosion on how the brain is supposed to work. While the scope and approach of the various books differ, the authors all live in the "artificial intelligence" computer age. They share the worst common bias of modern science—namely, that the brain and its supporting neurological system are a highly intricate "mechanical" device, a sort of super-sophisticated, linear computer complex. The circuitry conforms to a hyper-dense hardwired computer chip array.

The underlying fallacious assumption of such modern approaches to the brain and nervous system is not modern at all. The bias can be traced back to the grandfather of crude mechanism and reductionism in modern science, the French Jesuit René Descartes (1596-1650). Descartes was responsible both for the dictum that "man is a machine," and for the notion that linear sense perceptions, transmitted as on-off signals through highly complicated "networking," are the dominant model of mental activity.

Neuroelectric Systems is a textbook which grew out of the Polytechnic Institute of Brooklyn's program in biomedical engineering, and approaches the mammalian nervous system through the eyes of an electrical engineer. The authors describe their intended audience as "people who are engaged in the marriage of biology and/or medicine and engineering." After a series of useful introductory chapters on the basic physiological systems that "gather, process and transmit information impinging upon them from the outside world, usually in the form of complex systems," the book then unsuccessfully tries to apply hardwired, linear engineering circuitry diagrams to non-linear biological processes, such as skeletal muscle activity, the auditory system, vision, and brain activity.

From Message to Mind is a comprehensive overview of the frontiers of developmental neurobiology, and presents a broad panorama of ongoing research. It covers such areas as molecular approaches to neural development, intercellular contacts, the molecular biology of the brain, axonal "pathfinding," cell differentiation in the nervous system, and the mechanical aspects of "the turned-on brain." The underlying "marriage" which this book promotes is of the bride of molecular biology and modern genetics, to the traditional groom of the neurosciences.

Happily, the work emphasizes that the intricate neuronal connections that comprise the complex circuits of the brain are not established chaotically during development. Since there are many more synapses in the brain than genes in the genome, the intricacies of neuronal circuits cannot be based upon a "one gene-one synapse" formula. Thus, we get to explore areas of cell-to-cell communication, and intra-cell signals as well.

If genes don't regulate the signals, what does? Unfortunately, the regulation process proposed here is copied from one of modern molecular biology's other dogmas: Cell surface molecules that adhere to cell membranes are the signal "markers." The mechanisms presented are directly borrowed from the vocabulary of the antigen-antibody interations of modern immunology. One wonders why such an otherwise interesting book would completely ignore the wealth of modern biophysics research spectroscopies which are mapping non-linear group interactions and "tunings" in the brain through such technologies as Nuclear Magnetic Resonance (NMR), Positron Emission Tomography, and so forth.

Also, one searches in vain for insight by the authors into the fact that, each day, it is becoming more apparent that AIDS is primarily a neurological disease, and not merely an immunological disease. If the approach at the frontiers of research is not shifted, we fear that neurobiology will be as wickedly outsmarted by the AIDS virus as immunology and molecular genetics have been.