

# A quantum view of life's mechanics

**Q**uantum mechanics, the mathematical description of the inner workings of subatomic matter and forces, is the most basic and irreducible of the physical laws, verified by observation and experiment many times over. Along with Albert Einstein's theories of relativity, it is easily one of the greatest scientific achievements of mankind. But it is in the interpretation of what is really going on down there, out of view, requiring us to throw away common sense, where quantum physics gains its almost irresistible charm as a paradigm for poets, philosophers and scientists alike.

In **The Quantum Society** (Morrow, \$25, 361 pages), Danah Zohar and Ian Marshall use the quantum paradigm (in a manner that echoes the 1970s cult classic "The Tao of Physics") to suggest an alternative to the worldview connected with Isaac Newton's mechanistic physics, which tidily carves up experience into subject and object, observed and observer.

However, the subatomic quantum world, experiments say, blends together. Events are random rather than sequential and predictable. At the paradigm's core lies the observation that external reality, rather than being distinct from us, is observer influenced. Light behaves as a perfect wave until we measure it, at which point it becomes nothing but tiny particles.

The authors pick up the quantum paradigm and extend it marginally, drawing out parables for modern society. Some of the quantum themes they would like to see woven into society are inter-relatedness and the many-sided nature of truth, viewpoint and experience.

Exactly how his "nexus of unbroken wholeness" is to be cast over the complex dimensions of society, however, is not spelled out. The authors propose a covenant. Yet he primer material for this, **A Politics of Transformation**, comes off as a

**Machine** (Free Press, \$22.95, 211 pages) reversing the analogy instead to a model of the computer based on the mind.

Mr. Gelernter, who had his life and career put on hold in 1993 when he was seriously injured by a letter bomb, is one of the founders of parallel computing, a process of "stacking" computers that enables enormous increases in computing process speed. The pioneers of computers, Mr. Gelernter insists, overlooked one important thing in the mind-machine analogy: emotion and its connection to the senses, memories and creative reasoning. Do I sense the influence of quantum "holism" here too? Perhaps, although there is no direct reference to it.

Mr. Gelernter describes current efforts to build computers with emotions, maintaining his belief that they would aid and not usurp humans in their role of doing useful, inventive work.

Murray Gell-Mann muses dryly in the afterword of **The Quark and the Jaguar** (W.H. Freeman, \$23.95, 375 pages) that, in retrospect, he guesses "the main function of this book is to stimulate thought and discussion." For Mr. Gell-Mann, the 1969 winner of the Nobel Prize in physics for his theory predicting the existence of the subatomic "quark," the words would appear to apply equally well to the function of his life.

Mr. Gell-Mann, who by the age of 24 had made major contributions to theoretical physics, these days is an early retiree from Cal Tech, an avid naturalist and founder of the Santa Fe Institute. He traces the inspiration for this book to a walk in a Belize forest.

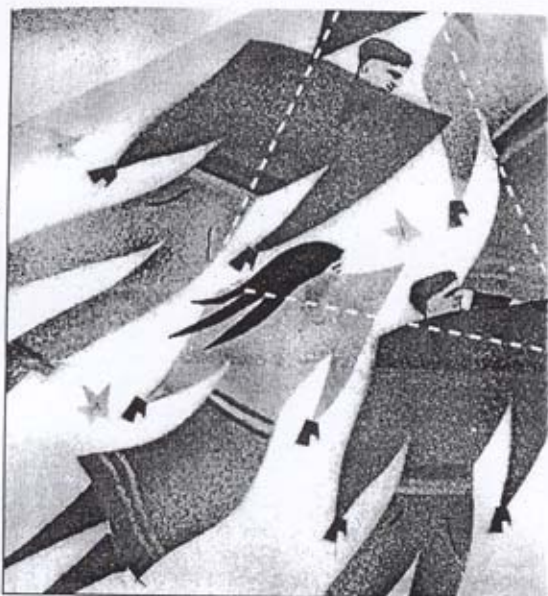
rather tired rehash of all the deficiencies of Western liberal values and institutions. Eventually the point becomes labored, perhaps from the strain of unnecessarily connecting what is essentially a quest for some type of new mythological certainty to the philosophical fallout of quantum physics.

Quantum theory often provokes debate over whether or not anything is fundamental, or if events, or "histories" as they're sometimes called, occur only when we observe them. Tapping into this recondite vein of the quantum paradigm, Fred Alan Wolf's **The Dreaming Universe** (Simon & Schuster, \$23, 426 pages) gives a highly speculative account of the nature and meaning of dreams.

Suppose, as seems the case, that all matter, including ourselves, obeys the fundamental laws of physics and behaves quantum mechanically. Then the brain, and ultimately consciousness itself, could be considered a consequence of quantum mechanical interactions. This could account for the fragmented imagery of dreams, as neurons in the brain, freed from control of the dreamer's consciousness, communicate in a sort of complex, random but meaningful synchronicity.

Mr. Wolf proposes a meaning with references to early dream research, Jungian "physics," the quantum wave function and the Australian aboriginal concept of dreamtime, which holds the physical universe to be the dream of a Great Spirit.

Thirty years ago, with the advent of the first primitive supercomputers, it was man learning and feeding off the machine, incapable, itself, of imperfection. The faddish thing then, as evidenced by a number of old books on my shelf, was to refer to the brain as a biocomputer — hard-wired and potentially programmable. Now that we have apparently reached the functional (not computational) limits of the computer, Yale computer scientist David Gelernter suggests in **The Muse in the**



Detail from jacket of "The Quantum Society"

Mulling the connection between quantum theory and the larger world of creatures and culture, he was startled when a jaguarundi crossed in front of him. For the first time, he notes, he felt the urge to write a book.

The connection between the simple (quark) and the complex (jaguar) is exemplified in what Mr. Gell-Mann calls complex adaptive systems. As befitting a Nobel laureate, this book is full of clear, fact-rich analysis and insightful analogies. Graphically, one begins to see the underlying connection and point — what makes a child learning language and a bacterium evolving drug resistance similar, both complex and adaptive.

Mr. Gell-Mann devotes a rather lengthy section to quantum physics, in part to take some of the sap out of what he derides as "quantum flapdoodle." The cult of the quantum paradigm, he suggests, has been nurtured in part by some basic misconceptions about what quantum mechanics implies.

Quantum flapdoodle, on the other hand, has proliferated because some have seized the chance to interpret, say, the probabilistic behavior of an atom as an indication that in nature anything goes. Typically, Mr. Gell-Mann recalls being asked as a graduate student to calculate the probability that, owing to quantum fluctuations, some large, heavy object would jump a foot into the air in a given time period. The answer, thankfully, was a number very near to zero.

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