

The Hidden Connections

Book Review by Bill Ellis

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The Hidden Connections: A Science for Sustainable Living by Fritjof Capra (Random House: New York, 2002)

This book is about creating learning communities, but that is not its topic. Its topic is networking, or in Capra's words "connections." It's a comprehensive review of all cosmic networks that make up "life, mind, and society."

Capra moved beyond his profession, physics, with *The Tao of Physics* that explored the parallels between quantum mechanics and Buddhist, Taoist and Hindu thought. With *Turning Point*, *Uncommon Wisdom*, and *The Web of Life* he explored the science-social nexus further by showing the relevance of chaos, complexity and Gaian theories to philosophy and to society. In *The Hidden Connections* he expands again his science/social analysis to link new concepts arising from brain research, genetics, neurobiology, and bioneering to the understanding of the cosmos and the natural laws society must obey if humanity is to continue to exist.

This is a good layman's primer of current scientific breakthroughs and their implications to everyday life. Only occasionally does it become more involved in the intricacies of science than this reviewer thinks necessary to meet the author's goal of "integrating the biological, cognitive, and social dimension of life into the science of sustainability." Two concepts that he seems to consider too lightly are "emergence" and "downward causation." They are particularly relevant to both the brain/mind and the gene/DNA networks.

All steps in cosmic evolution, as Capra clearly explains, result from simple entities linking to create more complex ones. The emergence of each new entity is the emergence of a physical or organizational form. With the new emergent system new properties or "qualia" also emerge that are not included in, nor predictable from, the component parts of the new system. Capra uses "sweetness" as a simple example. Carbon, hydrogen and oxygen combine to create sugar. The emerging new physical entity has the emerging new unpredicted property or "qualia" of sweetness.

Similarly as the networking of genes produces DNA, a new "qualia" emerges that is more than just the connections of genes. It is this wholeness of this DNA network that determines the kinds of people we can become. As Capra masterfully points out, replacing one or more genes here or there in the complex DNA chain may, or may not, change that emergent "qualia" of the person. In like manner, the "qualia" of mind, thinking or consciousness, emerges with the emergence of the neural networks of the brain.

The critical characteristic of any emergent complex network is "downward causation." Nobel Laureate, brain researcher Roger Sperry, enunciated the principle that newly emerging qualia of any new complex entity may take over partial control over its parts. Sperry suggested that this is somewhat like a wheel. The spokes of the wheel are governed by the wheel, and so are the molecules and atoms within the spokes. More exactly, he believed that the mind is a qualia of the brain. The mind is able to activate neural networks and thereby control the body itself, and all the effects that humans have on society.

"Learning" is a hidden connection in Capra's *The Hidden Connections*. The book makes much of the "creation of knowledge." It recognizes that "knowledge creation is an individual process." It is a unique emergent property of the mind/brain of each individual. It comes from the networks of communities in which the individual is embedded. The value of the book is not in any formula given for creating learning communities. It is in the symbiotic feedback loops it calls for from which learning communities will emerge, and that will emerge from learning communities.

Capra sees "a system of education for sustainable living, based on ecoliteracy, at the primary and secondary school levels, . . . with a pedagogy that puts the understanding of life at its very center; and experience of life in the real world . . ." He notes "that life, from its beginning, did not take over the planet by combat but by networking."

See also:

- The 2003 International Democratic Education Conference
July 16th - July 24th, Albany, New York, U.S.A.
- The Education Revolution by the Alternative Education Resource Organization
 - Democratic Education
- Paths of Learning: An Introduction to Educational Alternatives
by Robin Ann Martin, November 2000
- by Elisabet Sahtouris:
 - Living Systems, the Internet and the Human Future, 5/13/00
 - Issues of Human Evolution into Global Community, January 2002
 - Skills for the Age of Sustainability: An Unprecedented Time of Opportunity, May 2002
 - The Biology of Globalization, 1998
 - *EarthDance: Living Systems in Evolution*, 1999
- by Dr. Mae-Wan Ho:
 - Organism and Psyche in a Participatory Universe, 1998
 - Towards a New Ethic of Science, 3/16/00
 - Evolution, 1998
 - The Organic Revolution in Science and Implications for Science and Spirituality, 9/00
 - The Biology of Free Will, 1996
- A Native American Worldview / Hawk and Eagle, Both are Singing
by Paula Underwood Spencer, 1990
- 9/22/01 rator's corner: The New Myth For Our Species: The Creation of Consciousness

<http://www.ratical.org/co-globalize/Hconnections.html>