CHAPTER 24

Postscript: Rhythm in a Global High-Tech Age

The rhythms that regulate people's lives are not the same from era to era; certainly they changed in the last quarter of the 20th century. There was also an avalanche of new scientific knowledge on topics related to the subject.

Rhythms are affected by cycles of global warming and cooling. There was warming between 1925 and 1944, but such marked cooling in the 1970s that there was talk of the coming of a new ice age. Then, from 1978 onward, increased warming and melting of the icecaps raised new alarms.[1] Scholars began to learn more about longer-range climate shifts. *Science* magazine reported: "Old trees and supercomputers are revealing a slow, multidecadal climate pulse that beats in the Atlantic Ocean and reaches around the globe."[2] All forms of life (e.g., migratory birds) were affected by climate and the pulse of climate change.[3] *Science* reported in February, 2000: "The more scientists look, the more connections they see between shifts in climate and changes in animal behavior and populations."[4]

New knowledge was gained about circadian rhythms. *Science* reported in 1999 that "a 24-hour molecular clock ticks in organisms from bacteria to humans," with a peptide called PDF as the key outgoing clock signal.[5] It was found that the biological clock had two oscillations moving in counterpoint.[6]

There was a lengthy debate about the findings of sociobiologists. Sociobiologist Edmund Wilson replied, in his book *Consilience* (1998), that the arts and social sciences should be based on understanding of how human nature evolved.[7]

Because television, communication satellites, wireless telephony, and the Internet were changing the speed and ubiquity of communication around the globe, the social environment and its rhythms were changing. By the last decade of the 20th century, when many organizations and institutions had globalized, there was a 24-hour global economy. The patterns of supply chains were being rewoven to encompass the new global reach. Cities were overflowing with population in some parts of the world, while in other parts they were emptying out as people moved past suburbs to exurbs. In a world full of refugees and migrants, through modern communications dispersed peoples could form virtual communities.

Because of automation of manufacturing, the subject of cybernetics was more important than ever. There were many new kinds of work and old work

was done in new ways, with new rhythms. Societies were restructured; lifespans lengthened; life cycles and their rhythms changed. The percentage of Americans working in service industries in 1999 was about twice as high as that of those working in manufacturing. Manufacturing companies, more automated and more global, were less organized in hierarchies. The United States was moving toward a 24-hour, seven-day-a-week economy. "Two fifths of all Americans work[ed] mostly during the weekends or nights. . . As of 1997, only 29.1 percent of employed U.S. citizens worked a 'standard work week'." People changed jobs and careers more often than before.[8]

The last quarter of the 20th century saw quantum leaps in brain research, partly because of attempts to create artificial intelligence. John C. Eccles reported in 1977: "the journal *Brain Research,* founded in 1966, published in one year (1975) 18 volumes totaling over 9000 pages; it is only one of the many journals started in the last few years."[9] Researchers in cognitive neuroscience and neural networks found that, underlying complex behaviors, there were distributed brain networks involving interactive synchronization in multiple brain regions.[10]

DNA research from 1953 onward, culminating in a complete mapping of human genome structure by the year 2000, promised not only to reveal new insights into body rhythms and their relation to the operations of the brain, but also greatly to alter life spans, which by itself would alter the rhythms of life.

Psychologists continued to explore patterns of human cognition. *Science* reported: "Critical periods have been well documented for the development of sensory systems in the brain, especially vision. But many neuroscientists also believe that critical periods exist for development of at least some of the brain functions that underlie complex learning and thinking skills."[11] Bruer reported in *The Myth of the First Three Years* that there were critical periods when the brain showed greater plasticity in responding to experience, but scientists agreed that such periods were not as sharply defined as some laypersons said.[12] Piaget had believed that human intelligence was primarily designed for the solving of physical, logical, or quantitative problems. Now scholars were saying that human intelligence was intrinsically social. Linguist Mark Baker, studying how unwritten languages expressed spatial concepts, found that some of the languages required that their speakers continually run a mental compass and positioning system and that the difficult process appeared to be learned, not innate. Catherine Snow, in her review of Katharine Nelson's book, *Language in Cognitive Development,* said, "Language is the channel through which culture is recreated for every generation, through which knowledge is transmitted, and through which the autobiographical self is established."[13] The argument in Michael Tomasello's *The Cultural Origins of Human Cognition* was that human uniqueness as a species was founded on the unique human capacity for identifying others' intentions.[14] More was learned about intelligence in other mammals.[15]

Not the least of the new insights were those of physicists into the nature of space and time. "Newton declared space and time to be eternal and immutable ingredients in the makeup of the cosmos."[16] Leibnitz and others said space and time were simply ways of summarizing relations between objects and events. Now Alain Comnes had developed a noncommutative geometry in which there were no conventional notions of space and time. Stephen W. Hawking commented: "When we combine quantum mechanics with general relativity, there seems to be a new possibility that did not arise before: that space and time together might form a finite, four-dimensional space without singularities or boundaries, like the surface of the earth but with more dimensions."[17]

After atoms had been split, and particle research advanced, along came string theory, which promised to close the gap between quantum theory and Einstein's theories of relativity in the universe. Brian Greene reported: "Each elementary particle is a particular mode of vibration of a minute oscillating string. . . . The strings 'vibrate in ten dimensions of space-time', of which we see only four." There was, however, no apparent way to test the theory since "the most direct test . . . would require a particle accelerator at least the size of our galaxy".[18]

In the face of all the new discoveries and many more coming, there was no way to close the book on the subject of rhythm as the basis of human (and all earthly) existence.