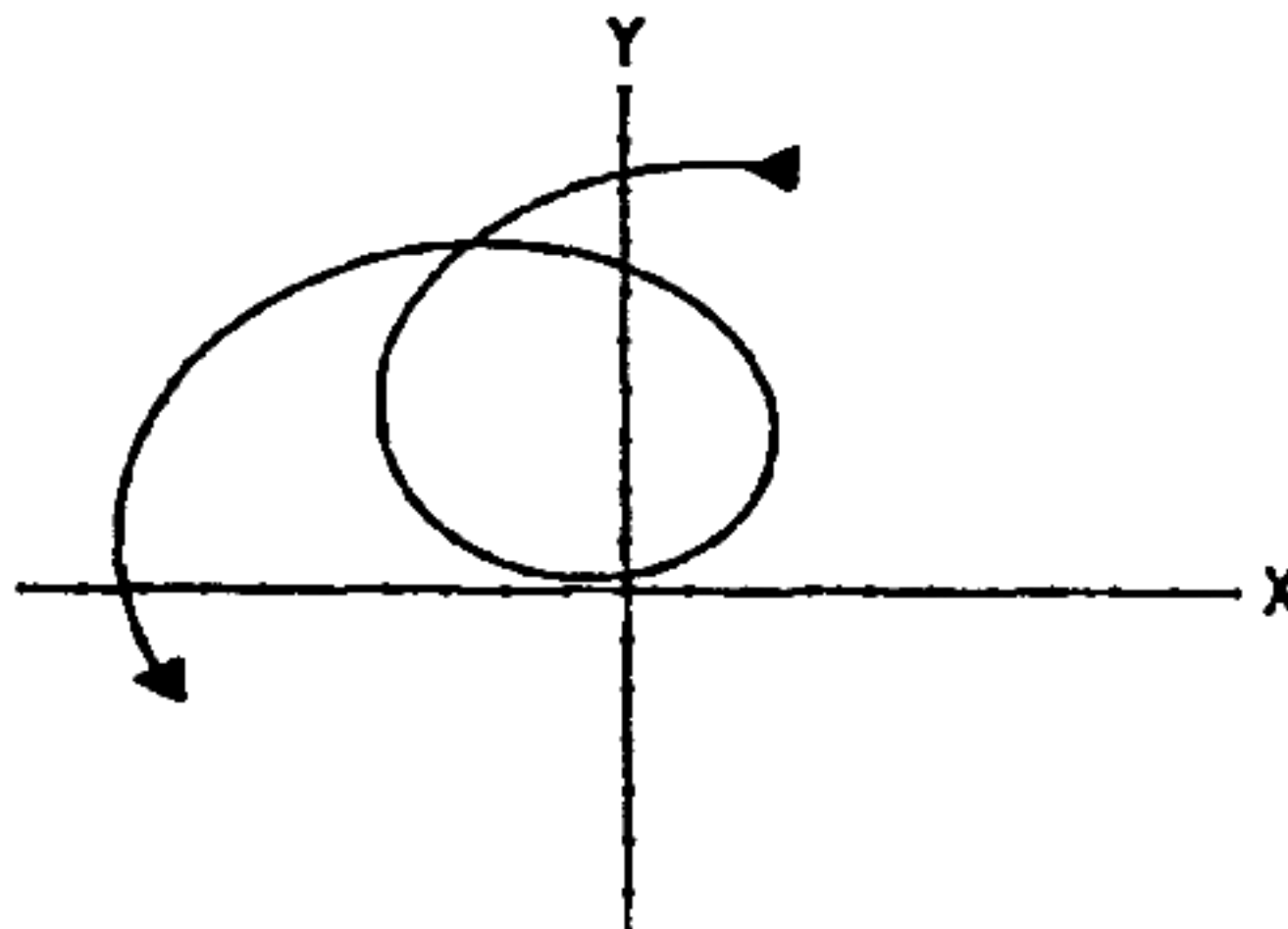

• CYCLES •

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When the Sun Goes Backward
A Harbinger of
Climate and Economic Cycles in the 1990s



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The Law of Waves and the Invalidation of the Scientific Method

BY IRVING I. DARDIK

*All things by immortal power near or far
hiddenly to each other linked are, That
thou canst not stir a flower without trou-
bling of a star.*

—Francis Thompson, 1897

Since the beginning of scientific reasoning, man has searched for a single, all encompassing law of the universe. This "Theory of Everything" would explain what science assumes to be its Fundamental Dual Reality: *a material universe in which change occurs in space and time.* "Change" includes individual motion as described by deterministic mathematical laws and collective change as described by statistical law. This duality of matter and change presents the proverbial problem of "form versus function."

As scientists acquire more knowledge, the more we distance ourselves from the goal of defining a single law to explain both matter and change. Instead, we are accumulating a growing number of laws and sciences of increasing complexity. The Theory of Everything has eluded us.

Richard Feynman (1965), the Nobel laureate in physics, said,

... what turns out to be true is that the more we investigate, the more laws we find, and the deeper we penetrate Nature, the more this disease persists.

Irving I. Dardik is a physician and founding chairman of the United States Olympic Sports Medicine Council.

Every one of our laws is a purely mathematical statement in rather complex and abstruse mathematics. Newton's statement of the law of gravitation is relatively simple mathematics. It gets more and more abstruse and more and more difficult as we go on. Why? I have not the slightest idea.

However, the problem is even deeper than what Feynman describes as a proliferative "disease of laws." As science evolved, more and more mathematical laws were discovered to describe matter and motion. These range from Newtonian mechanics to the theories of relativity, from the laws of thermodynamics to quantum theory. However, not one mathematical law describes the organizational behavior of complex systems. How do new properties emerge as the parts of the complex system interact as if the whole is greater than the sum of the parts? Nature, in all of its complexity, seems to refuse to follow the simple, deterministic laws of science.

This problem is especially significant because complexity is the rule in Nature rather than the exception. Why are complex systems—such as a cell, an immune system, the brain, a living organism, a swarm of bees, a rain forest, an economic system, a society, etc.—not subject to the mathematical laws of prediction? Many laws govern the motion of simple systems, but no law can explain how complex systems are organized so that every part simultaneously "knows" what all the other parts are doing. The causal laws of prediction

would seem to be governed also by a law of synchronization. Sandwiched between the extremes of these two issues—many deterministic laws versus no law of synchronous complexity—lies the realization that a Theory of Everything grows ever more elusive.

Scientists offer a number of reasons why a Theory of Everything has not yet been found: more scientific research and technology are needed; formal abstract mathematics can never fully model the complexities of informal Nature; even if a Theory of Everything does exist, it can never be found; a Theory of Everything simply does not exist. From a scientific perspective, these excuses have one thing in common: they look *within* science itself for the answer.

I propose a completely different place to look. Instead of looking for Nature's deep regularity within the towering structures of information, knowledge, and science that past observations have built, I go back to the beginning where it is possible to reconsider the very basic premise that gave birth to our scientific methods of trying to understand the universe.

This basic premise, which gave us science, has been accepted *without question* since our earliest observations and reasoning. *This premise holds that the universe and everything in it is a puzzle made of parts that add-up to make wholes.* I call this premise the *Puzzle Hypothesis*. The idea of parts and wholes is one of inherent *discontinuity* in which everything in