

The scope of the book is tremendous. While few critical readers will agree with all its conclusions and suggestions, most will agree that the work deserves a large measure of respect because it offers promising points of departure for analytic and constructive work towards a completion of a unified process for philosophy of science and religion.

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**The Marriage of Sense & Thought: Imaginative Participation in Science**

by Stephen Edelglass, Georg Maier, Hans Gebert, and John Davy. Hudson, NY: Lindisfarne Books, 1997, xi + 146 pp., \$16.95, (p). ISBN 0-940262-82-7.

*The Marriage of Sense & Thought* is a must-read for anyone interested in the practice of science. This includes scientists, of course, but also lay persons interested in epistemology — how we know what we know, and the nature of “knowledge.” The book was first published four years ago as *Matter and Mind*; this revision represents a second edition. Both editions are subtitled “Imaginative Participation in Science,” and this subtitle hints at the book's content. The four authors are experienced scientists and educators, whose views have been strongly shaped by, among other things, Goethe's scientific works and the scientific and educational approaches of Rudolf Steiner.

While Goethe is better known for his artistic endeavors, he created a scientific approach that was significantly different from the prevailing approach of his (or our) time. The “modern scientific” approach, following Descartes' model, emphasizes the difference between two sources of knowledge — external observation and internal thought — in an attempt to distinguish that which is “objective” (and therefore “desirable” and “trustworthy”) from that which is not. Indeed, the “detached observer” is the ideal to which many scientists aspire, and it arises from a “materialistic” world-view that does not consider or embrace anything not rooted in “external” (physical) space. In contrast, Goethe contended that there is only one source of knowledge — experience — and that this includes both observation and thought. For example, to Goethe, there was no distinction between consideration of a single plant or the idea “plant,” because the archetypal or “ideal” representation of “plant” was as “observable” or “perceptible” — and thus real to him — as any actual plant. The Austrian scientist, philosopher, and educator Rudolf Steiner significantly extended Goethe's approach, describing the process of observing phenomena and thinking about them as perception and conception, whose union represents reality. The authors contend that this “marriage of sense and thought” requires imaginative participation in science. Thus, the authors argue, the so-called ideal of the detached observer is neither achievable nor desirable, and that “choosing to limit science only to those experiences that are measurable is a

wholly arbitrary choice within the framework of the nature of sense experience" (pp.107–108).

The authors give a particularly powerful example of the nature of marrying sense and thought in their discussion of the well-known conundrum of the color and sound of a tree falling in a forest. They argue that the tree reflects and absorbs electromagnetic radiation, and produces an acoustic pressure wave in air, independent of the presence of an observer, but that the tree has "color" and produces "sound" only if an observer is present to note and interpret these physical phenomena of radiation reflection and air compression and rarefaction. Thus, the concepts of "color" and "sound" arise within the imagination of the observer *via* participatory thought.

This unified approach to observing and thinking, first described by Goethe and extended by Steiner, leads to the primacy of phenomena, rather than abstract models, in both gaining and describing knowledge about the world. In a phenomenologically based scientific approach, ideas serve as the bridge from one observation to the next. An extremely important concept regarding this approach to the practice of science, put forth by the authors, is: "... a relationship with the physical world can be understood as a state of equilibrium in which the investigator balances a focus of attention on one aspect with an awareness of the whole from which it is drawn" (p. 84). In this regard, the authors point out "... the danger that models may become myths on which the mind dwells," and that in the same way that ancient myths become divorced from sense experience, "modern scientific models are removed from the original perceptions that inspired the thoughts upon which these same models were formed" (p. 73).

How did classical and modern approaches to science evolve? Classical science, which evolved from the craftsperson legacy, was based on the senses. The authors emphasize the apparent attraction of classical science to simple external "mechanical" or "materialistic" measures of space, matter, time, force, and energy — highlighting this attraction by identifying the measurement of length as particularly desirable (*e.g.* as in a thermometer, where a measure of temperature is converted into a measure of length). The authors point out the challenge of relating these simple measures, which are themselves abstractions made further abstract through mathematical formulations, to the underlying phenomena of the "real" world. Modern science is making it increasingly necessary to bridge the gap between the world "out there" and the world "in here." The discovery of electricity and magnetism, which forced a type of thinking that went beyond human senses and purely mechanical laws, heralded the era of modern science; relativity theory and quantum mechanics further forced scientists to consider parts of reality imperceptible by the senses and unexplainable by mechanics.

Must we go beyond a materialistic-reductionist, model-based view of the world? It depends on our purpose. Models are useful in many circumstances for predicting the outcome of experiments. The authors, however, present the

challenging notion that many times such models are unnecessary and counter-productive. This is because established models have a tendency to limit our willingness and ability to move beyond the unconscious acceptance of these models as “reality” toward the recognition (and ultimate acceptance) of experiences which were previously categorized as “occult.” If we wish to go beyond models, and attempt to truly understand the world, both percept and concept must be included, for only a marriage of sense and thought can lead to a complete and accurate description of reality. The authors argue that we must develop our faculties of thinking, including what they call “precise imagination,” and acknowledge and embrace active, imaginative participation in the scientific process.

This clearly written and compelling book challenges all of us to rethink our notions of the practice of science, and the optimum approach to the scientific method. Whether or not the holistic, humanistic approach advocated by the authors will ultimately be accepted remains to be seen, but, at the very least, their proposals are worthy of serious attention and discussion.

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**Intuition: The Inside Story** edited by Robbie Davis-Floyd and P. Sven Arvidson. New York: Routledge, 1997, xvii + 208 pp., \$20.00, (p). ISBN 0-415-91594-5.

This is a collection of essays by thirteen of the participants in the Academy of Consciousness Studies, a two-week convocation hosted by the Princeton Engineering Anomalies Research (PEAR) Laboratory at Princeton University in 1994. The anthology comprises two parts — the Nature of Intuition and Intuition, Science, and Praxis — and provides a voice for this interdisciplinary, international community of scholar/practitioners, who “address the interrelationships of consciousness and environment in the construction of reality, acknowledging the dynamic complementarity of science and spirituality.” From philosophy, medicine, education, and quantum theory, to midwifery, psychology, and neurology, *Intuition* swiftly covers a plethora of perspectives in its intention to address the pivotal issue of consciousness and its role in science.

The authors ask us to examine our beliefs in something greater than ourselves, and greater than the material world. If we take the leap, as the book does, and find the willingness and courage to embrace an aspect of ourselves and reality larger than our physical senses and beyond the capabilities of the brain, then what implications does this have for science? *Intuition* steps forward to bridge science and spirituality, materialism and idealism, as well as reason and intuition, and explores the polarities of mind and heart, of