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David Bohm's Theory of the Implicate Order: Implications for Holistic Thought Processes*

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Abstract: David Bohm's theory of quantum physics, which focuses on the schism between matter and consciousness, is discussed in terms of positivist knowledge and the interdisciplinary holistic paradigm. This paper examines how scientific and educational holism, predicated on the relationship between knowledge and reality, fosters innovative approaches such as evolutionary learning, a pedagogical application of general systems theory. In pursuit of right-brain thought and a unified knowledge base, diverse modes of inquiry are presented in the context of Bohm's thesis of an implicate order. Given that holistic thought processes generate a reality-based knowledge, problem-solving styles are examined, which reveal the holistic orientation of proactive problem-solving. Interdisciplinary dialogue is identified as an essential way for moving toward holistic expressions and networks of thought.

NEW VERSIONS of the sciences as well as other academic disciplines are being formulated in terms of a naturalistic mode of inquiry (Lincoln, 1989; Palm, 1979). The emergent post-positivist paradigm is directed toward a holistic conception of reality, replacing the Cartesian, mechanistic mode of conceptualization (Capra, 1982; Guba, 1981; Lincoln, 1989; Turner, 1990), In fact, characteristics of the "whole paradigm" are being identified in a variety of disciplines (Lincoln, 1989, p. 69). New dimensions include a refocusing from simple to complex realities, the movement from the mechanical to the holographic, and the emphasis from linear to mutual causality (Lincoln & Guba, 1985; Macy, 1991; Schwartz & Ogilvy, 1979). The underlying premise initiating this change is the growing scientific legitimation of consciousness as a causal reality, initiated by Sperry's (1987) medical research on human split-brain studies. For Sperry, the admission of subjective knowing and "treatment of consciousness, at the epicenter of all knowledge and understanding" (p. 55), has challenged the boundaries of instrumental, objectivist reason to the point of generating a "consciousness revolution" (p. 37), creating what he calls the "new mentalist paradigm" (p, 55). For Harman (1988), this linking of mind to the once exciusive domain of materialist, reductionist interpretation, is nothing short of a second Copernican revolution.

My own research in the sociology of health and illness which focuses on alternative, holistic health modalities in terms of explanatory frameworks for illness, client-practitioner interactions, and clients' responses to treatment, deals with the above mentioned conceptual issues, especially what McGuire (1988) terms the mind-body-society schism. A major objective of my study is to understand health as a real world problem. I investigate how clients commit themselves to a healthy lifestyle and holistic worldview. Evolving consciousness becomes an important component in understanding how they become engaged in purposeful activity to redesign their interrelated systems of living—the biological, social, psychological, spiritual, and environmental. An underlying knowledge assumption guiding these premises is that a multidimensional nature of illness designates an interdisciplinary "perceptual space" (Lyng, 1990, p. 112), which makes many social and behavioral sciences, and even many nonscientific disciplines relevant to the investigation of health and illness. Because the holistic health model claims that "all medical perspectives are inherently partial," it is an alternative "multiper-spectival system" of health care employing "multitherapeutic" approaches (Lyng, 1990, p. 94). This eclectic body of knowledge and technique contrasts with the almost singular emphasis on anatomo-clinical theory in the biomedical model (Foucault, 1973; Lyng, 1990).

My research questions and themes, too, have taken on an interdisciplinary focus, I cite literature from numerous fields including general systems theory, psychoneuro immunology, sociology, philosophy,

ethics, educational philosophy, and physics. For the sake of integrating knowledge, the anthropologist Levi-Strauss' bricologe approach is employed, meaning that diverse scholarly literature and research studies are incorporated to follow the course of inquiry wherever it will lead (Emmet, 1969). In the context of this literature, a distinct notion of health and health-seeking behavior from the perspective of the humanities and the social sciences is emerging (Cassell, 1984). The synthesis of this intellectual framework generates the definition that health is the capacity for effective life-functioning, cultivated by the information-processing abilities and problem-solving skills of average people who are so motivated. This research project has become an exercise in what holistic physicists David Bohm and F. David Peat (1987) call the "free play of thought," a component of creativity in which "the creative person does not strictly know what he or she is looking for. The whole activity, therefore, is not regarded as a problem that must be solved, but simply as play itself (p. 49). My linkage to Bohm's ideas are best conveyed through a metaphor developed by Duhl and Den Boer (1980) in which true health or aliveness is portrayed through a continuous unfolding and enfolding of movement in life processes—the dance of life. The issues of movement, current, and flow in thought are crucial to interdisciplinary discourse.

Interdisciplinarity: A "Looking Glass" Phenomenon

A holistic perception of reality—seeing things whole—requires interdisciplinary focus, and sets into motion the search for a "complete knowledge system" (Harman, 1988, p. 99). The disciplinary divisions and specializations in American education amidst "the ethos of self-containment" have constituted a set of separate "reality-world(s)" or "windowless box(es)" for knowing (Hill, 1991, p. 43). This restricted educational model results from the fragmenting tendencies of an industrial order, dominated by a machine metaphor (Oliver, 1989). A new cultural paradigm, proposed by Oliver, mandates academic interdisciplinarity. This model integrates the mind, body, and spirit in knowing, values our connection to nature, and takes into account the evolutionary capacity of the human species:

> This requires that we work toward a sophisticated theory of deep knowing and being that will raise the most general questions about the quality and destiny of the human species, of nature, and of human participation in nature. It is at this point, for example, that the distinction between the various disciplines must break down. For the study of such questions requires that we be able to move between and interrelate the fields of physics, biology, religion, history, and poetry in a single conversation. (p. 30)

A single conversation among the disciplines is considered a natural pursuit for scholars such as von Bertalanffy (1967), founder of general systems theory, a transdisciplinary field, posited on "natural philosophy," which recognizes organismic rather than mechanistic principles of ordering within biological and social life. Von Bertalanffy claims that broad-based theories as well as major developments in science transform worldview. In the attempt to construct a grand scheme of knowledge through disciplinary convergence, he states that "we are seeking for another basic outlook—the world as organization" (p. 57). The emphasis on logical analysis to the exclusion of synthesis, especially in the fields of science and philosophy (Laszlo, 1971), has strongly influenced the fact that we have lost the flow of natural perception, which provides what Bohm (1970, p. 165) terms a "panoramic view." Our focusing on components has made us less capable of "seeing the world as an interconnected, interdependent field or continuum" (Laszlo, p. 56). As a result, the disciplines are confronted by numerous perceptual problems, complicated by a divided knowledge base to solve these problems.

To begin with, the packaging and specialization of knowledge into disciplines has produced problems of applicability, there being a loss of practical solutions to "whole, real-world problems" (Easton, 1991, p. 17). The postindustrial, "global" reconstruction of the world into a system of societies also demands the integration of concepts, theories, methods, and frameworks to facilitate multiple levels of understanding, an epistemological challenge particularly in the social sciences (Smelser, 1991). One

postmodern task in education is the initiation of dialogue across differences, an essential dynamic in learning communities which are becoming increasingly intercultural and interdisciplinary (Burbules & Rice, 1991; Hill, 1991). Thedialogue across differences argument aims at establishing common meanings across groups, cultures, and paradigms, which aTe still rooted very often in die closed, uncommunicative practices of the previous era (Burbules & Rice, 1991). The achievement of holistic perception can add comprehensiveness and depth to understanding our relationship and expression in the social and universal scheme (Oliver, 1989). But the transition from a standard learning approach to holism, as summarized by Oliver involves interdisciplinarity and much more:

> the great problem for the fragmentary abstract academic is to move away from considering different modes of experience, thought, and communication as separate or even competing aspects of knowing and rather consider that experience or know-ing is *one integrated process*. While it is possible, as a matter of practical convenience for a specific time or purpose, to reduce our world to fragmentary literary or scientific qualities of knowing, we need not pretend tha the world is actually made of such unrelated fragments that can be legitimately studied only in this way—in the library, in the laboratory, in the "field"—or must be taught in this way in the classroom. (p. 48)

To the holist, fragmentation does not occur only at the level of objective disciplinary content. There is also the subjective factor of consciousness. The numerous versions of holistic and process education are considered to have confluent goals, meaning that cognitive and affective domains merge and seek to integrate the intellect with emotions for responsible action in life (Brown, 1971; Goble, 1970; Hillman, 1973; Oliver, 1989). Otherwise, Bohm claims that "strong distinctions prevail between emotions, thoughts and acts" (quoted in Ferguson, 1985, p. 1), which fragment the person through egocentrism, and the planet through irresponsible caretaking. The rationalist mode of thinking in American education can be traced to the basic premise of seventeenth-century positivism whereby consciousness was separated from body and matter (Wilshire, 1990).

The resolution of this schism, along with many other dualities and paradoxes in the workings of nature and the universe, have been and continue to be the provocative "quantum questions" of investigation for holistically-minded scientists. Among the prominent are Niels Bohr, Werner Heisenberg, Edwin Schroedinger, Ilya Prigogine, Rupert Sheldrake, Karl Pribram, and David Bohm (see Augros & Stanciu, 1987; Briggs & Peat, 1984; Prigogine & Stengers, 1984; Sheldrake, 1981; Talbot, 1991; Wilber, 1985a; Wilbcr, 1985b; Wolf, 1989). Their field theoretical, contextual, and relativistic thought is articulating new intellectual maps:

> away from limited ideas such as mechanism, causality, locality, unitarity, and regular order toward more subtle notions of nonunitarity, inscape, creativity, rich and subtle orders of space and lime, chaos as an infinitely complex order, activities of meaning and information, spontaneous structure, communication that becomes communion, and the breaking down of barriers between life and the inanimate, between mind and matter. (Peat, 1991, p. 229)

To think in these terms generates a big picture of undivided wholeness, a mapping of "continual returnings and reflections" (Briggs & Peat, 1984, p. 275), often depicted in holograms (parts imaging the whole); in other words, a "looking-glass universe" (see Briggs & Peat, pp. 14-15). As this metaphor and the conceptual and methodological frameworks associated with it filter from the natural sciences, predominantly physics, into the social sciences and humanities, it seems logical to assume that a knowledge system of "undivided wholeness" (see Bohm, 1980a, p. 11), one structured on interdisciplinarity, is the seemingly natural choice to reflect this postmodern, integrated perspective. In the modern era, by contrast, the "cultural paradigm of scientific knowledge" (Bellah, Madsen, Sullivan, Swidler, & Tipton, 1991, p. 154), having its stronghold in medicine within the research university,

required the specialized knowledge afforded by disciplinarity (Flexner, 1979). In the case of holistically-constructed knowledge, a variety of disciplines are interconnecting in what "may amount to a rewriting of the book of science" (Hannan, 1987, p. 22). This is most evident in what is called the Upward Causation Model of Science (see Figure 1), closely aligned with the ideas of two Nobel laureates, Sir Karl Popper and Roger Sperry (see Popper & Eccles, 1977, especially chapter 1; see also Harman, 1987). This causative model links the physical sciences, the life sciences, the human sciences, and the spiritual sciences into at least four levels of explanation based on "the concept of a hierarchy of complementary and mutually non-contradictory 'explanations' for the same phenomenon" (Hannan, 1988, p. 91).

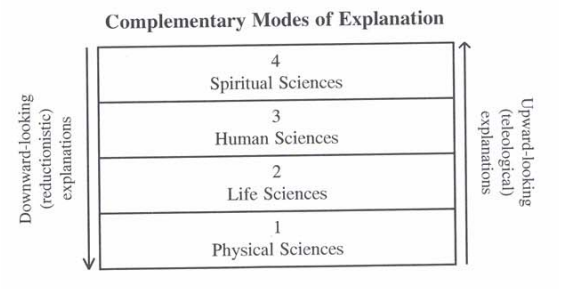

FIGURE 1. An Upward Causation Model of Science wherein the hierarchical arrangements of the sciences renders complementary, not contradictory, explanations at different levels. From *Global Mind Change* (p. 98) by W. Harman, 1988, Indianapolis, IN: Knowledge Systems, Inc. Copyright 1982, by Willis Harman. Reprinted by permission."

The general tendency in science has been to explain phenomena using the downward-looking, reductionist, quantifiable explanations of the physical sciences (Harman, 1988). Upward causation can explain the lower, physical level in terms of social-economic-political-environmental macrodeterminants, culminating in a teleologieal explanation, having used subjective self-reports as legitimate data (Harman, 1988). For example, viewing health as a multilevel problem within the upward causation model, can yield an interpretation to the effect that "biochemical and biophysical processes are correlated with mental functions at a higher hierarchical level" (Brady, 1973, p. 82), This interplay of levels and processes is a dynamic of the looking-glass phenomenon. It projects a more comprehensive science that imparts meaning to the queries of the human condition (Harman, 1988).

Holistic Thought and David Bohm: A Matter of Consciousness

The point of initiation to a holistic mode of thinking is an "integral education" (see Naranjo. 1982, p. 56), which tends toward and even reaches the varied dimensions of people and orients them to the living system of which each person is a part. Educational holism entails moving beyond the two-dimensional parameters of rationalist knowing (e.g., linear, yes and no, black and white, computerized ways of understanding the world) into deeper, more complex "layers of knowing" (Oliver, 1989, p. [81), which take into account feelings, intuition, movement, images, stories, theories, and critical thinking, along the continuum of all the disciplines! David Bohm (1980a) in his book *Wholeness and the Implicate Order*, presents a multilevel and dynamic view of cosmic functioning, claiming the unity of matter and consciousness. In elaborating upon this core supposition, he finds potent implications for holistic thought processes such as those mentioned.

Bohm criticizes our atomistic thought processes and fragmented approach to reality. He points to the negative consequences emanating when "the process of division is a way of thinking about things" (p. 2). For the individual, divided thought constructs what Bohm terms "a fragmentary self-worid view" (p. 15). The individual acts as a compartmentalized rather than unified agent, dividing the world. The collective impact or "overall world view" (p. x) of segmented thinking and behavior is reflected, according to

Bohm, in the global array of social, economic, and environmental problems (see pp. 1, 2). On the other hand, Bohm interprets holistic thought as thought which does not break. He explains that:

> thought is a sort of 'dance of the mind' which functions indicatively, and which, when properly carried out, flows and merges into a harmonious and orderly sort of overall process in life as a whole, (p. 55)

In the context of the looking glass phenomenon, the "harmony and order" or else "conflict and confusion" (pp. 55, 2) that prevail in society, reflect our mental competencies and deficiencies.

Theory of the Implicate Order

The background to Bohm's perspective on thought is his theory of the implicate order. The fundamental concepts of this theory are contained in the notion of "holomovement" (p. 96), a term he coined wherein he posits the "unbroken wholeness" (p. 95), and enfolded order of the material universe (Capra, 1982). Consciousness is an integral feature of the holo-movement, thus mind and matter are interdependent. The resulting dimensions of reality, he terms the explicate, implicate, and super-implicate orders. The explicate order is manifest. It includes "the three dimensional world of objects, space, and time." The implicate order is the "deeper", hidden, enfolded order which includes "the all-encompassing background to our experience: physical, psychological, and spiritual." A "subtler dimension" is the super-implicate order. Beyond the super-implicate, the orders are continuous "merging into an infinite, n-dimensional source or ground" (see Weber, 1986, p. 25). Bohm's explanation is a creative statement deviating from standard quantum physics. In this overall scheme, thought which links matter and mind, is described within a cycle of movement. This cyclical or spiral movement entails an ongoing flow between memory and the general environment. Grounding knowledge in flowing movement has several major implications. Knowledge (applied through thought) is viewed as process. Indeed, Bohm enjoins us to think that

> experience and knowledge are one process, rather than to think that our knowledge is about some sort of separate experience. We can refer to this one process as experience-knowledge (the hyphen indicating that these are two inseparable aspects of one whole movement). (1980a, p. 6)

Experience-knowledge is arrived at by what Bohm (p. 63) calls "thought with totality." This caliber of thinking is an art form. It entails the movement of awareness into deeper spheres of the mind creating insight rather than fixed or reflective knowledge of "how everything is" (p. 63). Bohm speaks of how art forms, like poetry, function primarily to cultivate new perceptions with actions implicit in these perceptions. He agrees with Whitehead's view of knowledge as process, but Bohm (p. 50) elaborates on the intricacies involved in thought's "*movement of becoming*" which has no final fixed form. He calls for a deliberate sensitivity to ever-changing "process" (the activity or how we "do" thinking) and "content" (substance of thinking) (p. 18). Otherwise, Bohm believes, thought will be reduced to its present limitation of communicating a static reality independent of the mind and the person. Bohm particularly criticizes the mistake of accepting theories as truth rather than as changing and flexible forms of insight about ourselves in the world. This familiar orientation to thought splits knowledge from reality.

Evolutionary Learning

Bohm's views sustain the pedagogical challenge of how to communicate knowledge effectively in teaching by addressing schisms such as thought/action, subject/object, and knowledge/reality. I will integrate Bohm's views with evolutionary learning, a pedagogical perspective of general systems theory, which regards knowledge acquisition as a design process, a construction of human inquiry. Banathy

(1988), a general systems theorist, describing this learning approach, explains that evolutionary learning "can enable us to cope with change and complexity, renew our perspectives, and redesign our systems, often reorganizing them at higher levels of complexity" (p. 26). Crucial to the attainment of evolutionary competence, in her discussion, is *how ideas are learned, nurtured, developed into creative images/ perspectives of humankind, and contextualized in human activity systems*.

The standard mode of learning, also called maintenance learning, focuses solely on the established order of perceiving and living, and tends to be informational. It is not suited to changing situations or dynamism. Botkin, Elmandjra, and Malitza (1979) state that "maintenance learning is the acquisition of fixed outlooks, methods, and rules for dealing with familiar and recurring situations" (p. 10). The complement to maintenance learning they term innovative learning (another name for evolutionary learning). Innovative learning focuses on long-term survival. "It is the type of learning that can bring change, renewal, restructuring, and problem reformulation" (Botkin et al., p. L0). The notion of progress is inherent in innovative learning. Thought advances toward higher dimensions, a parallel to Bohm's reasoning. An underlying assumption of the holistic health process, for instance, is self-responsibility for utilizing personal and social resources to achieve life-long health (Tubesing, 1977). Individuals organize their lives around health promoting principles and habits of their own design. Information is vital to such development as it expands consciousness and guides actions toward perfection or wholeness (Foss & Rothenberg, 1988).

Design and inquiry are complementary concepts that are aspects of a self-organizing, evolutionary process. From the viewpoint of knowledge as design, knowledge is a human construct conducive to self-design and redesign. Whitehead (1978) believes that "the thinker is the final end whereby there is thought" {p. 51). Originating in human inquiry, designing knowledge entails creative application and active problem-solving. This kind of knowledge is the opposite of "inert knowledge" or merely informational knowledge (Perkins, 1986, p. 19). Students can recall inert knowledge in test situations, but it is a constricted form of knowing which does not flow readily into reality. They are generally unable to utilize it in the context of actual problems (Perkins, 1986).

The mental dynamics necessary for original, creative, and contextual thinking are addressed by Bohm (1980b) in an article on the role of insight or "inward perception" in education (p. 8). He identifies the "energy of the mind" (p. 12) as the very "*germ of insight*" (p. 11). Bohm describes this energy as mentally invigorating; it impels passion and curiosity in the learner, as this passage shows:

> When this sort of passion is absent, the mind is working in a state of low energy in which it cannot go beyond certain habitual frames of thought, in which it feels comfortable, safe, secure, respectable. It therefore cannot properly face the challenge that requires questioning basic notions, of which it is at best only dimly conscious, (p. 11)

The notion of a relationship between learning thought and energy, with its implications for mental vitality, invites the inclusion of perceptual and reasoning processes within the phenomena of the bodymind continuum, of which energy is a main unit of observation, as in the healing therapies and/or "energy medicines" of acupuncture, light, sound, and touch therapies, homeopathy, and Reichian therapy (Capra, 1982; Seem, 1989). Bohm. furthermore, has discussed how the neurochemical activity of thought releases endorphins, making the intriguing statement that "if certain thoughts can liberate endorphins, then the thought that you have a solid whole becomes very appealing" (Bohm & Kelly, 1990, p. 454).

Among the many questions to be considered will be how a healthy body and intelligent living can empower "insight (which) affects all the different functions of the mind—physical, emotional, intellectual, and so forth—in one undivided act" (Bohm, 1981, p. 391). Another pertinent question will be how to develop and sustain the relatively intense energy levels needed for creative, inventive thought (Bohm, 1980b; Carrel, 1935; Gehlen, 1988; Gilman, 1990; Johnston, 1986, 1991). Bohm's (1980b) overall insight is that the boundless directions of inquiry become highly accessible to an energetic mind relieved of "rigid grooving and compartmentalization" (p. 22). Thus, a liberated mind can think within a

broad field or an open reality which allows "reason to flow freely in new ways" (p. 22), unfolding into "new forms of *imagination* and new orders of reason" (Bohm, 1981, p. 387; see also Bohm & Kelly, 1990).

Modes of Inquiry

Bohm (1980b) reminds us that "reason is not restricted to being a technico-practical instrument" (p.17). In fact, our attempts at problem-solving, often confined to the parameters of scientific and technological frameworks, become disassociated from human understanding and ill-adapted to reality when they are based on instrumental reason alone (Bellah et al., 1991; Sloan, 1991). To rethink and rebuild effectively the complexities of the social order, holists consider it imperative to recognize the diversity and oneness of knowledge (in Bohm's terminology, a holistic ground capable of generating a "common pool of information" through dynamic intellectual interconnectivity) (Briggs, 1989, p. 114; see also Lyng, 1990; Palm, 1979; Werbaeh, 1986). This means "we must recover an enlarged paradigm of knowledge, which recognizes the value of science but acknowledges that other ways of knowing have equal dignity" (Bellah et al., 1991). The general systems theorist Jantsch (1975), in his book *Design for Evolution*, distinguishes three basic modes of inquiry: the rational, the mythological, and the evolutionary. Recently, Wilber (1990) a theorist of consciousness, identifies the transcendental mode of inquiry in his provocative work *Eye to Eye: The Quest for the New Paradigm*.

The rational approach which predominates in the university, influenced by the "scientification" of knowledge (see Klein, 1990, p. 21), is a detached view whose major failure is to focus on purpose. Jantsch criticizes that:

> the rational approach also removes "the environment" and its regulation from the world of humans and human activity. It deals with man's world as being "artificial" and distinct from a "natural" world. The rational approach thus gives rise to a dualistic view, setting man against the world minus man, (p. 85)

From Bohm's perspective, rational inquiry restricts the potential of thought. It separates thought from the content of living, limiting thinking to the theoretical. For philosopher/educator John Dewey, the essential matrix of inquiry is cultural. Inquiry is propelled by the very problems of living and the relations among people. Dewey reminds us that the environment is not merely physical. He infers a subtle implicate social/environmental order by referring to such items as living patterns, ways of cultural transmission, and belief systems {see Dewey, 1938, p. 42).

The totality of thinking, according to Bohm, necessitates use of both sides of the brain. The Western emphasis on rational inquiry is oriented to left-brain thinking capacities, enacting a mode of thinking the Greeks termed logos. Left-brain thinking is characteristically logical, analytical, and objective. Exclusive reliance on this mode of thinking presents a fragmented version of reality because "meaning is disembodied from a reality of flux and change" resulting in knowledge that is "purely mechanical, computable, and deductively certain" (Labouvie-Vief, 1990, p. 56).

The second major approach to inquiry is the mythological which is culturally underutilized. It activates right-brain thinking competencies such as subjectivity, holistic views, and artistic expression. Mythological inquiry is based on the mode of thinking the Greeks called *mythos*. It takes form primarily in stories and dialogue, linking individuals to a reality that includes them. In this framework of consciousness, "thought and thinker, knower and known, are one single indivisible unit, and it is this bond that derives the meaning of an experience" (Labouvie-Vief, 1990, pp. 55-56). When this cognition is enacted into myth, the human condition is meaningfully depicted through a symbolic interpretation of human actions. This "plane of reference," as Campbell called it (quoted in Collins, 1985/86, p. 52), relates to Whitehead's (1978, p. 4) idea that experience is the "starting point" for thought (see also, Whitehead, 1985). Mythological inquiry also meets Bohm's (1980a) expectation wherein he states that "the process of thought is not, however, merely a *representation* of the manifest world; rather, it makes

an important *contribution* to how we experience this world" (p. 205).

It is in the evolutionary approach to inquiry that the person partakes in the enfolding and unfolding of the universe. Evolutionary inquiry structures a participatory role for the person "in the great order of process called evolution which makes it possible to learn about the universe by inquiring into our inner world" (Jantsch, 1975, p. 88). In this one massive motion of thought and being, several major schisms are dissolved, among them the human and the natural, the physical and the spiritual. The individual no longer functions in a divided society but in a unified cosmos. In the words of Bohm (1980a) there exists "undivided wholeness in flowing movement" (p. 14). In an evolutionary sense, the thought flowing into reality should capture the "one-ness of the thinking process and its content," Bohm's ideal (p. 18). As the person becomes whole, s/he attains self-realization, which to Whitehead (1978, p. 222) is "the ultimate fact of facts."

Jantsch (1975) selects the mythological mode of inquiry as the one that best exemplifies "human capability" (p. 101) by virtue of attaching purposeful action to creativity and relations between self and the world. But he also espouses an integrated view in which all three approaches should be used simultaneously. This presents a challenge to our present thinking processes which are dominated by a singular mode of inquiry—the rational.

The transcendental mode of inquiry discussed by Wilber (1990) posits an integrated expression of the individual into the deepest spheres of being and invisible reality. This is a spiritual reality in which the person combines what Wilber terms the eye of flesh, the eye of the mind, and the eye of contemplation. Ultimately, Wilber speaks of the construction of a "transcendental paradigm" meaning:

> an overall knowledge quest that would include not only the "hard ware" of physical sciences but also the "soft ware" of philosophy and psychology and the "transcendental ware" of mystical-spiritual religion, (p. 1)

The transcendental paradigm would synthesize empiricism, rationalism, and transcendentalism. This New Age paradigm, with roots in the "primordial tradition" or "perennial wisdom" of the ancient knowledge systems of Chinese medicine, Tibetan Buddhist psychology, and also Native American healing practices, challenges the metaphysical bias of separability in Western science (Harman, 1991, p. 114), It calls for a unified inquiry into the hierarchical dimensions of existence, taking the individual into the implicate order and beyond. In transcendental inquiry, the person enfolds-unfolds to a higher-dimensional reality by mastering his/her states of consciousness.

One continuing paradox of science with vast implications for comprehending health and many other human matters is the mind/body dichotomy. Harman (1991) proposes a "wholeness science" to complement conventional science, which consists of the pioneering "*epistemological choice to include 'all the evidence*'" (p. 115). The inclusion of subjective experience gathered in mythological, evolutionary, and transcendental modes of inquiry complements rational evidence. This kind of total explanation is increasingly perceived as essential to mending the mind/body schism (Lafaille & Lebeer, 1991).

Reality-Based Knowledge

Modes of inquiry mirror the diverse formations of knowledge. In the case of rational inquiry, thought is delimited to abstraction, static concepts, and schismatic conceptions of reality. Scientific and disciplinary discourse is now exploring the participatory nature of knowledge. It seeks to ascertain the linkage between knowledge and action (Stefano, 1991). Bohm's own reference to a reality-based or environmentally-grounded knowledge is one that requires a complex knowing that is interpretive rather than merely descriptive. Simply stated, descriptive knowledge is fact-oriented; interpretive knowledge is evaluative, and determines the significance of facts. Contemporary philosopher John Kekes (1983) points to the virtuous character of interpretive knowledge. Kekes explains that interpretive knowledge involves wisdom for the purpose of attaining noble ends. In his analysis, he asserts that the "breadth" and "depth"

imposed on the comprehension of life facilitate a *perception* of the whole. This is essential to attaining goodness within the human condition (pp. 279-280).

The human project of recreating a better society through knowledge is a major theme in the work of philosophers/educators Paulo Freire and Antonio Faundez. In their work *Learning io Question: A Pedagogy of Liberation* (1989), a "spoken" book written in dialogue form, they discuss fusing ideas and values into one as well as uniting empirical and scientific knowledge. Like Bohm. Freire and Faundez address barriers which confine thought to the theoretical plane, leading to thought processes that are more artificial than real. In agreement with Bohm, they refer to the domination of our thought by models and concepts to the point that we mistake our theories for reality. Faundez cautions against "ready-made knowledge" (p. 35). Freire is convinced that taken-for-granted knowledge cultivates

> a pedagogy of answers, which is a pedagogy of adaptation, not a pedagogy of creativity. It does not encourage people to take the risk of inventing, or reinventing. For me, to refuse to take risks is the best way there is of denying human existence itself, (p. 40)

Both Freire and Faundez believe that knowledge originates and is dynamically sustained through the art of questioning. They point to the fabric of our everyday lives as the source of our questions. This focus aligns with Bohm's quest for experience-knowledge, and his perceived need to "question the questions" (1981, p. 397). The comments of Freire and Faundez express the need for a fundamental questioning of the explicate order or manifest reality as a beginning point for knowledge. The goal they strive to achieve is a knowledge which mirrors reality. They propose a reordering of the present flow between reality and the use of concepts. Now, they argue, concepts define our reality because they are regarded as ends rather than means. A new pattern of processing thought is proposed in terms of "reality-concept-reality" (p. 51). Essentially, in the words of Faundez "we should start from reality and use concepts as mediators in order to return to reality" (p. 51).

Bohm's (1980a) views on language are an appropriate addition to such a holistic organization of thought. He objects to the subject-verb-object structure of language on the basis that it inhibits continuous flow, fostering a rigidity of thought. In the same vein, Freire observes that "we end up fossilizing concepts by turning them into static objects" (p. 52). Bohm (see especially chapter 2) introduces a new mode of language which he calls the "rheomode," in response to the tendency for closed pattemings of thought. The root of "rheo" is a Greek verb, meaning "to flow" (p. 31). In the rheomode, thought is activated. The verb is primary, alleviating the schism between the content (meaning) of words and their function (actions they promote). Thought is undivided; it exists as whole movement "appearing in perception and experienced in action" ending the isolation "between our 'inward' mental activities and their 'outward' function" (p. 46). One example of how a noun is converted into a verb is through a holistic approach to health. Health takes on the form of a state and a process, reflecting an integrated life pattern, which has overcome various kinds of divisions and oppositional forces. A coordination is established between the inner person and the outer world (Duhl & Den Boer, 1980).

Bohm, Freire, and Faundez search for understanding the whole through knowledge. They question the validity of the prevailing scientific world-view as a realistic, inclusive perception of how we live and experience the world. These creative thinkers perceive the need for input into science from commonsense, experiential knowledge to cultivate an authentic and liveable world view. A holistic world view is constructed by thinking with totality. Certainly, Freire's emphasis on the relationship of "word, action, and reflection" (p, 38) in pedagogy is a key synthesis for generating whole thought.

Problem-Solving Orientations

In line with Bohm's theme of movement, the nature of whole thought is processual rather than an accomplished fact. Knowledge is emergent. The constant flow of knowledge into the realities of the living process of which we are a part, promotes what Bohm (1980a) calls "the actuality of

knowledge" (p. 64). Knowledge advances beyond the instrumental function of providing information and telling about the world; it is transformed and experienced as "genuine reality" (p. 64). This has implications for many facets of how we interact with knowledge, certainly in terms of how we proceed in problem-solving.

A divisive mentality, Bohm claims, reduces problems to "manageable proportions" (p. 2), Systems scientist Russell L. Ackoff (1978) in his book *The Art of Problem-Solving*, elaborates on the kinds of rationales from which we can derive the extent and quality of thought present in two major types of problem-solving orientations—reactive and proactive. Reactive problem-solving involves "the destruction, removal, or containment of something that is present but not desired," (Ackoff, p. 19), illustrated by the use of surgery as a means of curing illness in biomedicine. This approach is negatively-focused and retrospectively-oriented. Thought is isolated to the immediate and remains situation-specific. In the looking-glass, reactive problem-solving reflects the prevailing scientific worldview.

On the other hand, proactive problem-solving involves the acquisition or attainment of something absent but desired. It is positively-focused and prospectively-oriented. Planning is basic to proactive problem-solving. Prevention strategies in holistic health employ plans (Bradford, 1990; Brody, 1973; Green & Shellenberger, 1991). Ackoff (1978) explains that "*proactive planning consists of designing a desirable future and finding ways of moving toward it as effectively as possible*" (p. 26). As a holistic thinking process, planning entails a forward, encompassing expression of consciousness capable of dealing with complexity. Ackoff defines a plan as a "system of solutions to a system of problems" (p. 30). The planner actively partakes in problem-solving. S/he addresses an interplay of problems, abandoning the standard, piecemeal formulas of problem management/reduction. Instead, s/he thinks with totality, using the whole brain. Bohm, Pribram, and other researchers, applying a holographic model of the brain, reveal the capacity for multi-level and synthetic thinking abilities, including intuition and other realms of consciousness (Talboi, 1991). These holistic thought processes potentially engage the thinker *beyond* the explicate order. Wise persons planning for a wise society may be the ones who evolve to the point of thinking with totality.

Continuing Questions and Thoughts

The ideas of Bohm, Freire, Faundez, Wilber, Dewey, Whitehead, and the various general systems scientists pose the question of *how to* proceed with knowledge in order to "give way to a balance between the development of knowledge and the development of the knower" (Russell, 1983, p. 207). Our very reasoning boundaries are being challenged to a more enriched expression of the mind. In the words of general systems scientist C. West Churchman (1968):

> Whatever modern rationality is, it must be far richer in meaning than the logically consistent: It must include contradiction, opposition, conflict, evil, as well as consistency, sameness, cooperation, and good. (pp. 153-154)

Although seemingly obvious and natural, the fundamental connection between thought and being-in-the-world, has been obscured by excess of a cerebral, analytical focus in reasoning. Churchman, like Bohm, challenges us to the possibility for broader, holistic reasoning where thought and reality are one. If we fail to rethink and reorder our way of reasoning, we will continue to confuse data with knowledge, lose fundamental knowledge for living in society, allow experts to do most of our thinking, overlook the environmental variable in almost all fields of study, and wrongly assume that an increase in knowledge enhances human goodness (Orr, 1991). David Orr, an environmental educator, questions the reality factor in our present knowledge: "All things considered, it is possible that we are becoming more ignorant of the things we must know to live well and sustainably on the Earth" {p. 53).

Knowledge needs to be applied skillfully to life as humans continuously adapt themselves to their environment. At present, humans are faced with problems of global magnitude and ultimate concern. The very survival of the planet's life-support systems is a foremost question in our minds. Robert Ornstein and

Paul Ehrlich (1989) address this issue in their book *New World New Mind: Moving Toward Conscious Evolution*. They conclude "there is now a mismatch between the human mind and the world people inhabit" (p. 9). People are using an obsolete mental system to comprehend the world which entails fragmented perception limited to immediate needs and dangers. This limited perception typically results in short-term goals, piecemeal solutions to problems, and an undirected future. Ornstein and Ehrlich propose a new kind of perception which sees the whole: "we have to look at ourselves in the long view and understand an evolutionary history of millions of years rather than the fleeting 'history' that is taught" (p. 11). Our way of thinking needs to be changed in order to respond intelligently to unprecedented social problems, most notably, the proliferation of nuclear weapons, the depletion of natural resources, and overpopulation. Decision-making now requires a mindset that plans for long-term goals.

An aesthetic, right-brain version of planning evokes an image of the person-in-the-universe. In modern times, the "economic person" and "the human as mechanism" have been predominant images (Markley & Harman, 1982, p. 20). How will we design a new image of the person as a "whole thinker"? In Bohm's later work with David Peat, *Science, Order, and Creativity* (1987), dialogue—the "free exchange of ideas and information" (p. 240)—is identified as one of the effective ways to guide human consciousness. In academia, the dialogue process challenges the "compartmentalized positions" (p. 242) of the disciplines, "Dynamic unity within plurality" (p. 242), a feature of Bohmian dialogue formation, has potential as an integrative principle for organizing knowledge. In discussing specialization within science, Bohm claims that fragmentation can be overcome by the fact that there is "a background of ideas that extends across the sciences without limit" (p. 71). What inevitably invites dialogue in "the spirit of creative free play" within scientific communication are "long-range connections between the ideas, approaches, and methods" (p. 71). As it turns out in science, each discipline provides a "context" (p. 72) for other disciplines. These observations may hold true in other fields. Proficient dialogue on whatever topic can reify the implicate order for its participants. Those who have experimented with Bohm's form of holistic group discussion called dialogue have reached some semblance of the implicate order. They speak of "an elegant underlying order and often stunning logic" (Briggs, p. 48) emerging in their conversations.

Interestingly, a "community of inquirers" to quote philosopher Charles Sanders Peirce (see Bellah etal., 1991, p. 163), who converse together *freely* in the interest of "communicative deliberation" (p. 163), have no known end. Scientists and scholars "whose ideas develop in constant conversation with each other" (p. 163), are the group most likely to "reappropriate" the "paradigm of communicative reason" {p. 165). This interactive and communicative model of cognitive and moral reason rooted in the classic period of American philosophy, as explained by Bellah et al., is based on core ideas from the works of Charles Sanders Peirce, William James, Josiah Royce, John Dewey, and George Herbert Mead. Utilitarian, technocratic, and individualistic cultural tendencies inside the university and in the general public are challenged by this model.

Since the basic implementation of communicative reason takes place in dialogue, this approach can foster a professional ethic based on cooperation and exchange, creating a network of ideas among specialized disciplines (see Klein, 1990; Wilshire, 1990). Interdisciplinary dialogues have potential to advance insights for intellectual, social, and ecological relating, and to construct a better knowledge and science of ourselves as human, living beings (Carrel, 1935; Johnston, 1986, 1991). In the quest for wholeness, "through dialogue, he (Bohm) believes, we might just discover a new holistic meaning for ourselves in nature" (Briggs, 1989, p. 49). An interdisciplinary focus in process and content will inevitably accompany the far reaches of this investigation.

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