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Mark A. Schroll
Sofia University

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Understanding Bohm's Holoflux: Clearing Up a Conceptual Mistunderstanding of the Holographic Paradigm and Clarifying its Significance to Transpersonal Studies of Consciousness

Mark A. Schroll
Sofia University
Palo Alto, CA, USA

Throughout the past 31 years transpersonal anthropologists and transpersonal psychologists seeking a scientific language to discuss anomalous phenomena and the farther reaches of human nature (or to invoke a discussion of ultimate reality, universal mind or cosmic consciousness) have referred to the *holographic paradigm*, the conceptual origin of which is directly related to David Bohm's implicate order theory. In 1982 and 1984 Bohm discussed the holographic paradigm's limitations (and more specifically his concept of *holomovement*) to accurately represent his implicate order theory, suggesting instead the more precise conceptual reference *holoflux*; yet the limited publication of this correction has not been noticed by those who continue to champion the holographic paradigm. This paper reiterates Bohm's 1982 and 1984 correction, and discusses its implications for transpersonal theory.

Keywords: *David Bohm, consciousness studies, transpersonal anthropology, transpersonal psychology, holographic paradigm*

David Bohm (1984a; Bohm & Weber, 1982b) put forth a revision of the *holographic paradigm*—specifically revising his concept of *holomovement*—that he referred to as *holoflux*. Unfortunately Bohm's revision was not repeated in future publications. This revision sought to clarify the application of his *implicate order theory* to transpersonal theories of consciousness. The word *implicate* is based on the Latin term *plicare*, meaning *to fold*. The *implicate order* can therefore be referred to as a domain of unmeasured reality, a useful schematic reference to matter that has been enfolded or injected back into the whole. Juxtaposed to the implicate order is Bohm's concept of the *explicate order*. The explicate order refers to the domain of phenomenological-sensorimotor events: matter projected from the whole that has passed the minimum threshold to affect our human sense perception. In other words, the explicate order refers to the domain of reality usually referred to as physical phenomena—relatively independent sub-wholes like rocks, plants, animals, humans, and galaxies—that the usual state of human consciousness perceptually discerns as randomly distributed autonomous entities. The

mathematics of fractals and chaos theory has allowed recognition of patterns of order beyond the threshold of sense perception (Briggs & Peat, 1989; Peat, 1991), echoing Bohm's idea that the explicate order is only *relatively autonomous* from a larger whole, the implicate order. A more thorough discussion of Bohm's theory of the implicate order will come later in this paper, the purpose of which is to contribute to an understanding of the significance of Bohm's correction to transpersonal theories of consciousness.

It is worth pointing out that this conceptual clarification is not an indictment of transpersonal anthropology and transpersonal psychology's credibility—any more than when physics discarded the concept of the *ether* in 1905. The ether (as its more complete historical examination and discussion in Appendix A makes clear) was eventually understood by Einstein as an unnecessary structural projection onto the universe. Similarly, the concept of the holographic paradigm is an unnecessary structural projection onto the universe, and thus provides an invitation for transpersonal studies to deepen its contemplation of alternative conceptual theories (Barbour, 1990; Battista, 1996; Cardena &

Winkelman, 2011; Comfort, 1984; Fisher, 1997; Grof, 2008, 2012; Hall, 2013; Kelly, 2002a, 2002b; Prattis, 1997; Rothberg, 1986, 1989; Schroll, 2008a, 2010a, 2013; Valle, 1981; Weber, 1981, 1986a).

Moreover, the reason that clearing up Bohm's revised theoretical assessment of the holographic paradigm continues to be a priority is that the error he sought to correct continues to be perpetuated. The most recent example can be found in Stanislav Grof's (2012) paper "Revision and Re-Enchantment of Psychology: Legacy of Half A Century of Consciousness Research":

In its farthest reaches, individual consciousness can identify with the Universal Mind or Cosmic Consciousness, the creative principle of the universe. Probably the most profound experience in holotropic states is identification with the Supracosmic and Metacosmic Void, primordial Emptiness and Nothingness that is consciousness itself. The Void that has a paradoxical nature; it is a vacuum, because it is devoid of any concrete forms, but it is also a plenum, since it seems to contain all of creation in a potential form. This experience seems to be related to the concept of the PSI or *Akashic field* formulated by world-famous system theorist and philosopher Ervin Laszlo. According to him, it is a subquantum field which is the source of all creation and in which everything that happens remains holographically recorded. Laszlo equated this field with the concept of *quantum vacuum* that has emerged from modern physics (Laszlo, 2003, 2004). (p. 148)

To be clear, the only thing I am calling into question here is Grof's statement "the source of all creation and in which everything that happens remains *holographically* recorded." I agree with everything else here quoted, and agree fully with his position that "transpersonal experiences . . . are ontologically real and are not products of metaphysical speculation, human imagination, or pathological processes in the brain" (Grof, 2012, p. 148). It is worth mentioning that William G. Roll's PSI field (which influenced Laszlo's Akashic field) has been important in shaping the views of this paper (Schroll, 2012). To the best of my knowledge and brief correspondence with Roll, he was the first to apply the field hypothesis to an understanding of psi in his article "The Psi Field" (Roll, 1964, personal communication, September 3, 2009; Schroll, 2012)." Likewise, this current paper is not an attempt to call into question Karl

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Pribram's use of the holographic metaphor as a means to make sense of experimental evidence that indicates memory is stored equipotentially throughout the brain (Pribram, 1974, 1976, 1977a, 1977b, 1981, 1982).

This paper has been divided into two parts as follows: Part 1 begins with a brief biographical sketch of Bohm, and an introduction to the philosophical questions that his implicate order theory raises, followed by an examination of the two most basic ways Bohm has attempted to explain his theory, (1) Bohm's *ink drop model* of the implicate order; and (2) Bohm's holographic model of the universe; this is followed by the *television broadcast model* of the implicate order, which helps to point out additional common misunderstandings. Part 2 furthers this inquiry and is divided into seven parts: (1) Ken Wilber's criticism of the holographic paradigm; (2) Bohm's response to Wilber's criticism; (3) Gordon G. Globus' defense of Bohm's holistic physics; (4) The holomovement: Bohm's initial narrative construction of wholeness; (5) The holoflux—Bohm's continuing attempt to construct a language and conceptual understanding of wholeness; (6) Defining and investigating cosmic consciousness: Questions that Bohm's holoflux raises for transpersonal theory; and (7) Conclusion.

Part 1

Bohm's Search to Establish a New Order in Physics

Born in 1917 in Wilkes Barre, Pennsylvania, Bohm's momentous career in physics, marked by a lifetime of courage and controversy, ended on October 27, 1992, when he suffered a fatal heart attack, leaving the world with one less eloquent voice for cosmic wholeness. Far beyond his legacy within the field of physics, it is this emphasis on eloquence, the action, practice, or art of using language with fluency, power, and aptness in discourse that stands out as Bohm's enduring methodological approach to problem solving.

Bohm's journey into the transpersonal can be traced to his fledgling investigation of quantum theory's philosophical meaning, marked by the publication of his book *Quantum Theory* in 1951. This philosophical inquiry emerged as a consequence of having conversations with Albert Einstein while both men were living in Princeton, New Jersey. Einstein's influence on Bohm deepened the latter's search for the ultimate meaning of reality (Sharpe, 1993, p. 13). Bohm, who was a student of Robert Oppenheimer at the University of California-

Berkeley, had also been inspired by Oppenheimer's lectures.¹ Oppenheimer (having spent time studying and discussing with Niels Bohr at his institute in Copenhagen) had been influenced by the *Copenhagen interpretation of quantum mechanics* (Moore, 1966; Schroll, 2010b).

Thus Bohm's initial motivation in writing *Quantum Theory* (1951) was to present Bohr's position as clearly as possible. It was after writing this book that Bohm began to have doubts about Bohr's interpretation of quantum theory and began to develop his own interpretation (Sharpe, 1993, pp. 16-19). The majority of Bohm's thinking has been summed up in his book *Wholeness and the Implicate Order* (Bohm, 1980a), the exposition of which had been extended in his and F. David Peat's book *Science, Order, and Creativity* (Bohm & Peat, 1987).

Bohm elaborated on various aspects of these ideas in several other publications and lectures (Bohm, 1980b, 1983, 1984a, 1984b, 1985, 1986, 1987, 1988, 1993; Bohm & Kelly, 1990; Bohm & Toms, 1984, 1990; Bohm & Weber, 1982a, 1982b, 1986a, 1986b, 1987; Bohm & Welwood, 1980; Sheldrake & Bohm, 1982). His tangential excursions into Eastern philosophy, parapsychology, neuroscience, ecology, and other topics—stimulated by his discussions with Jiddu Krishnamurti—led Renée Weber (1986b) to describe Bohm as “a rare combination of the scientist and mystic combined in one person [Indeed,] Bohm is considered one of the world's foremost theoretical physicists and one of the most influential theorists of the emerging paradigm” (p. 23).² While Bohm has not specifically written in defense of transpersonal psychology (rather these tangential excursions have run somewhat parallel to his primary interests), he can be considered one of the chief advocates working to demonstrate a viable position that could be transpersonal psychology's relationship to relativity and quantum theory.³

Bohm's visionary approach toward understanding transpersonal psychology's relationship to these fundamental physical theories represent what Gordon G. Globus (1986) has referred to as *holistic physics*. I have subsequently referred to Bohm's approach as a *transpersonal physics*. Bohm recalled in the introduction to *Wholeness and the Implicate Order* that his interests in the mystery of movement as a child stimulated his holistic approach to physics. Attempting to solve this enchanting perplexity of motion (as well as unify quantum and relativity theory), Bohm stretched his

imagination beyond modern physics' theoretical limits in an attempt to establish a “new order” in physics. Bohm's “new order” (which he refers to as the *implicate order*), is an attempt to explain motion in terms of an undivided wholeness, instead of the presently accepted view of motion as a series of autonomous Cartesian coordinates (objects), described in terms of differential equations. It was Bohm's contemplative pursuit of *something that goes beyond* the present understanding of quantum theory that produced the broader philosophical proposal of the implicate order.

Pursuing this line of thought eventually led Bohm to turn the traditional metaphysics of Euro-American science on its head, saying that the implicate order *is* the fundamental basis for reality, which is contrary to the established Cartesian view. Bohm's rejection of the established Cartesian view might suggest to some that Bohm was seeking to promote an updated version of Plato's theory of forms; however, unlike Bohm's implicate order, Plato's theory of forms is a one way interaction, in which ultimate archetypes influence the material world, yet the material world in turn has no influence on the nonphysical, nonspatial, nontemporal domain of reality beyond the physical world of objects.⁴ Clarifying this difference, Bohm proposed that the understanding of motion be viewed instead as a cyclic process of projection, injection, and re-projection. The archetypal form is projected from this state of potentiality into matter that then is imbued with experiential knowledge of the material world, and then subsequently enfolded back into the domain of forms, and then re-projected. Bohm's implicate order can therefore be understood as a model of an evolutionary metaphysics. Nevertheless, this previous explanation raises as many questions as it helps to answer.⁵

In addition, another way Bohm sought to clarify his theory of knowledge was to suggest the implicate order is a domain that resembles the concept of reality Immanuel Kant referred to as *noumenon*. Here again it needs to be made clear that Bohm's theory of knowledge is very different from Kant's. Bohm discussed the similarities and differences in a conversation with Weber titled “Mathematics: The Scientist's Mystic Crystal”:

Weber: Kant's problem was: We cannot see things as they really are because we impart our structures to experience, so we bar the way to the noumenon with our own inner categories.

Bohm: But my view is to say, “I am the noumenon,” so there is a way out of Kant’s trap. At least I am *of* the noumenon.

Weber: Or I can come into harmony with it, become commensurate with it, which Kant of course denies.

Bohm: Yes. I am participating in the noumenon. (Bohm & Weber, 1986b, p. 152)⁶

The significance of Bohm’s assertion—*that we can participate in the noumenon*—cannot be underestimated. It invites the consideration that humankind is capable (at least in certain discrete states of consciousness) of being able to access the very source of reality beyond the veil of appearances (Tart, 1975, 1986). If this claim could be proven it would have a profound influence on transpersonal theory. But this paper’s focus is not a thorough examination of transpersonal theory and how Bohm’s views influence it. Rather, this paper’s purpose is to help clarify how Bohm’s views have been misunderstood, misused, and distorted. It is tempting to want to leap ahead and begin to theorize and contemplate the relevance that Bohm’s unifying vision of cosmos and consciousness—the implicate order—has had and will have on transpersonal psychology. However, before attempting this, the more immediate task of clarifying some essential points about his theory must be first undertaken.

Bohm’s Ink Drop Model of the Implicate Order

Bohm provided an illustration of how the implicate order is able to explain the mystery of motion in terms of a device demonstrated at the Royal Institute in London that he saw on BBC television:

Consider two concentric glass cylinders, the inner one fixed and the outer capable of being slowly rotated. The space between the cylinders is filled with a viscous liquid such as glycerin. When the outer cylinder is turned, fluid close to it is dragged along at nearly the same speed, but fluid close to the inner, stationary, cylinder is held nearly at rest. Hence fluid in different regions of space moves at different rates, and in this way, any small element of the glycerin is eventually drawn out into a long thin thread. If a drop of indissoluble ink is placed in the liquid, then it becomes possible to follow the movement of the small element by watching how the drop is drawn out into a thread until eventually it becomes so fine as to be invisible.

At first sight one may be tempted to say that the ink drop has been totally mixed into the glycerin so that its initial order has been lost and is now random or chaotic. But suppose that the outer cylinder is now rotated in the reverse direction. If the fluid is very viscous, like glycerin, and the cylinder is not rotated too quickly, then the fluid element will return to its original form and the droplet of ink will appear as if from nothing. (Bohm & Peat, 1987, pp. 172-173)

Keeping this analogy in mind Bohm (1980a) extended this ink drop model as a means of illustrating how his concept of the implicate order is able to transcend traditional notions of space-and-time:

In the present example, however, it is appropriate to describe the movement of the dye in [terms of degrees of implication]. . . . To specify this movement in more detail, it is useful to introduce a new measure, i.e., an “implication parameter,” denoted by T. In the fluid, this would be the number of turns needed to bring a given droplet of dye into explicate form. The total structure of dye present at any moment can then be regarded as an ordered series of substructures, each corresponding to a single droplet N with its implication parameter T_n. (p. 153)

Conceptually this device and ink drop model is very helpful in stimulating the understanding of Bohm’s transpersonal physics and his theory of the implicate order, but a few words of caution need to be mentioned concerning this ink drop model: (1) This model should not be taken as a literal interpretation of reality, or as an argument for determinism that suggests every cosmic event is prearranged according to its implication parameters, tempting as this is as a way to project a desire for predictability and order onto this ink drop model; (2) Bohm’s ink drop model is purely theoretical and/or is a thought experiment and has not been framed as a hypothesis needing to be tested. The ink drop model is only the most introductory idealization of how the implicate order has been envisioned by Bohm and his Birkbeck colleagues. To treat Bohm’s ink drop model as anything more is to totally miss the point of why he proposed it as a thought experiment; and (3) Bohm’s ink drop model is actually a misrepresentation of his theory of the implicate order. Why? Because even though

the constraints of time are overcome by stipulating movement in terms of degrees of implication—allowing the viscous fluid to move continuously as a whole—the various autonomous ink droplets *remain in a one-to-one correspondence as they are stirred up*. This implies location in space, and therefore division.

Bohm's Holographic Model of the Universe

In the attempt to accurately represent Bohm's concept of the implicate order, where, except in imagination (Bohm, 1984b), or how, through one's own transpersonal experience (Walsh, 1992, pp. 41-42), can a model be discovered to solve the present dilemma? The solution to this search for a model capable of providing a way to properly understand Bohm's concept of the implicate order was found in a new kind of photography called *holography* (Bohm, 1980b; Briggs & Peat, 1984; Keepin, 1993; Sharpe, 1993). Unlike ordinary photography that uses a lens (similar to the lens of an eye) to record a light image comprised of a one-to-one correspondence with the object, holography uses an instrument known as a *holograph*. The holograph, whose name derives from the Greek words *holo* (whole) and *graph* (to write), is a device invented in 1964 by Dennis Gabor. The purpose of the holograph, as the name implies, is to "write the whole."

This writing of the whole is made possible using another device called a *laser*. A laser produces a highly ordered and regular beam of light. Using a holograph one can create a holographic image through the following operation. A beam of light is projected from the holograph onto a half-silvered mirror splitting the beam. This process allows part of the beam (the *reference beam*) to shine directly on the object being photographed while the other half (the *working beam*) is rerouted using mirrors to form an interference pattern with the original beam. This interference pattern of these two beams of laser light creates a three-dimensional image, which is then projected onto a photographic plate.

However, the photographic image of these interference patterns is too fine to be seen in detail because it exists below the threshold of visual perception. Thus the image continues to be seen as an ordinary photograph. The technology of holography provides the means to transcend the threshold of visual perception by allowing perception of the complex wave motion of the target object created by the holograph. This is accomplished by re-illuminating the photograph with a laser, thereby

producing the illusion of a three dimensional holographic image. Still, the most interesting aspect of holography has yet to be revealed. To demonstrate this, the photograph of the target object must be broken, leaving only a small portion of the picture undamaged.

What might happen if a laser beam is projected through the remains of this photograph? Common sense says only a partial image of the original will be visible. Surprisingly, what is seen is the target object's complete three-dimensional image, although the quality of the image is dimmer than the unbroken photograph. It is this feature of holography—summed up in the phrase "each part contains the whole"—that provides another visual metaphor of Bohm's implicate order.

Holograms (as discussed) do not represent an object in terms of a one-to-one correspondence, implying space and therefore division. On first inspection Bohm's use of the hologram as another theoretical example of the implicate order appears to have overcome the limitations of his ink drop model. Likewise it also seems to transcend time order constraints because the relationship of information in a holographic image is enfolded within the whole image. Thus, on the one hand, I agree with transpersonal theorists like Stanislov Grof and Hal Bennett who have argued:

The holographic model offers revolutionary possibilities for a new understanding of the relationship between the parts and the whole. No longer confined to the limited logic of traditional thought, the part ceases to be just a fragment of the whole but, under certain circumstance, reflects and contains the whole. As individual human beings we are not isolated and insignificant Newtonian entities; rather, as integral fields of the holomovement each of us is also a microcosm that reflects and contains the macrocosm. If this is true, then we each hold the potential for having direct and immediate experiential access to virtually every aspect of the universe, extending our capacities well beyond the reach of our senses. (Grof & Bennett, 1992, p. 10)

Transpersonal anthropologist Ian Prattis (1997) similarly interpreted Bohm and Grof's work, saying:

As scientific method moves to include the scientist's self-awareness as an integral part of enquiry, the implications for an exponential leap in discovery are elicited and revealed together with a higher

understanding of both subject and object First, there is a fundamental axiom about the necessary conjointness of the metaphysical with the physical. Secondly, this conjointness is expressed holographically on multiple levels that are interconnected. “Holographic” refers to the communication of a total energy event, whereby each part of the event is encoded with the structure of the whole (Grof [& Bennett], 1992; Wilber, 1982[b]). (p. 246)

On the one hand, I agree and support the spirit of the implications for consciousness studies that Grof, Bennett, and Prattis put forth, yet, on the other hand, I respectfully disagree with their reliance on the literal implications of the holographic paradigm due to reasons that will be presented through the rest of this paper. First, however, two more examples will be presented. Diego Pignatelli (2008, 2009) offered the metaphor of the *holodeck*, a “virtual holographic simulation or holographic room” (Pignatelli, 2009, p. 23) based on the science fiction television series *Star Trek: The Next Generation*, as a way of referring to transpersonal states of consciousness. Similarly, based on Pribram’s and Bohm’s reference to the holographic image, Jenny Wade (1996) championed a *holonomic theory of consciousness*. This led Wade to suggest that:

Evidence from various disciplines supports a dual form of consciousness, where a physically transcendent source of awareness and a brain-based source of awareness coexist in ways that may not be directly causal or physically linked according to the conventional understanding of Western medicine. (p. 249)

Granted, these examples from Grof and Bennett, Pignatelli, Prattis, and Wade provide very creative ways to envision transpersonal states of consciousness (especially for those who have never experientially encountered transpersonal states). The holographic paradigm has been further ingrained within the current mode of thought by Daniel Goleman’s (1979) interview of Pribram in *Psychology Today*, and popularized by other authors Ferguson (1980), Pelletier (1978), Talbot (1980), and Zohar (1990). Nevertheless, these conceptual images lose their luster when the question is asked: Does the holographic model provide an accurate representation of Bohm’s implicate order? The short answer is *no* (Schroll,

2005a, 2005b). The long and more detailed answer is taken up in Part 2 of this paper. Before turning to this more detailed answer, one brief example of the holographic model’s limitations is provided to accurately represent transpersonal experience or the implicate order. Consider the Buddhist concept of the Jewel Net of Indra that bears a likeness with holography, in which each facet of every jewel reflects all the others. Ken Jones (1990) offered this metaphor in his chapter “Getting Out of Our Own Light,” suggesting that Indra’s Net

is an excellent example of an expression of root Dharma of great ecological and social potential. At each intersection of Indra’s Net is a light-reflected jewel (that is, a phenomenon, entity, thing) and each jewel contains another net, ad infinitum. The jewel at each intersection exists only as a reflection of all the others and therefore has no self-nature. Yet it also exists as a separate entity to sustain the others. Each and all exist only in their mutuality. In other words, all phenomena are identifiable with the whole, just as the phenomena that constitute a particular phenomenon are identifiable with it. (pp. 185-186)

At first glance, this quote seems to support the views of Grof and Bennett, Pignatelli, Prattis, and Wade by demonstrating a parallel between the holographic paradigm and the ancient wisdom of the Buddha. This practice of matching the linguistic similarities of physicists and mystics has, however, become the focus of severe criticism. In particular, physicist Jeremy Bernstein (1982) makes the accusation that the method of comparing parallel phrases of language written by physicists and mystics—made real or apparent in Fritjof Capra’s (1975) book *The Tao of Physics*—“is so vague that it can accommodate anything” (p. 8). Clarifying this criticism, Bernstein added that

when a writer—any writer—says that the parallels between any branch of science and some mystic view of the universe are valid “beyond any doubt,” my blood begins to freeze. The most valuable commodity that we have in science is doubt In this respect the one thing I am sure of, beyond any doubt, is that the science of the present will look as antiquated to our successors as much of nineteenth-century science looks to us now. To hitch a religious philosophy to a contemporary science is a sure route to its obsolescence. (p. 8)⁷

Upon closer examination, the initial assumption about the comparison of Bohm's implicate order and the Jewel Net of Indra has allowed a serious category error. This problem is raised into relief through an examination of the holographic paradigm's announcement: *the whole is contained within each part*. This statement indicates that the principles of holography demonstrate holism; but, it is a holism confined solely to the ontological domain of matter. In other words, imagination and transpersonal experience (which includes dreaming) may have their origin in a domain that is beyond matter (Bohm, 1984b; Schroll, 2007, 2011b; Ullman, 1979). Unlike holography, the metaphor of Indra's Net is not referring to *mere material causation*; it is, instead, pointing to the *co-existence and interdependence* of an ontological domain that "is the reality beyond both being and non-being" (Wood, 1957, pp. 14, 35).⁸

While parallels between mysticism and the implicate order must be skeptically assessed, this reference to a domain beyond both being and non-being is worth pursuing a bit further. Technically, the Buddhist idea of co-existence and interdependence is known as *dharmadhatu* (Law-nature), the origin of which stems from the *Avatanshaka Sutra* (Wood, 1957, pp. 14-15, 35). T. P. Kasulis (1981) provided a clear exposition of this idea titled "the Allegory of the Bell," and supported Grof's (2012) reference to the "Metacosmic Void, primordial Emptiness and Nothingness that is consciousness itself" (p. 148):

Walking along a mountain path in Japan, we come upon a rudimentary hermitage with a large temple bell suspended from a simple wooden pagoda. Unlike Western carillon bells, the Japanese bell has no clapper and is struck on the outside much as one might strike a gong. . . . Admiring the excellence and obvious age of the engravings on the casting, we hear the footsteps of the temple priest and turn to ask, "How old is this extraordinary bell?" Touching his palm to the massive casting, he responds, "This is about five hundred years old, but" (removing his hand to point into the black void within the bell) "the emptiness within—that's eternal". . . .

To refine the analogy, think of the casting of the bell as Being and the hollow center as Nonbeing. The bell's function, the ringing of its tonal quality, is located neither in the casting nor in the emptiness. Without the hollow interior, the bell

would be a metal slab that might clang but certainly could never emit music. On the other hand, the hollowness without the casting could only produce the rushing echo of silence. For the bell to resound, both the Being and the Nonbeing of the bell are necessary. . . . Nonbeing is an empty potentiality until it interpenetrates with Being, *giving birth to all things*. But as soon as it does, as soon as it becomes delimited and specifically meaningful, it is no longer absolute. . . . [Yet w]ithout Being, Nonbeing lacks all definite signification. (Kasulis, 1981, pp. 33-35)

Properly understood, this analogy allows an understanding of the paradox of the Void as both vacuum and plenum (as Grof, 2012, p. 148 pointed out); and like Einstein's insight that the ether was an unnecessary structural projection onto the physical universe, the Allegory of the Bell is a means to conceptualize cosmic consciousness without projecting the holographic paradigm onto it. To assist further thinking about this problem a final model is offered that provides a more direct way of re-assessing the understanding of Bohm's implicate order theory.

The Television Broadcast Model of the Implicate Order

The television broadcast model was developed prior to the conversion of broadcasting television media in a digitized format. Therefore, to a certain degree, the conceptual image of this way of framing Bohm's model will seem particularly antiquated—and offers support for the kind of skepticism Bernstein (1982) suggested regarding comparisons of science and mysticism based on similarities of language. However, from another viewpoint, this model may help to illustrate how conceptual models are envisioned in terms of familiar metaphors and are frequently theorized extensions of instrumentation that humans use to explore and interact with the world.

In an effort to try and create an idealized model that is closer to Bohm's theory of the implicate order, consider the following example. During the filming of a television broadcast, the visual image is translated into weak electromagnetic radio signals that carry the form of the visual image. This visual image can be described as having been implicated or enfolded. These weak electromagnetic radio signals are then broadcasted from the television station where they are picked up by an antenna, satellite dish, or relayed via coaxial cable and

transmitted by a receiver. Reaching a receiver (which is part of the television's structural components), the weak electromagnetic radio signals are amplified by the energy from the power plug in the wall socket and projected through the receiver's cathode-ray tube. This process transforms the amplified radio signals into a focused beam of electrons striking the television screen. From this random pattern of electrons being fired at the screen the electrons become visible light or photons that then enter—via the retina of the eyes—the cerebral cortex. It is within the cerebral cortex that this random pattern of electrons/photons are explicated, or unfolded, and translated into the contents of consciousness, cognitive awareness, or memory.

Yet there remains a problem with the television model of the implicate order. On the one hand, discussion of a television broadcast model has extended Bohm's thought experiment to an actual sensorimotor occasion, in which discussion of movement in terms of weak electromagnetic radio signals eliminates the problem of objects located in a one-to-one correspondence in space, that is, the problem of division. This example of a television broadcast must, on the other hand, also be seen as limited because the frequency modulation of the weak electromagnetic wave signals transmitting the visual image are now translated in terms of time order constraints. This suggests that time (which implies the rules of relativity theory as they have been conceived as a measure of the physical transmission of light energy) is a factor in the operation of the implicate order. Bohm made it clear in subsequent publications that the implicate order is outside of time (Bohm, 1985; Bohm & Weber, 1982b, 1986a).⁹

With the help of both the Allegory of the Bell and the television broadcast model, the example of Pignatelli's holodeck referenced earlier is a possible way of understanding Bohm's implicate order. The initial encounter with this virtual world provides the appearance that it represents the implicate order, and Bohm's concept of a holographic universe. However, like the television broadcast model, the holodeck's very essence is created using high-energy photons that enable humans to interact with them. Therefore, the holodeck model not only suffers the limitations of time order constraints, but also is merely a modern variation of Plato's cave analogy (Wilber, 1984b, 1984c); it is mere appearance, mere explicated material causation masquerading as implicate reality and/or non-being. Similarly, turning to Wade's

(1996) reference to a dual state of consciousness, this example illustrates the same division that Kasulis (1981) sought to clarify as a limitation associated with Being and Non-being. Prattis (1997) and Grof and Bennett (1992) avoided these misunderstandings, yet they mistook the holographic paradigm and holomovement as Bohm's final solution toward understanding the implicate order. Part 2 of this paper will show that Bohm's 1982 and 1984 revisions—which he called holoflux—sought to correct this error.

Summary

Bohm's ink drop model is only a metaphorical proposal of theory, and not a hypothesis needing to be tested. This proposal is shown to be limited and to misrepresent Bohm's implicate order because the ink droplets remain in a one-to-one correspondence as they are stirred up, this implies location in space, and therefore, division. The television broadcast model was a slight conceptual improvement to the ink drop model, yet it too is incomplete because the weak electromagnetic wave signals that transmit images are limited in terms of time order constraints, and Bohm contended that the implicate order is outside of time. Likewise, the holographic model of the universe suffered from these same limitations associated with the television broadcast model.

In terms of Plato, the implicate order represents the idea of form, whereas Bohm improved upon Plato's theory of forms with his evolutionary metaphysics of injection, projection, and re-injection. Likewise, according to Kant true reality exists in the domain of noumena. However, Kant argued that it was impossible to know or experience noumena directly because humankind is bounded by the mental constraints of the phenomenal realm. Thus humans are unable to know what noumena are due to the limits of being time- and space-bound entities. Even the language humankind uses is incapable of articulating what noumena and what reality are. Thus humans can never break free of the threshold of cognitive constructs and sense perception. To be fair, Kant certainly would never have been able to conceive of something so subtle as quantum theory and quantum reality, and no one during Kant's lifetime ever thought humankind would be able to analyze matter to that level. Now, at least within Bohm's (1985, pp. 72-99, 1986) proposal of the implicate order, it is accepted that there is a continuum between mind and matter; nevertheless, a metaphor capable of providing a complete

understanding of consciousness that satisfies everyone has not yet been created.

Part 2

Ken Wilber's Criticisms of the Holographic Paradigm

To accurately represent Wilber's views I have at times paraphrased his work and at other times quoted him exactly. Wilber (1982b) has pointed out that since a hologram is created using light waves, time order constraints continue to plague this model because it must be transmitted in terms of cycles per second. Therefore (in reference to Bohm's ink drop model), the holographic frequency domain should not be considered an expression of the timeless/spaceless transcendental ground of Pure Consciousness or Spirit (which is eternal and infinite), because:

The fact is, the so-called frequency realm is simply a realm with space-time structures different from those of the linear or historical mind, and the mind has to impose its structures upon the less structured frequency realm. But in any event, or in any way you wish to interpret it, the frequency realm has *some sort of structure* And structure cannot be confused with that which is radically without structure, or perfectly dimensionless, transcendent and infinite. (p. 159)

Wilber (1982b) put forth the criticism that equating the holographic frequency domain with Spirit-as-ground is pantheism, which neglects the necessary clarification of true mysticism: that reality lies beyond the world of appearances. More specifically Wilber (1984b) has argued:

Any attempt to identify spirit with the manifest world of nature is, in this truncated view, charged with the ugly epithet of "featureless pantheism," and theologians are all in a tither to explain that "dragging God into the finite realm" supposedly abolishes all values and actually destroys any meaning we could attach to the word "God" or "spirit". (p. 10)

The crux of this argument rests on Wilber's contention (which he in turn credited to Huston Smith) that "four levels of being[, often referred to as the *Great Chain of Being*,] are the absolute minimum you can use to explain the world's great mystical religions. These are physical-body, symbol-mind, subtle-soul, and causal-

spirit" (Wilber, 1982b, p. 161).¹⁰ In order to thoroughly comprehend Wilber's argument, it needs to be understood that these four levels of Being represent a series of progressively decreasing domains of appearance (or progressively increasing states of awareness), which eventually culminate in the ability to see beyond the world of appearances.¹¹

Beginning with physical-body, this level represents the domain of appearance that is the furthest removed from Spirit-as-ground, the sensory-motor domain of matter: atoms, molecules, genes, and their corresponding fields of study—physics, chemistry, and biology. Symbol-mind refers to rational-intellectual understanding: that is, "language, syntax, communication, discourse, logic, value, intentionally, ideas, meaning, concepts, images" (Wilber, 1982a, pp. 84-85), which are capacities of understanding associated with the fields of psychology, sociology, philosophy, and the humanities in general. Subtle-soul refers to mandalic representations of spirit: "Platonic forms, archetypes, [and] personal deity-forms" (Wilber, 1984b, p. 10), which are iconic representations associated with the study of theology. According to Wilber (1984b), "in the soul-realm, there is still some sort of subtle subject-object duality; the soul apprehends Being or communes with God, but there still remains an irreducible boundary between them" (p. 10).

These first three levels of the Great Chain of Being can be summed up as the "immanent nature of Spirit" (Wilber, 1993, p. 58): a domain where the soul and the Godhead or absolute spirit come together, forming a unity without boundaries. It is "a non-dual state of radical intuition and supreme identity variously known as gnosis, nirvikalpa samadhi, satori, kensho, jnana, etc." (Wilber, 1984b, p. 10), which are states of consciousness associated with the study of mysticism. Yet paradoxically, by progressing through this cosmic road-map of decreasing appearance or increasing awareness, miraculously, Spirit-as-ground is not the final destination at the end of the journey; it is instead the beginning (see also Schroll, Rowan, & Robinson, 2011 for additional discussion of Wilber and transpersonal experience). Using this model as the foundation of his worldview, Wilber (1982b) has argued that the holographic paradigm is guilty of confusing the paradox of spirit/Spirit (Being and Nonbeing) because it collapses the Great Chain of Being to its lowest level, physical-body or matter.

Bohm's Response to Wilber's Criticisms

Taking Wilber's criticisms into consideration, René Weber explored the problems associated with the holographic paradigm by asking Bohm to clarify his position:

Weber: Unlike some people who question the validity of mapping physics onto the mysticism of the ancient wisdom traditions, you do not question it, if it is properly done.

Bohm: What kind of mapping?

Weber: For example, what [Fritjof] Capra tried to do in *The Tao of Physics*. Ken Wilber in *Quantum Questions* criticizes this approach and all similar attempts as invalid. By implication, your own work is open to the same attack.

Bohm: Part of this ancient alliance between science and theology at the time of Newton was to make matter as "materialistic" as possible¹² . . . to emphasize the transcendence of God. There is sort of a trace of that in Wilber.

Weber: Wilber says that matter is the lowest level of the hierarchical universe which he identifies with the Great Chain of Being. The upper levels contain the lower levels but not vice versa. People who try to ignore that, Wilber argues, are guilty of a kind of reductionism.

Bohm: In the view I'm presenting nothing is being reduced. Pure idealism would reduce matter to an aspect of mind. Hegel was an example of that. Pure materialism attempts to reduce mind to an aspect of matter, and of course that's what we see in a great deal of modern science. My view does not attempt to reduce one to the other any more than one would reduce form to content. (Bohm & Weber, 1986b, pp. 150-151)

Bohm (1987) continued to make it clear that the implicate order is not within space-and-time; consequently, Bohm's point of view cannot be accused of the kind of reductionism that Wilber was suggesting. Instead, from a completely different perspective, it is the conceptual framework of the Great Chain of Being that calls for critical attention. In particular, the use of spatial metaphors, such as terms like "upper" or "lower," is limited. An obvious reason for exercising such caution follows from the fact that the space-time continuum is no longer limited to Euclidean descriptions of matter, thanks to Riemannian geometry, Einstein's general

Understanding Bohm's Holoflux

theory of relativity, and to a lesser extent, quantum theory.

Thus, the application of spatial metaphors to domains *other than matter* would have even less significance and, more likely, no significance whatsoever. Unfortunately, language, which is based on a Euclidean perception of reality, continues to reflect a two-dimensional worldview. This argument is raised in the spirit of Bohm's etymological accuracy, from which it follows that the attempt to discuss the meaning of his theories would be served well by practicing the same precision he used in their expression. Those unfamiliar with the philosophical complexities of topological mathematics (which demonstrate the limitations of spatial metaphors) may enjoy Edwin A. Abbott's (1884/1952) classic satire on the subject titled *Flatland*. More recent excursions into the relationship between topological mathematics and what might be more accurately referred to as cosmology, astrophysics, and the philosophy of the infinite can be found in the work of Carpenter (1981), Gribbin (1986), Kaufmann (1979), and Rucker (1983).

In an attempt to further clarify this discussion about language, in an earlier work I noted that:

Dan "Moonhawk" Alford, who died from a brain tumor on October 24, 2002, shared my interest in Bohm's "rheomode" or flowing mode (Bohm, 1980), which Moonhawk referred to as "quantum linguistics," as opposed to "Euclidean linguistics." The easiest way to describe this radical shift in expression of meaning is it moves away from the subject-verb-object structure of language and places the grammatical focus on the verb instead of the noun; it's an active method of reflexive cognition and a means of using language for those [of] us who are interested in consciousness studies. By analogy, this is like using geometries to understand curved spacetime that are different from the geometry we use to measure flat places and two-dimensional surfaces. (Schroll, 2009, p. 54)

Euclidean conceptions of space have been applied in Freudian and post-Freudian attempts to map an understanding of consciousness (Eckartsberg, 1981). Bohm's transcendence of these Euclidean limitations in his model of cosmos and consciousness led me to my definition of consciousness—forthcoming later in this paper—and to champion Bohm's concept of holoflux.

Gordon G. Globus' Defense of Bohm's Holistic Physics

Additional responses to Wilber's criticisms have come from Globus (1986), who defended Bohm's holistic physics by posing the question:

Is there a kind of physical theory—perhaps holistic—whose story is consonant with the perennial philosophy? . . . [More specifically,] *Is the story of Bohm's physics consonant with the story of the perennial philosophy?* If so, then Wilber's whole argument would collapse, whatever the ultimate fate of Bohm's ideas, since Wilber (Wilber, 1984b) believes that *in principle* any attempt to relate physics with mysticism "is simply to misunderstand entirely the nature and function of each (p. 4)." Harald Walach <walach@europa-uni.de> (Globus, 1986, p. 50)

To date (that I know of), Wilber has not responded to Globus' (1986) critique, an observation that has gained support with the publication of the 1994 paper "The Worldview of Ken Wilber" by two of Wilber's closest colleagues Roger Walsh and Frances Vaughan. In this paper Walsh and Vaughan do not list any new publications by Wilber regarding the issue of physics and mysticism. Much to the contrary, in a section titled "Physics," Wilber's books *Quantum Questions* (Wilber, 1984c) and *The Holographic Paradigm and Other Paradoxes* (Wilber, 1982c) are cited as his definitive statements on this topic. The final paragraph in Walsh and Vaughan's section on "Physics" does cite Globus' (1986) paper, but fails to discuss its criticisms. Instead, Walsh and Vaughan (1994) attempted to put this matter to rest by saying:

some other theorists such as Capra (1991) and Globus (1986) [believe] there may be some identifiable parallels between descriptions from physics and certain mystical investigations, [but] these parallels are likely to be few, abstract, and certainly not proof of mystical claims. For Wilber, then, "genuine mysticism, precisely to the extent that it is genuine, is perfectly capable of offering its own defense, its own evidence, its own claims, and its own proof. . . . The findings of modern physics and mysticism have very little in common" (Wilber, 1984c, p. 26). (Walsh & Vaughan, 1994, p. 16)

Walsh and Vaughan's reiteration of Wilber's (1984c) assessment of the controversies associated with physics and mysticism is disappointing. It suggests a

lack of effort on their part to find a resolution to this controversy, especially because in 1994 both Walsh and Globus shared appointments in psychiatry and human behavior at the University of California at Irvine. Given the fact that Globus' critique was published in 1986, it seems only fair that anyone (such as Walsh) with the least amount of interest in brain science would have responded by writing at least a sentence or two specifically addressing this issue in that length of time. Considering the amount of time that has passed without further discussion, I would welcome any new reflections on this point from Walsh, Vaughan, Globus, Wilber, or others who have the time and expertise to contribute to clarifying these issues. Robert M. Fisher (1997) published a comprehensive assessment of Wilber's work, and cited Globus (1986), but Wilber and Globus' points of disagreement were not discussed.

In addition to his criticism of Wilber, Globus (1986) suggested alternative avenues of research and theory construction available to transpersonal psychology:

Suppose one holds (which Wilber would not, I think) that mind, soul, and transcendent spirit are all emergent properties of brain functioning, with transcendent spirit the highest level emergent. Then, although physics is surpassed by the transcendent aspect of spirit, brain science is not. In this nontraditional ontology, a scientific description of brain functioning at its very highest level of "super-system" functioning ought to be consonant with the mystical description of transcendent spirit (Globus, 1982). (Globus, 1986, p. 51)

As an aside, Globus (1986) agreed with Wilber's observations that causal-spirit (mysticism or transpersonal awareness) has little or nothing in common with physics. But, he disagreed with Wilber's criticism that Spirit (Nonbeing), the ground of all levels in the Great Chain of Being, has little or nothing in common with physics. Whereas Spirit-as-ground, said Globus, is where "the stories of physics and the perennial philosophy cohere" (p. 51). Furthermore, Globus made a careful distinction between the perennial philosophy and mysticism, making the case that, because the perennial philosophy and Bohm's holistic physics are conceptual in nature, they should not be confused or compared with mysticism.

In a significant contribution to this discussion, Walsh (1983) made this point very clear, stressing the

“crying need” for gnostic intermediaries: “Individuals who are both deeply immersed in the practice of the consciousness disciplines and are also competent scholars of traditional disciplines such as psychology and philosophy” (p. 30). He added that:

an effective gnostic intermediary must not only know what he or she is attempting to communicate, but must also know the conceptual environment into which it is being introduced, and to know this well enough to be able to link the two in a skillful and legitimizing way that will produce an “aha” reaction from the receiver. (p. 30)

Walsh’s encouragement for practitioner scholars to become gnostic intermediaries builds upon Wilber’s (1982a) argument that “the geist-sciences ‘rest on the relation of *lived experience, expression, and understanding*’” (p. 100), a point of view Wilber (1990a) developed in considerable detail in his book *Eye to Eye*. More recently Walsh (1990, 2007) extended his investigation into becoming a gnostic intermediary to the study of shamanism. Further discussions of shamanism in support of Walsh’s work can be found in Schroll (2010a, 2011c); additional views on shamanism can be found in Schroll and Greenwood (2011); and Schroll and Mack (2012).

Having made this distinction between mysticism and the perennial philosophy, Globus (1986) went on to ask if physics—more particularly Bohm’s holistic physics—and the perennial philosophy have something in common; Globus believed they do. Based on his investigation of this issue, Globus concluded that the story of physics *is* consonant with the story of the perennial philosophy; however, Globus was again careful in this affirmation, saying that: “rather than physics possibly supporting the perennial philosophy, the issue is one of mutuality of fit between the perennial philosophy and physics” (p. 50).

These careful points of clarification by Globus (1986), in addition to Bohm’s (Bohm & Weber, 1982b) rejoinder to Wilber’s critique, should not, however, be taken as a defense of the holographic paradigm. Bohm too, in a conversation with Weber (Bohm & Weber, 1986a), has called attention to the limitations of the holographic model of the universe:

If we remain with the holographic model, this essentially sticks to the implicate order and leaves out the super-implicate order. In other words, it’s a

tremendous simplification of quantum mechanics to make [it synonymous with] the holographic model; that is good enough in the classical sense where you use the holograph. But as a model for organizing the implicate order through the informational field—the quantum information potential—it leaves out what is very interesting, namely that this implicate order now actively organizes itself. This is crucial to understanding thought and the mind There is a principle I once thought of[, which serves to explain this relationship, that I referred to as] “soma-significance” instead of “psychosomatic.” The word psychosomatic emphasizes two entities, mind and soma (or body), but I want to emphasize two sides of *one process*. Any process can be treated either as somatic or as significant. A very elementary case is the printed paper: it’s somatic in that it’s just printed ink; and it also has significance. I say all along the line any part of the body or the body processes is somatic, it’s the nerves moving chemically and physically; and in addition it has a meaning which is active I am trying to say that all of nature is organized according to the activity of significance. This, however, can be conceived somatically in a more subtle form of matter which, in turn, is organized by a still more subtle form of significance. So in that way every level is both somatic and significant. (Bohm & Weber, 1986a, pp. 37-38)¹³

Bohm’s reference to the super-implicate order can be considered analogous to Wilber’s concept of Spirit-as-Ground. Wilber (1990b) agreed: “David Bohm has clearly moved toward a more articulated and hierarchical view, even if he objects to the word hierarchy” (p. 162). Still, it would actually be more precise to say Bohm objected to the idea that evolutionary development progresses in a strictly linear, stage-like fashion, such as the Great Chain of Being suggests. A more thorough discussion of Wilber and Bohm’s views on this issue, including the comments offered by Walsh and Vaughan (1994) under the heading “Evolution” (pp. 10-13), is beyond the scope of this paper.

To recap and summarize, this discussion has shown that Bohm’s implicate order model of cosmos and consciousness is not a harbinger of a new holographic paradigm. Does this mean that Bohm’s search for wholeness must be forsaken? Not in the least! As the inquiry throughout this paper has intimated, the

hologram was merely a metaphor that Bohm found useful toward illustrating what he meant by the implicate order.

Unfortunately, too many people took the metaphor as the domain of reality he was trying to get them to see. In pointing out the limitations of the holographic model of the universe, Bohm has shifted the discussion toward a deeper examination of the implicate order's self-organizing activity (projection, injection, and reprojection) as a means of understanding the relationship between thought and mind. This inquiry led Bohm to develop his concept of the holomovement. Bohm's coinage of the term holomovement reflects his pursuit of a conceptual language capable of describing the ontological reality that carries an implicate order, an enterprise that dovetails with Bohm's theory of the *quantum potential* and the investigation of what physicists have referred to as *nonlocality* (Battista, 1996; Schroll, 1997, 2008b, 2010b; Schroll & Krippner, 2006). This concept of holomovement is a topic that will now be examined in more detail.

The Holomovement:

Bohm's Initial Narrative Construction of Wholeness

In seeking to understand what Bohm meant by his concept of holomovement, a return to the discussion of the implicate order in Part 1 of this paper is called for. Bohm's contemplative persistence of *something that goes beyond* the present understanding of quantum theory produced the broader philosophical proposal of the implicate order. Pursuing the theoretical refinements associated with the implicate order eventually produced the idea of the quantum potential's ability to inform the content of its environment. Through this line of thought, Bohm eventually reached the additional insight that the implicate order's cyclic process (injection, projection, reprojection) could be referred to as the holomovement. Defining his concept of the holomovement, Bohm (1987) wrote:

The thought occurred to me: perhaps the movement of enfoldment and unfoldment is universal, while the extended and separate forms that we commonly see in experience are relatively stable and independent patterns, maintained by a constant underlying movement of enfoldment and unfoldment. This latter I called the *holomovement*. The proposal was thus a reversal of the usual idea. Instead of supposing that matter and its movement are fundamental, while enfoldment and unfoldment are explained

as a particular case of this, we are saying that the implicate order will have to contain within itself all possible features of the explicate order as potentialities, along with the principles determining which of these features will become actual. (pp. 40-41)

Bohm's definition of the holomovement may also have a broader metaphysical connotation. As briefly mentioned earlier in the section on "Ken Wilber's Criticisms of the Holographic Paradigm," the possibility of this broader metaphysical connotation first occurred to me during a lecture by Smith (1984). Smith was discussing his ontological model of reality, saying that these four levels (physical-body, symbol-mind, subtle-soul, and causal-spirit) could be thought of as the fingers on a hand; he added that the thumb, which is able to touch all four fingers, could be understood as the ground-of-all-being. This got me wondering: Is Bohm's implicate order (which generates, or more accurately coincides, and co-emerges within the context of the holomovement) analogous to Smith's thumb? The difficulty in posing this question without contradiction harkens back to the previous discussion of the emergence of language within a cultural context shaped by the worldview associated with Euclidean perception. This question remains unanswered and is provided here for contemplation.

Yet this definition of the holomovement is limited to its immediate significance as an extension of Bohm's concept of the implicate order. A summary of its relationship to the bigger picture associated with the *Einstein-Podolsky-Rosen (EPR) paradox*, nonlocality and quantum potential, can be found in Schroll (1997; see also Schroll, 2010b, pp. 4-5). Battista (1996) also offered an excellent overview of these concerns as they relate to transpersonal psychiatry. Sharpe (1990) also summed up the broader context of these concerns, saying:

Holomovement physics explains nonlocality. In the holomovement, the basic connections between elements are neither local nor nonlocal. They are, rather, alocal, or neutral concerning locality. The nonlocal connections of the EPR experiment can be thought of as coming from the more basic alocal connections of the holomovement. (p. 113)

Having now clarified Bohm's technical definition of holomovement once again invites inquiry into what Grof (2012) referred to as "Universal Mind

or Cosmic Consciousness” (p. 148) and/or what John Welwood called “big mind” (Bohm & Welwood, 1980, p. 26). In a conversation between Bohm and Welwood (1980), this concern was reiterated:

Welwood: It seems that the idea of implicate order which you have developed in physics is an analogy for a deeper order of mind. . . . The term “big mind” lumps many things together, namely, everything that is beyond what we can talk about, but which we can still know, intuit, or realize in some way, if only in little glimpses.

Bohm: Right. The holomovement is more “inward” than the two orders which are its extremes. . . . “Implicate” still means something could be said about it. But the ultimate ground of being is entirely unutterable, entirely implicit. (pp. 26-27)

The Holograph:

Bohm’s Continuing Attempt to Construct a Language and Conceptual Understanding of Wholeness

Bohm’s (1984a) concept of holoflux came to my attention during a conference at Harvard University that Bohm participated in, “Science and Mysticism: Exploring the New Realities.” During the question and answer period, Bohm was asked how precise the term holomovement was as a means to describe the type of movement to which he was referring. Bohm answered that through additional conversations with Karl Pribram the limitations of using the word holomovement became clear, because the word movement indicates the propagation of some phenomenological-sensorimotor event through the spacetime continuum.

The term holomovement (and its more precisely defined definition holoflux) was further clarified during a conversation between Bohm and Weber (1982b):

Weber: Could we begin by clarifying the difference between the holomovement, the holograph and the implicate order?

Bohm: Holomovement is a combination of a Greek and Latin word and a similar word would be holokinesis or, still better, *holoflux*, because “movement” implies motion from place to place, whereas flux does not. So the holoflux includes the ultimately flowing nature of what is, and of that which forms therein. The holograph, on the other hand, is merely a static recording of movement, like a photograph: an abstraction from

the holomovement. We therefore cannot regard the holograph as anything very basic, since it is merely a way of displaying the holomovement which latter is, however, the ground of everything, of all that is.

The implicate order is the one in which the holomovement takes place, an order that both enfolds and unfolds. Things are unfolded in the implicate order, and that order cannot be entirely expressed in an explicate fashion. Therefore, in this approach, we are not able to go beyond the holomovement or the holoflux (the Greek word might be *holorhesis*, I suppose) although *that does not imply that this is the end of the matter*. (p. 187, emphasis added)

Without exception (as the examination of the literature discussing Bohm’s implicate order demonstrated), authors employing the use of the term holomovement have failed to continue Bohm’s conceptual revision of its meaning. Likewise this is why holography cannot illustrate quantum states in a state of potentia, because these “states” are beyond the constraints of spacetime and matter. Realizing this, Bohm suggested the concept of holoflux, referring to phenomena that are not bounded by a rigid structure whose quantum transformation is more dynamic than any fractal image: “*Flux* refers to a change in state rather than movement in time or place. In other words, a transition in quantum state from potentia (Bohm’s implicate order) to spacetime and matter (the explicate order) does not require a path” (Schroll, 2005b, p. 58).

A similar point was articulated in a conversation between Krishnamurti and Bohm (1973) at Brockwood Park, Hampshire, England, on October 7, 1972:

Bohm: Would you say energy is a kind of movement?

Krishnamurti: No, it is energy. The moment it is a movement it goes off into this field of thought.

Bohm: We have to clarify this notion of energy. I have also looked up this word. You see, it is based on the notion of work; energy means, “to work within.”

Krishnamurti: Work within, yes.

Bohm: But now you say there is an energy which works, but *no movement*.

Krishnamurti: Yes. I was thinking about this yesterday—not thinking—I realized *the source* is there, uncontaminated, *non-movement*, untouched by thought, it is there. From that these two are born. Why are they born at all?

Bohm: One was necessary for survival.

Krishnamurti: . . . In survival this—in its totality, in its wholeness—has been denied, or put aside. What I am trying to get at is this, Sir. I want to find out, as a human being living in this world with all the chaos and suffering, *can the human mind touch that source in which the two divisions don't exist?*—and because it has touched this source, which has no divisions, it can operate without the sense of division. (pp. 498-499, emphasis added)

Defining and Investigating Cosmic Consciousness: Questions that Bohm's Holoflux Raises for Transpersonal Theory

My continuing reflection on the implications of holoflux, this conversation between Bohm, Krishnamurti, and how cosmic consciousness might be described and investigated has led me to suggest that as humans the whole of our waking lives is a mandala that we weave, which constitutes the personal unconscious. Time in this domain is linear, rational, serial, and causal. The whole of the biological lineage of the human species (which includes ancestral links with the nonhuman world) extending from here to the ends of the universe is the mandala the cosmos as a whole weaves, which constitutes the collective or transpersonal unconscious. This domain is non-linear, indeterminate, synchronistic, and acausal. Together they form the Self.

Less poetically, in light of the inquiry into sorting out Bohm's implicate order, this paper's examination has led back to my ongoing efforts to put forth my own transpersonally oriented definition of consciousness:

The immediacy of the continually emerging effort to establish an awareness of the reciprocal interaction taking place between the person-the-environment-and-the-fundamental unifying principle bonding this relationship together at any given moment. (Schroll, 2005b, p. 57)

In referring to “the person,” I take the view that humans possess a self-awareness that has free will to make decisions toward being-in-the-world. By “environment” I mean both nature and the built environment and/or the totality of the physical planet: Earth (and, to the extent one continues to become aware of it, the entire physical universe). By the “fundamental unifying principle” I mean something beyond space-time that serves as a generative organizational process, and has the

ability to bond this reciprocal interaction of person and environment together with this generative process at any given moment. This fundamental unifying principle is what I (after Bohm) call “holoflux.”

Moreover, this paper has focused on theoretical concerns associated with the understanding of a more precise way to frame thoughts regarding ultimate reality, or as Grof (2012) referred to it as “Universal Mind or Cosmic Consciousness the Supracosmic and Metacosmic Void” (p. 148), as a scientific basis to discuss transpersonal experiences. Beyond this is the separate yet related concern of the implications that Bohm's participatory vision of cosmos and consciousness—the holoflux—raises for transpersonal theory. Here (at the risk of getting into specifics that will go beyond this paper's limits), I want to briefly comment on defining a participatory spirituality. Jorge Ferrer (2011) said: “the *participatory approach* holds that human spirituality emerges from our cocreative participation in a dynamic and undetermined mystery or generative power of life, the cosmos, and/or the spirit” (p. 2). Ferrer clarified what he means by “undetermined mystery”:

My use of the term *undetermined* to qualify the mystery is mostly performative—that is, it seeks to evoke the sense of not-knowing and intellectual humility I find most fruitful and appropriate in approaching the creative sense of our being. Rather than affirming negatively (as the term *indeterminate*, which I used in *Revisioning*, does, *undetermined* leaves open the possibility of both determinacy and indeterminacy within the mystery (as well as the paradoxical confluence or even identity of these two apparent polar accounts), simply suggesting that the genuinely creative potentials of the mystery cannot be determined a priori. (p. 23)

I agree that the most humble position is to say that it is not known for certain what ultimate reality or cosmic consciousness is. Hence this has been the sub-thesis contributing to this paper: to clarify Bohm's contribution to the conceptual means available for a continuing inquiry regarding discussions of ultimate reality and the transpersonal domain. Specifically in response to Ferrer, there is a considerable difference in the kind of universe we live in depending on whether or not it is organized in terms of determinacy or indeterminacy.¹⁴ However, a complete answer to this problem and the epistemological question of how humans are able to know what reality

is cannot be fully explored in this paper. Raising these questions is essential to this continuing inquiry, yet answering these questions is something that will need to be taken up in future papers.

Conclusion

If successful, this paper has aided the understanding of Bohm's 1982 and 1984 corrections of the holographic paradigm—specifically his concept of holomovement—that he referred to as holoflux. In addition, this paper will have been successful if the relationship of Bohm's implicate order theory, and its significance to transpersonal anthropology and transpersonal psychology's inquiry, is now better understood, particularly in how it relates to the difficult problem associated with the inquiry of the farther reaches of human nature and Cosmic Consciousness. Toward this end, besides examining Bohm's work, this paper summarized the views of Globus, Grof, Weber, Wilber, Krishnamurti, Walsh, and others, whose various contributions were discussed and sometimes criticized. Nevertheless, at the end of the day, in spite of these best efforts, any attempt to frame Cosmic Consciousness or Universal Mind produces an awareness of human limitations, and it is this experience of humility that is the real lesson to be learned.

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Notes

1. Thank you to an anonymous reviewer in 2009 for reminding me of this.
2. Most of Bohm's contemporaries agree that he was indeed one of the world's foremost theoretical physicists. Their opinions differ when Bohm is referred to as one of the most influential theorists of the emerging paradigm. Regarding this claim, some of Bohm's contemporaries refer to him as a maverick and a scientist gone astray. This criticism of Bohm has been pointed out in *Looking Glass Universe* (Briggs & Peat, 1984). Kevin J. Sharpe (1993) also provided a detailed examination of the literature criticizing Bohm's theory of the implicate order, especially in chapters 1-3. Moreover, this paper builds on a previous discussion (Schroll, 2010b) of the physics of psi, nonlocality, and so forth.
3. A chapter on the epistemological, ontological, and consciousness-related implications of relativity and quantum theory to transpersonal studies (that also mentions Bohm's contributions) has been written by John R. Battista (1996). Battista agreed with the views of Bateson (Bateson & Bateson, 1987), Herbert (1993) and Bohm "that reality is both transcendent and immanent: It cannot be separated from matter but cannot be fully understood as material" (Battista, 1996, p. 204). See also Bohm and Welwood (1980).
4. Bohm (1980a) addressed this concern, saying:

[I]t is commonly believed that the content of thought is in some kind of reflective correspondence with "real things," perhaps

being a kind of copy, or imitation of things, perhaps a kind of "map" of things, or perhaps (along lines similar to those suggested by Plato) a grasp of the essential and innermost forms of things. Are any of these views correct? Or is the question itself not in need of further clarification? For it presupposes that we know what is meant by the "real thing" and by the distinction between reality and thought. But this is just what is not properly understood (e.g., even the relatively sophisticated Kantian notion of "thing in itself" is just as unclear as the naïve idea of "real thing"). (pp. 53-54)

5. Some of the questions this paper raises are addressed in Schroll (2010b, 2011b).
6. This clarification also raises as many questions as it answers. Unfortunately a discussion of the differences between Bohm and Kant's theory of knowledge exceeds the limits of this paper. A discussion of "Quantum Mechanics and Kantian Philosophy" can be found in Heisenberg (1971, pp. 117-124).
7. The deeper issues of misunderstanding connected with Bernstein's (1982) criticism exceed this paper's limits, and are taken up in Schroll (2011a). See also Sharpe (1993, pp. 68-72) for an overview of the critical comments that have concerned scientists regarding the physics and mysticism controversy.
8. I am indebted to various articles by Wilber (1982a, 1982b, 1984a, 1984b, 1990b, 1993a, 1993b) for these insights.
9. The issue of time as it relates to Bohm's interpretation of quantum theory and his views concerning the implicate order have been discussed in considerable detail in Griffin (1986). Additional insight for this model in Schroll (2013) was derived from examining Rupert Sheldrake's hypothesis of formative causation (Sheldrake, 1981, pp. 122-123; Sheldrake & Bohm, 1982; Sheldrake & Toms, 1985; Sheldrake & Weber, 1982). One anonymous reviewer of this paper in 2009 suggested it was actually Bohm that first put forth this TV model. This is incorrect. My guess is that this reviewer confused my TV model with Bohm's (1980a, pp. 186-198) discussion of multidimensional orders of reality. This mistaken attribution of my TV model with the far more complex conceptual example that Bohm suggested with his use of two

Appendix A

TV's and two cameras demonstrates why the present paper has been written. To say more about Bohm's example of multidimensional reality would exceed the limits of this paper.

10. A more detailed discussion of Smith's ontological model can be found in Smith (1982). Wilber (1982a, 1984b, 1984c, 1993a) has also elaborated on this model.
11. Metzner (personal communication, July 9, 1996; see also Metzner, 1998) reminded me that according to his theory of personality (and Smith's 1982 model), these four levels of Being are not merely progressively increasing states of awareness (an epistemological problem); they represent increasing levels of reality (an ontological problem). Speaking both epistemologically and ontologically in response to his study of Gnosticism, Metzner (1998) told us:

The sense of alienation, so widespread in Western culture and so particularly acute in twentieth century consciousness, can be seen as the inevitable and perhaps necessary starting point for personal transformation. Estrangement leads to questioning, searching and wondering. The quest or search may lead, if we are graced, to an awakening; the journey homeward may lead to the source of our beingness. (p. 257)

Limited space restricts a more complete discussion of Metzner's (1998) theory of personality. Similar to Metzner's (1998) are the views of June Singer (1990), who provided an exploration of these concerns from a Jungian, transpersonal, and psychotherapeutic framework.

12. This ancient alliance between science and theology was historically referred to as natural philosophy or natural theology. Bohm took up a discussion of natural philosophy and its relationship to consciousness and creativity in his interview with Michael Toms (Bohm & Toms, 1990). A more comprehensive discussion of natural theology was taken up by Stephen Toulmin (1982).
13. A complete discussion of Bohm's (1985, 1986) somasignificance concept exceeds this paper's limits.
14. I first sought to clarify this difference in Schroll (1988; having the assistance of Patrick McNamara as one of my peer reviewers), and expanded this discussion in Schroll (1997), yet only scant aspects of this have been published (see Schroll, 2010b).

The examination of the ether requires an Appendix because to understand its implications requires much more discussion than a mere footnote. The theory of the ether, or the *ether-sea*, was that of an odorless, tasteless, invisible substance permeating the entire universe, the conception of which implied a structural orientation. It existed, said the scientists of the 19th century, because it had to exist so that light as well as electro-magnetism could propagate through space by twisting, turning, wiggling, and displacing itself from one point to the next. This view of the universe was distinctly mechanistic and helped to promote the reality that both the universe, and the creatures populating and propagating this reality, were nothing but machines: a view of reality that supported the idea of linear causal determinism, even to the extent of eliminating free will.

This view of the universe as a machine would be prevalent today, had it not been for the demise of the ether-sea in 1897, just eight years after the death of James Clerk Maxwell. The ether-sea's demise came as the result of a crucial experiment that tackled the problem of absolute non-motion, the constancy of the speed of light, and the existence of the ether. This ingenious experiment bears the name of its inventors, Albert Michelson and Edward Morely, as these scientists successfully showed empirically that the ether-sea does not exist. To better understand the empirical rationale that Michelson and Morely used to determine whether the ether-sea truly existed, the discussion is turned over to Gary Zukav (1979), who described this experiment eloquently and succinctly in his book *The Dancing Wu Li Masters*:

The idea of the Michelson-Morely experiment was to [measure the apparent speed of light propagation through the ether in both the vertical and horizontal directions, and thereby] determine the [absolute] motion of the earth through the ether sea. Their experiment was conceptually simple and ingenious. If the earth is moving, they reasoned, and the ether sea is at rest, then the movement of the earth through the ether sea must cause an ether breeze. Therefore, a beam of light traveling against the ether breeze should have a slower velocity than a beam of light sent across the ether breeze. This is the essence of the Michelson-Morely experiment. . . .

To establish and detect this difference in velocity, Michelson and Morely created a device called an

interferometer (from the word ‘interference’). It was designed to detect the interference pattern created by the two beams of light as they returned to a common point. . . . [One beam of light would of course be sent horizontally, back and forth across the ether. While the other beam would be sent vertically, upstream against the ether and, then, downstream with the ether.] By observing the interference created by these converging beams in the measuring device, any difference in velocity between them can be determined accurately. When the experiment was performed, not the slightest difference in velocity could be detected between the two beams of light. The interferometer was turned 90 degrees so that the beam going against the ether wind now was directed across it, and the beam going across the ether wind now was sent directly into it. Again not the slightest difference in the velocity between the two beams could be detected. (pp. 130-131)

Following the results of the Michelson-Morely experiment, several attempts were made to make sense of the results. The ether had not been detected by Michelson and Morely, thus a new dilemma presented itself to the physicists of the 19th century. Either the ether-sea does not exist, which was what the experimental evidence unmistakably declared, in which case how does light and other forms of electro-magnetic phenomena propagate itself through space? Or the other alternative interpretation that seemed equally untenable to the 19th century physicists was that the Earth does not turn on its axis and does not rotate around the sun. This of course would denounce the Copernican theory, calling into question the basis of planetary motion. Undoubtedly physicists found the undetectability of the ether easier to accept than having to relinquish the theory of Copernicus.

Michelson and Morely were the first to suggest an explanation as to why the ether-sea had not been detected. They reasoned that a layer of the ether, like the atmosphere, was carried along as the earth moved through the ether-sea. Therefore the ether breeze could not be detected close to the surface of the earth. This explanation of why the ether could not be detected held until 1892, when an Irish physicist George Francis Fitzgerald presented an even more outrageous interpretation. This new hypothesis stated that matter was compressed by the pressure of the ether breeze.

This explained why both beams of light were able to be detected simultaneously by the interferometer, because the arm of the interferometer pointed toward the wind would contract, making the arm pointed horizontally slightly longer.

Following this assumption, Fitzgerald went on to explain that the resistance of the ether wind could not be detected because the amount the velocity of light was reduced traveling horizontally was in direct correspondence to the amount of contraction of the ether breeze to cause the interferometers arm to point vertically. Hence both beams of light could reach the measuring device at the same instant; whereas the vertical beam would travel a greater distance at a greater velocity, being detected by a contracted measuring device, the horizontal beam would travel a shorter distance at a slower velocity, and yet be measured by a longer measuring device.

While Fitzgerald’s interpretation of the Michelson-Morely experiment seemed a bit fantastic, it did have one major advantage—it was an untestable hypothesis! Ironically, however, this hypothesis gained a respectable place in science just one year later. This of course was because of a discovery of a mathematical expression for the Fitzgerald hypothesis by the Dutch physicist Hendrik Antoon Lorentz. A further irony was that Lorentz’s discovery was completely serendipitous, for it emerged from his attempts to support Fitzgerald’s hypothesis. Eventually Lorentz’s mathematized version of Fitzgerald’s hypothesis came to be known as the Lorentz transformation. This view of reality held for another 12 years until the Einsteinian revolution.

Therefore, to summarize and conclude, the Michelson-Morely experiment, conducted in 1887, was designed to measure the ether breeze. The ether was believed to be a physically real, but invisible, corpuscular web that extended throughout the universe, whose existence served as the medium through which light propagated itself (Jeans, 1943/1981). Consequently it was thought that as a result of the earth’s rotation and movement through this invisible medium that an “ether breeze” was created. The Michelson-Morely experiment failed to detect the ether’s physical existence. Various explanations to account for why the ether had not been detected began to emerge. However, it took the bold statement by a young 25 year-old scientist named Albert Einstein to declare 18 years later (in 1905) that the ether was not detected because the ether does not exist!

About the Author

Mark A. Schroll, Ph.D., Research Adjunct Faculty, Sofia University, Palo Alto, CA, is best known for his papers on ecopsychology, transpersonal psychology, and anthropology of consciousness. Lesser known is Schroll's inquiry in philosophy of science, summed up in his Dissertation's title *The Philosophical Legacy of David Bohm, its Relationship to Transpersonal Psychology and the Emergence of Ecopsychology: Searching for a Coherent, Co-Evolutionary, Sustainable Culture*. Summing up his evaluation of Schroll's inquiry of Bohm (1985-1988, 1996-1997), the late Professor Werner Leinfellner, Ph.D., co-founder and former vice-president of Austria's International Wittgenstein-Symposium, said: "Schroll has identified the coming crisis in philosophy and I am impressed with his courage to have taken on such a huge and difficult problem. . . . His aim to make this idea of holism accessible to philosophers and scientists who wish to apply it in their own fields of research has been accomplished successfully in his dissertation." Email: rockphd4@yahoo.com.