

EXEMPLARY SCIENTISTS: JAMES JEANS AND DAVID BOHM

(from *The Mystic's Vision* by Swami Abhayananda.
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I. JAMES JEANS

Homage To The Visionary Scientist, James Jeans

When I was a young man in the late 1940's and early 1950's, many paperback books on popular science were published and were available at my local drugstore perched on revolving wire racks, usually priced around 35 cents. There I was able to find, not only anthologies of the great philosophers, but also the latest books popularizing the scientific theories of George Gamow, Sir Arthur Eddington, James Jeans, and others.

One of the first acute observers to see the 'writing on the wall' implied in the observations of early twentieth century physics was British mathematician and astronomer, James Jeans (1877-1946). Long before it became evident to his peers, Jeans understood that Einstein's equations equalizing energy and matter meant that the material universe was nothing more than congealed light. In his book, *The Mysterious Universe*, published in 1931, he wrote:

The tendency of modern physics is to resolve the whole material universe into waves, and nothing but waves. These waves are of two kinds: bottled-up waves, which we call matter, and unbottled waves, which we call radiation or light. If annihilation of matter occurs, the process is merely that of unbottling imprisoned wave-energy and setting it free to travel through space. These concepts reduce the whole universe to a world of light, potential or existent, so that the whole story of its creation can be told with perfect accuracy and completeness in the six words: "God said, '*Let there be light*'." ¹

But the recognition that the material world was born of light was not the extent of Jeans' extrapolations on the revolutionary discoveries of physics in the early twentieth century. In that same book, he suggested that

“Recent scientific discoveries show that the stream of knowledge is heading toward a non-mechanical reality. *The universe begins to look more like a great thought than like a great machine.* Mind no longer appears as an accidental intruder into the realm of matter; we are beginning to suspect that we ought rather to hail it as *the creator and governor of the realm of matter*— not of course our individual minds, but the Mind in which the atoms (out of which our individual minds have grown) exist as thoughts.”²

“...The terrestrial pure mathematician does not concern himself with material substance but with pure thought. His creations are not only created by thought but are pure thought. ... And the concepts which now seem to be fundamental to our understanding of nature ... four-dimensional space, a space which expands forever; a sequence of events which follows the laws of probability instead of the laws of causation; all these concepts seem to my mind to be structures of pure thought. To my mind the laws which nature obeys are less suggestive of those which a machine obeys in its motion than those which a musician obeys in writing a fugue, or a poet in composing a sonnet. ... If all this is so, then the universe can best be pictured, although still very imperfectly and inadequately, as consisting of pure thought, the thought of what, for want of a wider word, we must describe as a mathematical thinker.”³

“If the universe is a universe of thought, then its creation must have been an act of thought. Indeed, the finiteness of time and space almost compel us, of themselves, to picture the creation as an act of thought. ...Modern scientific theory compels us to think of the creator as working outside time and space, which are part of his creation, just as the artist is outside his canvas.

“Indeed, the doctrine dates back as far as Plato:
 ‘Time and the heavens came into being at the same instant, in order that, if they were ever to dissolve, they might be dissolved

together. Such was the mind and thoughts of God in the creation of time.’”⁴

Jeans had framed a new/old scientific paradigm—one in which the universe of time and space was the product of Thought, and the Thinker was transcendent to the Thought. But Jeans was a product of the long-enduring tradition of Western philosophical and religious dualism in which God and His Creation (Spirit and Matter, Thinker and Thought) were distinct and separate entities; and he was scarcely able to escape this old way of thinking, and to clearly enunciate the implications of this radical paradigm. Here, he suggests that the Thinker/Creator is *outside* the Thought/Creation in the same way that an artist is *outside* his canvas. He fails to realize that, just as in the case of our personal minds the thoughts exist *within* our minds, so must the universal Thought exist *within* the Divine Mind. The Thinker transcends the Thought, to be sure; but He is not “outside of” or separate from the Thought, but rather encompasses the Thought/Creation and fashions it in accordance with His own Will.

Then, in 1934, when Jeans was the President of the British Association for The Advancement of Science, he delivered an Address to that Association in Aberdeen, Scotland, entitled “The New World-Picture of Modern Physics”, in which he explained more fully his position. Here is an extensive excerpt from that lecture:

“When geography cannot combine all the qualities we want in a single map, it provides us with more than one map. Theoretical physics has done the same, providing us with two maps which are commonly known as the particle-picture and the wave-picture. It is perhaps better to speak of these two pictures as the particle-parable and the wave-parable.

“The particle-parable, which was first in the field, told us that the material universe consists of particles existing in space and time. It was created by the labors of chemists and experimental physicists, working on the basis provided by the classical physicist. Its time of testing came in 1913, when Bohr tried to find out whether the two particles of the hydrogen atom could possibly produce the highly complicated spectrum of hydrogen by their motion. He found a type of motion which could produce this spectrum down to its minutest details, but the

motion was quite inconsistent with the mechanistic determinism of the Newtonian mechanics. The electron did not move continuously through space and time, but jumped, and its jumps were not governed by the laws of mechanics, but to all appearance, as Einstein showed more fully four years later, by the laws of probability. Of 1000 identical atoms, 100 might make the jump, while the other 900 would not. Before the jumps occurred, there was nothing to show which atoms were going to jump. Thus, the particle-picture conspicuously failed to provide an answer to the question ‘What will happen next?’

“The wave-parable serves this purpose; it does not describe the universe as a collection of particles but as a system of waves. The universe is no longer a deluge of shot from a battery of machine-guns, but a stormy sea with the sea taken away and only the abstract quality of storminess left— or the grin of the Cheshire cat if we can think of a grin as undulatory. This parable was not devised by Heisenberg, but by de Broglie and Schrödinger. At first, they thought their waves merely provided a superior model of an ordinary electron; later it was established that they were a sort of parable to explain Heisenberg’s pseudo-electron.

“In this way we have the two co-existent pictures—the particle-picture for the materialist, and the wave-picture for the determinist. When the cartographer has to make two distinct maps to exhibit the geography of, say, North America, he is able to explain why two maps are necessary, and can also tell us the relation between the two; he can show us how to transform one into the other. He will tell us, for instance, that he needs two maps simply because he is restricted to flat surfaces—pieces of paper. Give him a sphere instead, and he can show us North America, perfectly and completely, on a single map.

“The physicist has not yet found anything corresponding to this sphere; when, if ever, he does, the particle-picture and the wave-picture will be merged into a single new picture. At present some kink in our minds, or perhaps merely some ingrained habit of thought, prevents our understanding the universe as a consistent whole.

“The old physics imagined it was studying an objective nature which had its own existence independently of the mind which perceived it— which, indeed, had existed from all eternity whether it was perceived or not. It would have gone on imagining this to this day, had the electron observed by the physicists behaved as on this supposition it ought to have done.

“But it did not so behave, and this led to the birth of the new physics, with its general thesis that the nature we study does not consist so much of something we perceive as of our perceptions; it is not the object of the subject-object relation, but the relation itself. There is, in fact, no clear-cut division between the subject and object; they form an indivisible whole which now becomes nature. This thesis finds its final expression in the wave-parable, which tells us that nature consists of waves and that these are of the general quality of waves of knowledge, or of absence of knowledge, in our own minds.

“Let me digress to remind you that if ever we are to know the true nature of waves, these waves must consist of something we already have in our own minds. Now knowledge and absence of knowledge satisfy this criterion as few other things could; waves in an ether, for instance, emphatically did not. It may seem strange, and almost too good to be true, that nature should in the last resort consist of something we can really understand; but there is always the simple solution available that the external world is essentially of the same nature as mental ideas.

“Again, we may begin to feel that the new physics is little better than the old— that it has merely replaced one determinism by another. It has; but there is all the difference in the world between the two determinisms. For in the old physics the perceiving mind was a spectator; in the new it is an actor. Nature no longer forms a closed system detached from the perceiving mind; the perceiver and perceived are interacting parts of a single system. The nature depicted by the wave-picture in some way embraces our minds as well as inanimate matter. Things still change solely as they are compelled, but it

no longer seems impossible that part of the compulsion may originate in our own minds.

“What remains is in any case very different from the full-blooded matter and the forbidding materialism of the Victorian scientist. His objective and material universe proved to consist of little more than constructs of our own minds. To this extent, then, modern physics has moved in the direction of philosophic idealism. Mind and matter, if not proved to be of similar nature, are at least found to be ingredients of one single system. There is no longer room for the kind of dualism which has haunted philosophy since the days of Descartes.

“The old particle-picture which lay within the limits of space and time, broke matter up into a crowd of distinct particles, and radiation into a shower of distinct photons. The newer and more accurate wave-picture, which transcends the framework of space and time, recombines the photons into a single beam of light, and the shower of parallel-moving electrons into a continuous electric current. Atomicity and division into individual existences are fundamental in the restricted space-time picture, but disappear in the wider, and as far as we know more truthful, picture which transcends space and time. In this, atomicity is replaced by what General Smuts would describe as ‘holism’: the photons are no longer distinct individuals each going its own way, but members of a single organization or whole— a beam of light.

“The same is true, *mutatis mutandis*, of the electrons of a parallel-moving shower. The biologists are beginning to tell us, although not very unanimously, that the same may be true of the cells of our bodies. And is it not conceivable that what is true of the objects perceived may be true also of the perceiving minds? When we view ourselves in space and time, we are quite obviously distinct individuals; when we pass beyond space and time, we may perhaps form ingredients of a continuous stream of life. It is only a step from this to a solution of the problem which would have commended itself to many philosophers, from Plato to Berkeley, and is, I think, directly in line with the new world-picture of modern physics.”⁵

Then, in his book, *Physics And Philosophy*, published in 1942, Jeans continued explaining this concept of a Mind-based universe which, he felt, was the inescapable conclusion to be derived from the newest discoveries in physics. Here are a few excerpts from that book:

“A ...revolution has occurred in physics in recent years. Its consequences extend far beyond physics, and in particular they affect our general view of the world in which our lives are cast. In a word, they affect philosophy. The philosophy of any period is always largely interwoven with the science of the period, so that any fundamental change in science must produce reactions in philosophy. This is especially so in the present case, where the changes in physics itself are of a distinctly philosophical hue; a direct questioning of nature by experiment has shown the philosophical background hitherto assumed by physics to have been faulty. The necessary emendations have naturally affected the scientific basis of philosophy and, through it, our approach to the philosophical problems of everyday life. Are we, for instance, automata or are we free agents capable of influencing the course of events by our volitions? Is the world material or mental in its ultimate nature? Or is it both? If so, is matter or mind the more fundamental? Is mind a creation of matter or matter a creation of mind? Is the world we perceive in space and time the world of ultimate reality, or is it only a curtain veiling a deeper reality beyond?”

Mechanical Explanations of Nature

“Explanations which introduce tactile ideas— forces, pressures and tensions— are of course dynamical or mechanical in their nature. It is not surprising that such explanations also should have been attempted from Greek times on, for, after all, our hairy ancestors had to think more about muscular force than about perfect circles or geodesics. Plato tells us that Anaxagoras claimed to be able to explain the workings of nature as a machine. In more recent times Newton, Huygens and others thought that the only possible explanations of nature were mechanical. Thus in 1690 Huygens wrote: ‘In true philosophy, the causes of every natural phenomena are conceived in

mechanical terms. We must do this, in my opinion, or else give up all hope of ever understanding anything in physics.’

“Today the average man probably holds very similar opinions. An explanation in any other than mechanical terms would seem incomprehensible to him, as it did to Newton and Huygens, through the necessary ideas— the language in which the explanation was conveyed— not being in his mind. When he wants to move an object, he pulls or pushes it through the activity of his muscles, and he cannot imagine that Nature does not cause her movements in a similar way. Among attempted explanations in mechanical terms, the Newtonian system of mechanics stands first. This was supplemented in due course by various mechanical representations of the electromagnetic theories of Maxwell and Faraday. All envisaged the world as a collection of particles moving under the pushes and pulls of other particles, these pushes and pulls being of the same general nature as those we exert with our muscles on the objects we touch.

“We shall see later in the present book how these and other attempted mechanical explanations have all failed. Indeed, the progress of science has disclosed in detail the reasons why all failed, and all must fail. Two of the simpler of these reasons may be mentioned here.

“The first is provided by the theory of relativity. The essence of a mechanical explanation is that each particle of a mechanism experiences a real and definite push or pull. This must be objective as regards both quantity and quality, so that its measure will always be the same, whatever means of ‘measurement’ are employed to measure it just as a real object must always weigh the same whether it is weighed on a spring balance or on a weighing-beam. But the theory of relativity shows that if motions are attributed to forces, these forces will be differently estimated, as regards both quantity and quality, by observers who happen to be moving at different speeds, and furthermore that all their estimates have an equal claim to be considered right. Thus, the supposed forces cannot have a real objective existence; they are seen to be mere mental constructs

which we make for ourselves in our efforts to understand the workings of nature.

“...A second reason is provided by the theory of quanta. A mechanical explanation implies not only that the particles of the universe move in space and time, but also that their motion is governed by agencies which operate in space and time. But the quantum theory finds, as we shall see later, that the fundamental activities of nature cannot be represented as occurring in space and time; they cannot, then, be mechanical in the ordinary sense of the word.

“In any case, no mechanical explanation could ever be satisfying and final; it could at best only postpone the demand for an explanation. For suppose— to imagine a simple although not very likely possibility— that it had been found that the pattern of events could be fully explained by assuming that matter consisted of hard spherical atoms, and that each of these behaved like a minute billiard-ball. At first this may look like a perfect mechanical explanation, but we soon find that it has only introduced us to a vicious circle; it first explains billiard-balls in terms of atoms, and then proceeds to explain atoms in terms of billiard-balls, so that we have not advanced a step towards a true understanding of the ultimate nature of either billiard-balls or atoms. All mechanical explanations are open to a similar criticism, since all are of the form ‘A is like B, and B is like A’. Nothing is gained by saying that the loom of nature works like our muscles if we cannot explain how our muscles work. We come, then, to the position that nothing but a mechanical explanation can be satisfying to our minds, and that such an explanation would be valueless if we attained it. We see that we can never understand the true nature of reality.

The Mathematical Description of Nature

“In these and similar ways, the progress of science has itself shown that there can be no pictorial representation of the workings of nature of a kind which would be intelligible to our limited minds. The study of physics has driven us to the positivist conception of physics. We can never understand what

events *are* but must limit ourselves to describing the pattern of events in mathematical terms; no other aim is possible— at least until man becomes endowed with more senses than he at present possesses. Physicists who are trying to understand nature may work in many different fields and by many different methods; one may dig, one may sow, one may reap. But the final harvest will always be a sheaf of mathematical formulae. These will never describe nature itself, but only our observations on nature. Our studies can never put us into contact with reality; we can never penetrate beyond the impressions that reality implants in our minds.

“Although we can never devise a pictorial representation which shall be both true to nature and intelligible to our minds, we may still be able to make partial aspects of the truth comprehensible through pictorial representations or parables. As the whole truth does not admit of intelligible representation, every such pictorial representation or parable must fail somewhere. The physicist of the last generation was continually making pictorial representations and parables, and also making the mistake of treating the half-truths of pictorial representations and parables as literal truths. He did not see that all the concrete details of his picture— his luminiferous ether, his electric and magnetic forces, and possibly his atoms and electrons as well— were mere articles of clothing that he had himself draped over the mathematical symbols; they did not belong to the world of reality, but to the parables by which he had tried to make reality comprehensible. For instance, when observation was found to suggest that light was of the nature of waves, it became customary to describe it as undulations in a rigid homogeneous ether which filled the whole of space. The only ascertained fact in this description is contained in the one word ‘undulations’, and even this must be understood in the narrowest mathematical sense; all the rest is pictorial detail, introduced to help out the limitations of our minds.

“...To sum up, physics tries to discover the pattern of events which controls the phenomena we observe. But we can never know what this pattern means or how it originates; and even if some superior Intelligence were to tell us, we should find the

explanation unintelligible. Our studies can never put us into contact with reality, and its true meaning and nature must be forever hidden from us.”⁶

Sir James Jeans was indeed a visionary scientist in that he was able to see a truth that few others had seen, and he made that truth credible to others through his lucid writings. The mystic’s vision confirms and verifies that truth which Jeans came to solely through physics and philosophy, enabling us all to enthusiastically extol the fact that the Great Mind is indeed “*the creator and governor of the realm of matter*”, and proclaim that Divine Mind in which we live and move as the one and only reality to be adored as our own divine Self.

NOTES:

1. Sir James Jeans, *The Mysterious Universe*, New York, Macmillan Co., 1931, pp. 83-84.
2. *Ibid.*, p. 158
3. *Ibid.*, pp. 145-146.
4. *Ibid.*, pp. 154-155.
5. James Jeans’ 1934 Aberdeen Address may be found at:
http://www-history.mcs.st-and.ac.uk/history/Extras/BA_1934_J1.html
6. James Jeans, *Physics And Philosophy*, Cambridge University Press, 1942, may be found at:
http://www-history.mcs.st-and.ac.uk/history/Extras/Jeans_Part_I.html

II. DAVID BOHM

David Bohm's Implicate Order

Relativity and, even more important, quantum mechanics have strongly suggested (though not proved) that the world cannot be analyzed into separate and independently existing parts. Moreover, each part somehow involves all the others, contains them or enfolds them... This fact suggests that the sphere of ordinary material life and the sphere of mystical experience have a certain shared order and that this will allow a fruitful relationship between them. ¹

--- David Bohm

According to the mystics who have seen into the nature of reality, the one absolute Consciousness—whom we usually refer to as ‘God’—is the Source and Cause of all phenomena, manifesting the universe by His Creative Power in a manner similar to the way an individual mind projects a thought. This Divine Thought contains implicit within it the conscious Intelligence of the Source; and implicit in it also is the entire design and evolution of the universe, from its initial coming into being to all the refinements and transformations necessary in the process of its ultimate evolutionary development. Science does not recognize such a scenario as tenable and relegates the visionary knowledge of the mystics to the category of speculative metaphysics. However, one brave scientist stepped forward to acknowledge the possibility that the mystic’s vision could provide a basis for a true and consistent scientific worldview; his name is David Bohm.

David Bohm (1917-1992) was born in Wilkes-Barre, Pennsylvania on December 20, 1917. His father was a Jewish furniture dealer, but David went to college, receiving his B.Sc. degree from Pennsylvania State College in 1939 and his Ph.D. in physics at the University of California, Berkeley, in 1943. At U.C. Berkeley, he studied with Robert Oppenheimer; and when Oppenheimer went to Los Alamos to work on the “Manhattan Project”, Bohm remained at Berkeley as a research physicist. There, he worked on the Theory of Plasma and on the Theory of Synchrotrons and Synchrocyclotrons until 1947, when he took a position as an Assistant Professor at Princeton University, working on Plasmas, Theory of Metals,

Quantum Mechanics and Elementary Particles. It was there he met and had regular meetings with Albert Einstein.

In 1949, during the repressive McCarthy era, Bohm was called before the House Un-American Activities Committee, and he was asked to testify against Robert Oppenheimer who was being accused of Communist sympathies. Bohm refused to testify, and he was thereafter tried and acquitted. But the damage had been done; he was fired from his position at Princeton University, and was unable to find work in this country. He then moved to Brazil where he taught briefly at the University of Sao Paulo. He also taught for a brief time in Israel before moving to Bristol, England in 1957. In 1961, he became professor of physics at the Birkbeck College of the University of London, and remained there for the next 30 years, writing and publishing his several books: *Causality and Chance in Modern Physics* (1957), *The Special Theory of Relativity* (1966), *Wholeness and the Implicate Order* (1980), and *Science, Order and Creativity* (1987). David Bohm died in 1992.

In the 1950's David Bohm was widely considered one of the most talented and promising physicists of his generation. But his primary work from the 1950's to the 1990's—the ongoing development of his “causal interpretation” (which he later referred to as an “ontological interpretation”) of quantum mechanics as an alternative to the standard ‘Copenhagen Interpretation’—was met with dismissive hostility by the majority of the world physics community. In an attempt to provide a scientific formulation of quantum physics consistent with the mystic's vision of a Divine source and manifestation of our world, Bohm presented in his book, *Wholeness And The Implicate Order*, his fully developed theories.

The first part of his book's title, “*Wholeness*”, was a theme that grew out of his long familiarity with Quantum Physics. Ordinarily, when we seek for causes of isolated events or things, we settle arbitrarily on a preceding local event or state which we designate as the *cause* of the present event or state. But, as scientific investigations tend to show, the internal web of relationships between events and between things is endless. From the point of view expressed by the mystics, and by David Bohm, isolated things and events are not caused by other things and events but are rather linked in a complex web of relationships within a larger common Whole whose nature in turn determines the nature of those constituent things and events. In other words, the material reality is no longer thought to be the independent bits of which the Whole is constituted, but rather the other way around: the

overall condition of the universal Whole governs the functions and interrelations of all constituent parts within the Whole.

Here is how Bohm and his co-author, Basil Hiley, explained, in a 1975 article, this understanding:

“The world which we perceive cannot properly be analyzed into independently existent parts with fixed and determinate dynamical relationships between each of the parts. Rather, the ‘parts’ are seen to be in immediate connection, in which their dynamical relationships depend, in an irreducible way, on the state of the whole system (and indeed on that of broader systems in which they are contained, extending ultimately and in principle to the entire universe). Thus, one is led to a new notion of unbroken wholeness which denies the classical idea of analyzability of the world into separately and independently existent parts. We have reversed the usual classical notion that the independent ‘elementary parts’ of the world are the fundamental reality, and that the various systems are merely particular contingent forms and arrangements of these parts. Rather, we say that inseparable quantum inter-connectedness of the whole universe is the fundamental reality, and that relatively independently behaving parts are merely particular and contingent forms within this whole.”²

The second part of his book’s title, “*The Implicate Order*”, referred to his suggestion, inspired by the mystic’s vision, that the phenomenal world “unfolded from an “enfolded order” in a noumenal Source, referring to these two as “the implicate order” and “the explicate order”.

According to his theory, *the implicate order* is an invisible substratum containing the archetypal template for the emergence and dynamic unfoldment of both matter and consciousness, much the way an individual’s mind is the archetypal template of conscious thoughts produced from it. And in his wonderfully lucid writings Bohm endeavored to explain how the *explicate order* (this perceived phenomenal universe) has its source in and unfolds from an (invisible) implicate, or enfolded order. The implicate order implicitly contains the explicate order, and the explicate order explicitly manifests the implicate order.

Bohm theorized that, in the implicate order, all things—matter as well as consciousness, body as well as mind—are integrally interconnected in a way that transcends space and time. This is because the implicate order is a noumenal substratum resembling a transcendent Thought-matrix which generates, forms, and organizes the constituents of the explicate order. Quanta appear wavelike until they are observed; that is, witnessed by a conscious observer. Then they appear to those observers as particles, i.e., individualized ‘things.’ Bohm suggests that this wave/particle complementarity can be explained by the implicate-explicate order duality: The implicate order is one indivisible continuum consisting of waves; the explicate order is perceived by the human consciousness as particulate, individualized.

Together, the implicate order and the explicate order comprise what Bohm regards as *the holomovement*, which he describes as “the unbroken wholeness of the totality of existence as an undivided flowing movement without borders”.³ In the mystic’s vision, the origin of the Whole (the ultimate Cause), is found to reside in the divine Mind (the implicate order), and in principle in its causal precedent, the transcendent Absolute Being. But in David Bohm’s ontological theory, nowhere is there any indication of a primary origin for this “undivided flowing movement”. However, he does suggest that the ultimate source of the *holomovement* might include a “superimplicate order”, which in turn may result from a “super-superimplicate order”, and so on indefinitely. In his theory, he does not explicitly define these possible primary causal orders, but ultimately, underlying all noumenal implicate orders, there must presumably be an Origin, an eternal Intelligence, or Divine Ground, something along the lines of the Absolute, or “One”, of Neoplatonism. But Bohm, as a scientist dedicated to the empirical method, seems to prefer to remain wholly noncommittal regarding the nature of any primary supernatural cause.

For the mystic, informed by direct visionary experience, the perceivable phenomenal world is the manifestation of the creative Energy of God. At the root of that creative Energy is the divine Source (what Plotinus called *Nous*, “the Divine Mind”), whose ultimate root is the “One”, the ineffable Absolute that is the Godhead. It is the Divine Mind that extends Itself by way of Its Creative Energy to the entire universe. The Divine Mind is inherent and implicit in Its own manifested Energy, and so It fills all animate and inanimate beings, to varying degrees according to their evolution, with Its own Consciousness and Joy. Thus, the manifested

beings, who are the evolutes of Its Energy, are able to know within themselves Its being, Its freedom, Its Consciousness, Its Joy. They are able to transcend in mind the limitations of the egocentricity imposed on them in the process of manifestation and ascend in consciousness to the very being of God, knowing Him as their own original and authentic Self.

In that mystical ascension to the Divine Mind (which Bohm refers to as *the implicate order*), the manifest beings become able to perceive the perfection of the universal manifestation in which all created things are linked in a wonderful unity of being and becoming.⁴ Like the atoms in a cresting wave, or in the flowering of a rose, they are welded together in a synchronous dance of movement toward their intended evolutionary culmination. How vast and perfect in every way is their dance! It is indescribably wonderful! In the mystic's vision the unfolding of the universe, and all that unfoldment entails, is seen to be a coordinated and integrated presentation wherein "all things move together of one accord;" and "assent is given throughout the universe to every falling grain."

If David Bohm experienced at some time in his career such a mystical revelation, I have not been able to find any mention of it. Nonetheless, his exposition of "The Implicate Order" evinces many similarities to the direct perceptions frequently reported by numerous mystics. In David Bohm's broad suppositional proposition, causality is seen to reside in the ideational substratum (the implicate order), and then becomes manifest in all its effusive multiplicity as a universe of time and space (the explicate order). Small-scale causes in the explicate order are deemed irrelevant, as they are merely expressions of an implicit order. And, while this 'ontological interpretation' of David Bohm's is a marvelous restatement of the expressed vision of the mystic, it remains, from the standpoint of science, merely another speculative philosophy, unprovable (unfalsifiable) by science's criterion of proof. Bohm's work remains ground-breaking proof, however, that gnosis is a fruitful source for scientific investigation and understanding. Perhaps other scientists will follow the path he has shown, expanding on his vision, and bringing us closer to a science that corresponds with the declarations of revelation proffered by the gnostics (mystics) of every generation.

NOTES:

1. Bohm, David; quoted in Friedman, Norman, *Bridging Science And Spirit*, St. Louis, Missouri, Living Lake Books, 1994; p. 95.
2. Bohm, David and Hiley, Basil, “On The Intuitive Understanding of Non- Locality as Implied By Quantum Theory”, London, Foundations of Physics journal, Vol. V, 1975; pp. 96, 102.
3. (David Bohm, *Wholeness And The Implicate Order*, Routledge & Kegan Paul, 1980, p. 172).
4. The mystical experience is frequently referred to as “the unitive experience” because it reveals the identity of the experiencer to be identical with the one all-pervasive reality, i.e., it reveals that ‘I and the Father are one.’ This nondual experience occurs because the mystical experience is a revelation of the subtle level of reality, what Plotinus called *Nous*, (the Divine Mind), or what David Bohm calls ‘the implicate order’. Previous to the “unitive experience”, the ‘explicate order’, which had been the experiencer’s former “reality”, appeared to consist of separate individual things and beings in a world of incredible diversity and multiplicity of identities. But now, suddenly awakened to this subtle level of reality, there is but one identity spreading everywhere; ‘I’ am in the clouds and in the gritty soil; ‘I’ am the pulse of the turtle; ‘I’ am the clanging bells of joy. In that implicate order, one ‘I’ is all-pervasive, constituting the one and only identity everywhere.

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