

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

masculine and feminine, in order to formulate new visions of a holistic science embracing and transcending opposing forces of a dualistic reality. The stories, anecdotes, and theoretical discussions offer us insight into the process of balancing intellect and intuition so that we may begin to transform our perspectives and heal the increasing split between traditional scientific awareness and unorthodox forms of metaphysical knowledge of reality. As contributor Anne Pineault states, we are “searching for the reasons connected to [our] season of discontent.” The forthcoming and at times sorrowful discussions of this increasing chasm serve to emphasize the importance of intuition in science and our daily lives.

The first essay, “Intuition, The Concept and the Experience,” by psychologist Marcie Boucouvalas, traces past and modern-day characterizations of intuition, from process and experience to spiritual frameworks of conceptualizations in a historical context. Using medical and business examples, she distinguishes theoretical models from experiential perspectives in her analysis of physical, emotional, mental, and spiritual levels of awareness. Boucouvalas suggests future questions relevant to the entire discussion of intuition as a whole.

Ethnographer Charles Laughlin dives into the dichotomy between reason and intuition in “The Nature of Intuition, A Neuropsychological Approach” refuting the claim that intuition has little or no place in science. From its roots in religion and metaphysics, the transformation of intuition from a valid source of knowledge to its current ‘positivist’ form as “a nemesis of science” is discussed by Laughlin. He then discusses three dimensions of consciousness, focusing on connections within the neuroendocrine system: ergotropic-trophotropic tuning, hemispheric asymmetry of function, and intentionality.

Philosopher P. Sven Arvidson addresses the phenomenology of intuition in “Looking Intuit, A Phenomenological Exploration of Intuition and Attention” by examining the process of transformation of consciousness in the moment of intuition. Elaborating upon the “eureka experience” — that moment of spontaneous understanding or awakening, attention shifts, and “elucidation” — he approaches the difficulties associated with the use of metaphor in discussions on intuition. In short, Arvidson believes that “metaphors used in theorizing and generating research on attention in psychology are misleading and not resonant with the phenomenological findings.”

Educator Joe Sheridan and artist Anne Pineault return “location to information” in their essay “Sacred Land – Sacred Stories, The Territorial Dimensions of Intuition.” The authors emphasize the importance of restoring “natural environments of mythic and intuitive proportions” to inspire a “primal mind” necessary for a sacred communion between mind and place, thereby developing the resonance between our being and our surroundings in the wild — this form of intuition they refer to as “wild intelligence.” In one example, a professor asks a Lakota-speaking Minnecujo for advice regarding his own personal experience of elation and then debilitating depression. The professor para-

phrases the Minnecujo's response, which addresses the connection between place and experience:

...Ancient memories [were] contained within the biological cells of my bones, my marrow, my skin cells passed on for generations by my ancestors. And that there was a communication between what I was genetically made up of and whatever traces of the ancestors were present at the site (p. 66).

With stories and anecdotes, they describe teachings of Elders, that involve communication between "different worlds" and "patterns of energy [that] contain an inherent consciousness that is made manifest by an act of will."

In "Wheels Within Wheels, Building the Earth, Intuition, Integral Consciousness, and the Pattern That Connects," Guy Burneko, director of the Graduate Liberal Arts program for Golden Gate University, embarks on a study of the "archaic, the magical, the mythical, the mental, and the integral" where the political and social bearing of intuition come to light. From Kosko's "fuzzy logic" to the "psychopolitical absolutism implicit in perspectival and dual rational consciousness," to language itself as a free self-organizing entity, "unencumbered by our usual utilitarian obsession," Burneko takes us on an intricate, poetic journey of analysis to see the ways we construct our reality through reason and intuition.

Physicist Evelyn H. Monsay in "Intuition in the Development of Scientific Theory and Practice" examines the problems of separation between the intuitive scientist and the process of logical positivism. She emphasizes that the scientist's hypotheses, theories, and laws arise due to imagination and intuition, and therefore, cannot be excluded from the scientific process. In her view, empirical observation is often colored by our expectations and what we choose to look at, creating a further subjective bias in the discovery process. She formulates an in-depth description of how science "gets done" and portrays the scientist as an "emotionally involved thinker whose imagination is fueled with intuitive notions of realities." Utilizing the serendipity, analysis, analogy, and animation of the scientist in the discovery process, she offers ways whereby the intuitive abilities of the scientist can be enhanced.

In her essay, "Subjectivity and Intuition in the Scientific Method," PEAR's laboratory manager, Brenda J. Dunne, emphasizes the dynamic and necessary interplay of experience with conceptualization, and experiment with theory, and argues for the inclusion of a subjective reality in science, such as intuition. Not only does she believe that subjectivity in science is imperative, but she feels it will take science to another level of brilliance. In her view, denial of assumptions, desires, or expectations by a scientist can be counterproductive, so subjective bias and conscious awareness must be partners for a "true practice" of science to occur. As she states, "the great intuitive leaps of insight... require the spiritual detachment that only comes from self-examination." As long as scientists separate themselves and their assumptions from the process

of gaining knowledge, then according to Dunne, we limit the scientific process and impede the intuition and creativity so crucial for deeper understanding of reality. As she states in her conclusion:

Development of new modes of conceptualization that will permit accommodation of the intuitive, creative, and mystical dimensions of consciousness within the purview of science would not only retain for science the resilience and adaptivity necessary for its continued relevance and utility in the burgeoning age of information, but would raise the scientific method to its rightful place as one of the triumphs of transcendent human achievement (p. 128).

Computer scientist Bob Harbort, in “Thought, Action, and Intuition in Practice-Oriented Disciplines,” discusses a “hermeneutic model through an examination of psychological and philosophical perspectives on intuition, motivation, and the role of experience in belief formation.” With models and diagrams, he outlines psychological and philosophical constructs of intuition as they apply to daily life.

Cultural anthropologist Robbie Davis-Floyd teams with midwife Elizabeth Davis to write “Intuition as Authoritative Knowledge in Midwifery and Homebirth.” They contrast the encouraged separation of woman and child in birth, arising within traditional western medicine practices, with a more holistic approach found with midwives. As a result of their anecdotes and arguments, one cannot help asking how much the technology employed in the process of birth influences our transpersonal and psychological development. They offer a portrayal of midwives who use a balance of medical skills and intuitive faculties to excel in their profession, citing lower mortality and caesarean rates from these practitioners compared to traditional hospital births. Through a series of interviews, the authors find the “enormous value” midwives place on “connection,” as well as an effort to “be open to oneself and to the woman and her birth.” Both require deep levels of trust and dedication to the power of their intuition.

Finally, Lucia Roncalli, in “Standing By Process, A Midwife's Notes on Storytelling, Passage, and Intuition,” offers liberating stories of midwifery that gently offer wisdom regarding intuition and its role in our lives, and how costly it can be when we ignore our intuitive knowledge. Guardianship and responsibility are powerful themes woven into her essay, emphasizing the mystical and meaningful roles intuition contributes to our lives.

In conclusion, *Intuition* offers powerful reasons for us to care about what we feel and know beyond intellectual understanding, to listen to our hearts, and to include the spontaneous wisdom from within as a valid means of acquiring knowledge. In an era of information and global interconnection, these visionaries emphasize the importance of human intuition — the subjective realm of consciousness — as a key ingredient not only for the future success of science, but also for individual spiritual development. The experiential knowledge

shared throughout this volume is a tribute both to the PEAR lab — responsible for the forum which inspired these essays — and to all people, seen and unseen, who care deeply about the future of the planet and what role science plays in our unfolding evolution.

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Before the Beginning by Martin Rees. Reading: Addison Wesley, 1997. ix + 291 pp. \$25. ISBN 0-201-15142-1.

The Inflationary Universe by Alan Guth, Reading: Addison Wesley, 1997. xiii + 358 pp. \$15 paperback. ISBN 0-201-32840-2.

The Whole Shebang: A State-of-the-Universe(s) Report by Timothy Ferris. Simon & Schuster, 1997. 393 pp. \$25 hardcover. ISBN 0-684-81020-4.

Even for books on the abstruse subject of cosmology, publishers' announcements use phrases like "This eagerly-awaited book...." If one reads further, here comes another book on cosmology touted as "This long-awaited volume....," and then another, and another. When one actually sits down to read them, these books all have the same tired old story of everything created instantaneously out of nothing, expanding space, contracting black holes, dark (unobserved) matter, relict radiation from a primeval fireball, *etc.* Is there anything really new here?

Let's start with one of the currently most recognized names in the business, Martin Rees, now Astronomer Royal of England. In his book, *Before the Beginning*, he dispatches alternative theories in a few pages titled "The Losing Battle for a Steady State." Although by now scientists know what he is going to say, the way he says it is actually very revealing.

As one who lived through the days of debate and knew the principle combatants, I can confirm that there was a titanic struggle between the proponents of steady state and the Big Bang. The most prominent advocate of steady state was Fred Hoyle, who founded the legendary Institute for Theoretical Astronomy (IOTA). After a well known, but under-reported political struggle in Cambridge, Hoyle resigned as director and was succeeded by Martin Rees. Rees's characterization in his book was: "Hoyle, the most creative and original astrophysicist of his generation..." If one pauses for a moment on the last three words one is perhaps better prepared for the cursory dismissal of "New Physics" in the few brief pages which follow.

The crucial belief systems are rather neatly summed up when Hoyle proclaims the primacy of observational data. Rees then adopts the stance that "Unless these [anomalous] effects can be nearly all incorporated into a single