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The Principle of Relativity

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I. From Physics to All Domains of Knowledge

¶1. The field of study that I have specialized in is primarily theoretical physics and its philosophy. One of the aims of these studies has been to see if it might be possible to detect any overlap in the underlying concepts from different intellectual attitudes. The idea has been to seek out the concepts from both Eastern and Western cultures in the different periods of history that might correspond with each other, in some abstract, underlying way.

¶2. My reason for this interest has been, in part, the idea that the epistemology of realism is the correct attitude toward the truths of the world. That is to say, it is based on an unprovable faith in the idea that objective knowledge exists — that there is an objective world characterized by abstract truths that are independent of whether or not human consciousnesses may be or ever would become aware of them. The implication of this form of realism is that the truths of the real world are invariant to transformations from one culture to another, from one language to another, mathematical or verbal, or from any time and place in history to any other. This is the idea of the extension of the principle of relativity, from physics to all other domains of knowledge.

¶3. It is proposed, then, that if some idea about the real world is indeed true as a part of objective knowledge, whatever it might refer to, then it most likely has been discovered many times in the past and it will continue to be re-discovered in the future. Such discoveries of objective truths during our history are communicated in different languages such as verbal, mathematical, and gestural as in dance with different modes of thought and in different contexts. It is my contention, nevertheless, that the essence of an idea, which underlies the various expressions of objective truth, is in one-to-one correspondence in all possible frames of reference of space, time and human culture.

¶4. This idea is then a generalization of Einstein's principle of relativity—from the scientific expression of the relations that govern the behavior of inanimate matter, the subject of physics, to all other natural laws, including relations of human societies.

II. *Preface on the History of Science— A Physicist's Perspective*

¶5. In this essay, a comparison will be made between the ideas of the philosophy of Einstein's theory of relativity and views of holism in Eastern and Western philosophies. This discussion will be from the reference frame of a theoretical physicist rather than from a philosopher or a social scientist. Thus, to preface this discussion, I would like to talk briefly about the interest that I have in this subject, as a physicist.

¶6. In today's scientific climate, there are two types of theoretical physics pursued, but only one of them entails philosophical questions. One type of theoretical research may be called "phenomenological"—this is the approach of the present day majority in physics. The idea here is to test the description of phenomena as far as possible in regard to a given set of principles, and then to generalize these principles in order to generate new predictions by induction. This approach remains loyal to the theoretical framework of the "normal science" period, in Kuhn's terminology.[1]

¶7. The second type of theoretical physics research may be called "foundational." It is the approach that does become enmeshed in philosophical questions. It entails investigations of the logical and mathematical consistency of the ongoing paradigms and, if need be, attempting to re-formulate defective theoretical structures. These should predict the same data successfully covered by the older theories, as well as improving the logical and mathematical aspects of the new theory, and make new predictions not covered by the older theories it attempts to supercede. The foundational approach to theoretical physics is based on deductive logic. This is because it starts with universals—first principles—that are to be tested by virtue of particulars, predictions, that are logically implied, and their comparisons with the facts of nature.

¶8. Thomas Kuhn's model of the history of science makes the following assumptions: (1) The paradigm changes that lead to a scientific revolution come only discretely, at a 'time' when the weight of evidence is against an ongoing paradigm. (2) The new, revolutionary ideas totally replace the ideas of the earlier period—the so-called stage of "normal science."

¶9. The views proposed here are in contrast with these. It is claimed that there is scientific evolution, rather than revolution, whereby there is a continuous evolution of ideas throughout the history of science, as our understanding of the real world progresses. The implication intended is that there are indeed threads of objective truth in science that continue through all of the periods of our history. In any particular period, however, one cannot know with certainty, based on the rules of science, which are the ideas that will eventually have to be discarded and which will be kept.

¶10. The search for truth in any field of study is in two parts: One part consists in asking questions, the other part consists in answering questions. In the field of fundamental physics, the phenomenological theoretician is more concerned with answering questions; the foundational theoretician is more concerned with the asking of the questions.

¶11. The difficult part about the asking of a question in science is to be able to judge if it is indeed a significant question. That is, to know in advance if its answer could lead to bona fide progress in our comprehension of the natural world. One must rely on intuition in the initial stages of investigating the significance of a question in science. For it is not always clear that a question is indeed significant. It is possible that an investigator can spend the rest of his or her life, or the lives of admiring colleagues and graduate students, on attempts to answer an insignificant question!

¶12. In the pursuit of truth, then, there should be some criteria that indicate whether a question in science or philosophy is significant. One criterion in science that everyone acknowledges to be necessary, though not sufficient, is that of repeatable empirical verification of an answer to a scientific question. Another necessary criterion for a question to be significant, in my view, is that it should lead not only to answers but also to new questions. A reason for the latter criterion, in my judgment, is that a total understanding about any domain of objective knowledge is unbounded. That is to say, it is infinite in extent! Since we are only finite human beings, we can never complete our understanding of any subject pertaining to the real world. For it is only when an understanding is complete, implying omniscience of the knower, that there would be no more questions about it. Thus, it is my belief that the answering of any significant question must necessarily lead to more questions.

¶13. Recall Galileo's comment in his *Dialogue Concerning The Two Chief World Systems*: "There is not a single effect in Nature, not even the least that exists, that the most ingenious theorists can ever arrive at a complete understanding of it."[2]

III. The Invariance of Truths

¶14. The following is a question that may be asked in the philosophy of science: Is a truth that may be discovered pertaining to an aspect of the real world unique to that domain of knowledge? Or is it possible that the essences of truths are invariant to transformation from one domain of knowledge to any other, from one culture to another, at different times and places? If the latter is the case, then it should equally apply to this invariance statement itself—that it must have been expressed before, in various contexts and in different cultures.

¶15. To exemplify this idea, in the fifteenth century the neo-Platonist philosopher, Marsilio Ficino, expressed this view. Referring to many centuries earlier, in the Hindu Culture, the scholar P. T. Raju states that: "truth is never lost, but it may be undiscovered and forgotten. It can therefore be discovered and recovered."[3] The implication here is that indeed there are invariant truths of the world, and when it appears that a new truth has been discovered, this is most likely an objective truth that has merely been recovered, perhaps in new clothing.

¶16. One more comparison from the Hindu philosophy pertains to a particular subject within physics, the nature of light. This subject has been debated throughout the history of physics in the West, such as the seventeenth century debate between Newton, who believed in the corpuscular model of light, and his opponents, Hooke and Huygens, who believed in the wave model. With the progress reached on this subject in Maxwell's field formulation of electromagnetism in the nineteenth century, demonstrating that light, per se, is a form of electromagnetic radiation, the continuum wave model was verified and the concept of light had to be re-defined. Faraday, a primary instigator of the concept of the continuous field, then interpreted light in a new way. He saw it as a manifestation of a continuous electromagnetic field of force acting between charged matter, rather than a discrete entity on its own such as the 'photon' concept in modern physics that may or may not interact with matter.

¶17. But it was much earlier in the history of physics that there was discussion in the Hindu literature on the concept of light and energy. According to Samkara of the *Vedanta* school: "the rays of the sun have no existence independent of the sun but are expressions of its energy."[4]

¶18. The main point I wish to make here is the idea that views expressed in the contemporary period, if indeed they are objectively true, should be found expressed in other periods and in other cultures, though in different contexts and clothed in other varied and assorted ways. If this thesis is true, that Einstein's principle of relativity extends to all domains of knowledge beyond physics, then in pursuing the truth it should behoove the scientist and the philosopher to study as many disciplines as possible, to see where there might be correspondence with the fundamental ideas of his or her own discipline. (Academia often pays lip service to this idea but rarely takes in seriously!) For if such correspondences should be found, there is more possibility that these ideas are true and that they should be pursued further as significant questions and answers about the real world.

¶19. With this thesis as my motivation, I now wish to pursue the particular idea of holism that one finds in the implications of Einstein's theory of relativity, whereby the world is not a sum of parts. With the view of holism, the universe is a single continuum with an infinite number of distinguishable manifestations. It is the latter that we identify with the 'things' of the world.

IV. Holism

¶20. The idea of holism that has persisted during the millennia has appeared and reappeared in the Eastern and Western cultures, in philosophy and in science. This idea has been expressed in different contexts referring to the multitude of manifestations of the universe, from the physics of elementary particles and galaxies, to philosophical views of the human society.

¶21. Einstein's theory of relativity entails concepts of objective completeness, continuity and determinism. One may compare these features with aspects of Asian philosophies, as in *Brahminism* and *Taoism*, as well as some of the Western philosophies, as in Plato and Spinoza. Further, this ontological view of matter is based on the epistemological approach of abstract realism. This is the view that there is a real world, independent of observers, a world whose basic characteristics are not necessarily directly perceivable but rather must be reached in logical fashion, from the theoretical interpretations of the observable facts of nature and logical analyses of these theories.

¶22. The principle of relativity is the primary axiom that underlies the theory of relativity. [5] It asserts that all of the laws of nature must be independent of the reference frame in which they may be expressed, from any other arbitrary reference frame. This is an assertion of the objectivity of the laws of nature.

¶23. Einstein's theory of relativity is not based on the outlook of relativism. The latter is the notion that all knowledge is relative only to a knower. This view would imply that there is no universal, objective knowledge. In contrast with the view of relativism, and along with Einstein's philosophical approach, it is clear that one thing about the universe that is not relative is its own existence. For there is nothing outside of the universe to be relative to! (Recent references to "many universes" is, in my view, a misnomer. If there were many simultaneous cosmic systems implied in physics, that some call "universes," then the philosophy of relativity theory implies that they must all be aspects of a single all encompassing closed system—the actual, single universe.) One must then ask: Precisely what is the meaning of the 'absoluteness' of the universe? It signifies, to me, that the basic characteristics that define the manifestations of the universe, that we represent with the laws of nature, are totally objective. That is to say, the absoluteness of the universe signifies that its laws are invariant regarding their expressions in one reference frame or another, with one language or another, in one particular context or another.

¶24. According to the theory of relativity, then, objective laws that underlie all of its manifestations must characterize the real, objective universe. This statement is none other than the principle of covariance, also called the principle of relativity, that is, the underlying axiom of the theory of relativity. The laws of nature are to underlie explanations of all matter from the domain of elementary particles to that of cosmology. The claim that these laws are objective in this sense then implies that their expressions— mathematical, verbal, or any such way to communicate ideas must be independent of the frame of reference or the language expression.

¶25. The way in which physicists distinguish one reference frame from any other is in terms of the parameters that characterize relative motion. In relativity physics, the continuous changes of the space and time parameters in the expressions of the laws of nature in one reference frame to the space and time parameters of other reference frames in which one wishes to re-express the laws of nature are characterized by parameters of motion. The use of the parameters of motion to transform to different frames of reference is then analogous to the rules of translation of languages of the laws of nature.

¶26. It then follows, because of the continuity of the space and time language parameters, that the expressions of the laws of nature are necessarily in terms of continuous functions of the space and time parameters, rather than in terms of the motions of discrete points, as in the atomistic theories. This is then a field theory, where we have a precise mathematical language for expressing the continuity of matter that constitutes the entire universe in any of its domains— from the microscopic to the cosmological. In this approach matter does not appear as a collection of separate, discrete things. The totality that is the universe—including ourselves!—must then instead be characterized by a set of distinguishable modes of the continuous universe, rather than things in it.

¶27. These are the modes of a continuous, non-separable whole, in the Taoist sense of *ch'i* of the ancient Chinese philosophy of Lao Tzu.[6] This holistic view of the universe is also akin to Whitehead's concept of solidarity.[7] In the latter view, causes fuse in continuous fashion with effects, and effects with causes, so that what one calls by the name cause is relative to a particular (subjective) reference frame. In another reference frame, the causes may be the effects and vice versa. With this view, an objectively real event is not a singular cause or a singular effect. It is rather the full unification that is called cause- effect.

¶28. One also sees this concept of the relativity of cause and effect in the teachings of Buddha. According to Takakusu, "In Buddhism every stage is a cause when viewed from its effect. When viewed from the antecedent cause, it is an effect. Also it may be said that there is a cause in the effect, and an effect in the cause."[8]

¶29. When the continuum field theory, according to Einstein's theory of general relativity, is extended from its application to inanimate matter so as to incorporate all other domains of knowledge, including the human being and his/her consciousness and ethical values, it appears to me to extend to a global understanding of all of the physical and non-physical aspects of the universe, that is, a universal theory. This also corresponds with the idea of the Hindu union of *Atman* and *Brahman. Atman* signifies the essence of the self and *Brahman* signifies the essence of all that there is—including but also transcending selves. According to the Vedandic tradition of Hindu philosophy, "Brahman is to be realized as one's own soul. That is, the Absolute within us."[9] The union of *Atman* and *Brahman* then indicates a holistic state of full fusion of the individual self and all that there is—the universe and beyond, reaching a state that is sometimes referred to as "non-being." This state is called wu in the *Taoist* and *neo-Taoist* writings of ancient China, and it is similar to the concept of *anatman* non-self of the Buddhist literature, and the state of *aiyeen* of the Jewish Kabbalistic literature.

¶30. With this philosophy, one focuses on becoming rather than being. Thus, the individual, as a separable entity, is an illusion since it is continually transforming and transmuting within the domain of all that there is. This concept is then comparable with an aspect of Whitehead's philosophy wherein one understands the universe in terms of the elementarity of process rather than thing.[10] These holistic concepts in Asian philosophies and in Whitehead also compare with the approach of Spinoza, wherein the universe is a holistic system, not to be taken as a sum of separable parts. Nor is there an absolute distinction in Spinoza between subject, knower, and object, known, or between the Cartesian mind and matter, or between physical cause and effect, in fundamental terms. Each of these apparently dipolar configurations is, in fact, a set of modes of a single, continuous, holistic entity, that in principle is the universe.[11]

V. A Comparison with Buber

¶31. In an existential view of the contemporary period, it is possible to understand this sort of cosmological oneness in terms of a particular interpretation of Martin Buber's philosophy. In this view, what it is that is fundamental is the existential relation, I-Thou, rather than the separate relata, I and Thou.[12] In my reading of this philosophy, the elementarity of I-Thou eliminates any semblance of an absolute subject I relating to the absolute object Thou. Rather, I-Thou is a single object, wherein the hyphen is irremovable. With this view, I-Thou is an inseparable relation similar to the *Tao* of Lao Tzu or the *Brahman* of Hindu philosophy.

¶32. In contrast with my reading of Buber, it appears from his own writing that Buber's interpretation of I-Thou is in terms of two entities rather than one. From his view, the existence of a consciousness allows the subject I to totally extricate itself from the universe, leading residually to the rest of the world appearing as an object, set in the context of matter, space, and time—the It. Only then does I become aware of It as other—an object. Indeed, the existence of the I-It relation is necessary for us to acquire any scientific understanding of the world in terms of space, time and matter.

¶33. My dialogue with Buber does not concern whether or not the I-It relation exists. In my view it certainly does exist, in the same sense that the Cartesian thinker exists, *cogito ergo sum*. My question is, rather: How does the I-It relation derive from the I-Thou relation? I see two alternative answers to this question. The first is Buber's own intention, that I and Thou are logically distinct entities wherein I, at will, enters into a relation with Thou, and simultaneously, Thou enters into a relation with I, as separate person and Person, though in mutual relation with each other. This view is clearly expressed in Buber's writing: "The description of God as a Person is indispensable for one who means by "God," Him who—whatever else He may be— enters into a direct relation with us men in direct creative, revealing and redeeming acts, and thus makes it possible for us to enter into a direct relation with Him."[13]

¶34. Buber's meaning of "God" at this point is ambiguous. But whatever else it is, his intention is that "God" signifies that He participates in a relation with individual consciousnesses. Buber thus insists that, along with the usual attributes ascribed to God, one must add that of "Person"— an individual insofar as He participates in an I-Thou relation with individual souls. My focus here is not concerned with the theological aspects of Buber's philosophy, but rather on how it corresponds with the holistic concept in Eastern and Western views.

¶35. An alternative interpretation of the I-Thou relation is that it is the whole that is a unique entity and non-separable into individuated parts. With this interpretation, then, Thou refers to an aspect of a closed relation, *I-Thou* – a relation that entails a transcendent God. Here, the natural universe is, in turn, one of His manifestations. With this view, one of the infinitude of manifestations of God, that comprises the natural universe, is the subject I. That is to say, I is a relative rather than an absolute subject of the I-Thou relation—focusing on the individual consciousness and its ability to be aware of other.

¶36. The question then arises: How does an individual consciousness come into play if I-Thou is indeed one? Within the holistic interpretation, I believe that an answer is that I appears in the sense of an approximation , one of its aspects called "human consciousness", is capable of establishing. This makes it appear that there are two things – an absolute subject I and an absolute object It. Still, this is an approximation that only gives the illusion of two, whereas what it is an approximation for— I-Thou —is really one, non-separable entity.

¶37. Thus, with Buber's philosophy using this alternative interpretation of his words, the I-It relation is not on the same ontological basis as the I-Thou relation. Rather, the apparent objectivity of I-It refers to an idea of a component manifestation of the whole entity, I-Thou, where the I is reached from an aspect of the totality, i.e. one of its modes, that allows individual reflection. It is only in the latter state of mind that I can have an awareness of other, as it is required to understand the world of science. Thus it seems to the observer, I, when in this state of the whole, that it is in itself an absolute subject of the I-It relation—an observer of the absolute object It.

¶38. We see, then, that from Buber's own view, there are two relations that are complementary —I-Thou and I-It. When one is, the other cannot be. Yet, the subject I may choose at will to enter into one of these relations or the other. This type of complementarity is perhaps along the subjectivist line similar to Bohr's principle of complementarity of the modern quantum theory (the Copenhagen school). While it is still relation that is elementary in Buber's philosophy, and while I-Thou is a single objective relation and I-it is a subject-object relation, I-Thou and I-It are on ontologically equivalent levels, according to Buber himself.

¶39. My alternative to this interpretation of Buber's philosophy asserts that I-Thou is all that there really is. It is a continuous whole and nonseparable, similar conceptually to the *Tao* of Lao Tzu or the *Brahman* of the Hindu view. In this stance, all that one may say about I-Thou is that it *is.* It is not defined in the context of space, time or matter. It is ontologically prior to all things and manifestations. But as an approximation, the human consciousness, as one particular mode of the whole, may distance itself from what seems to be a remainder, thereby becoming aware of the It.

¶40. Still, I is not to be regarded with this view as an absolute subject, separable from the I-Thou. Rather, it is a manifestation of the entire relation I-Thou, seemingly giving a consciousness the impression of a world out there.

¶41. In modern physics, the philosophical approach of Einstein's theory of general relativity, as an underlying theory of matter, is in my judgment closer to the latter view of *I-Thou.* This takes the universe as a truly closed system, while in the former view, I-Thou is a set of complementary relations—similar to Bohr's principle of complementarity that underlies the quantum theory. It is interesting, then, that this conflict between the alternative interpretations of Buber's I-Thou existentialism seems to compare with the contemporary conflict between Einstein's and Bohr's approaches to the truth of the physical universe. It is this latter conflict that may be compared, in turn, with the debates on holism versus particularity since the ancient times.

¶42. According to Einstein's theory of relativity, then, the universe must be characterized by a closed system of matter, continuously distributed everywhere. Thus, there can be no localized subject, I, looking down on the rest of the universe, as a localized object. With this view, the human consciousness itself is not more than one of an infinitude of manifestations of the continuous and non-separable universe. The role of any manifestation of the universe such as a single consciousness is analogous to a ripple of a pond. Indeed, the ripple is not a separable thing that could be removed from the pond and studied on its own, say by measuring its weight, size, color, etc. This is because the ripple is not more than a mode of behavior of the entire pond—it is of the pond and not a thing in it. As we come to understand the ripple more completely, we see that it reflects the nature of the entire pond, holistically.

¶43. In the same way, a human being may reflect on his or her own role as not more than one of an infinite number of manifestations of the continuum, that is the closed system – the universe. It is a view that follows from the philosophy of Einstein's theory of general relativity, as well as the holistic views in Asian and Greek philosophies from ancient times.

¶44. The latter holistic view is also similar to the worldview of *Brahminism*—where the single reality that is all that there is is *Brahman*. It is this absolute totality that is defined to be existence itself. That is, with this view existence is not merely one of the attributes of Brahman. Rather, *Brahman* is Existence. With this outlook, the essence of being—*Atman*— is one with *Brahman*. While this ancient Hindu view is much older than the explicit expression of Martin Buber's I-Thou existentialism, Buber's idea was strongly influenced by Jewish mysticism—the Kabbala. The Kabbala was not expressed in written form until the Middle Ages. But it has been demonstrated in scholarly works that it was expressed in oral tradition since Biblical times, many centuries before the Common Era.

VI. Spinoza and Asian Philosophies

¶45. Let us return once again to the time of Spinoza, in the seventeenth century. The conceptual outlook of Einstein's theory of general relativity is akin to holism in Spinoza's philosophy. However, Spinoza went further than Einstein did, for he added the human dimension, including consciousness, social and personal ethics as belonging to the full set of manifestations of the physical universe. One sees this same extension in the writings of Confucius.

¶46. An interpretation of Spinoza's "God" is in some sense similar to that of the Hindu *Brahman.* The view extends from a naïve sort of pantheism to the view that the natural universe itself is only one of an infinitude of manifestations of God—that is, that God transcends the natural universe, the subject of physics. The latter view is called "panentheism." Though the natural universe, in this view, is not separate from God, it is not all there is to God. One sees this view as well in the *Bhagavad-Gita* where it is said of *Brahman*: "Undivided, He seems to divide into objects and creatures. Sending creation forth from Himself…"[14]

¶47. One finds a similar passage in the Western culture in the ideas of Jewish mysticism—the Kabbala—where it is said: "He is the beginning and the end of all degrees of creation; all degrees are worked with His seal, and He can be designated only by unity. He is one despite the innumerable forms with which He is invested."[15]

¶48. A similar holistic view of the universe may be found several centuries later after the writings of the Hindu culture and the oral tradition of the Kabbala in the cosmological views of Plato and Parmenides in ancient Greece. Plotinus, of the Helenistic period, said: "All things that exist do so by virtue of "unity"—in so far as they exist in any ultimate sense and in so far as they may be said to be real. … But of this One no description or scientific knowledge is possible. … And it is wholly self-sufficient by virtue of its being simple and prior to all things."[16]

VII. Concluding Remarks

¶49. I have tried to demonstrate in the preceding comments that the holistic cosmological approach that underlies Asian cultures is also embedded in the Western tradition, from Biblical times to ancient Greece, to Spinoza in the Renaissance period of Western Europe, and to the modern era of Einstein and Buber.

¶50. It is interesting from the perspective of the history of science that at the present stage a stalemate has been reached in regard to the two so-called revolutions of twentieth century physics. These are the quantum theory and the theory of relativity, each taking opposite stands of discreteness and particularity versus continuity and holism. [17] The quantum and relativity theories are fundamentally incompatible at the conceptual level, as well as in regard to their respective mathematical expressions. This is because of their contrasting views that one may associate with atomism, indeterminism and positivism of the quantum approach, versus continuity, determinism and realism of the relativity approach. The dilemma that appears at this stage of physics, at this beginning of the twenty-first century, is that the quantum theory, on its own terms, must necessarily fuse with the theory of relativity—in the form of a 'relativistic quantum field theory'. But such a fused theory has never been structured to this time, in a logically and mathematically consistent manner, ever

since the onset of quantum mechanics in the 1920's. One may then conclude that the future understanding of matter, as expressed with the laws of physics, may lie in the direction of a suitably generalized one of these theories while rejecting the other. My choice, for several scientific as well as intuitive reasons, is that it is the basis of Einstein's theory of general relativity that will survive as an elementary theory of matter, in all domains—from elementary particle physics to cosmology.

¶51. This turn, away from the basis of the quantum theory, must nevertheless keep *the nonrelativistic approximation* for quantum mechanics as a useful calculational tool, in the domain of low energy, i.e. nonrelativistic physics of micromatter. This would then be adhering to *the principle of correspondence,* which has applied to most of the revolutionary changes that have occurred throughout the history of science. This paradigm change would then bring us in our understanding of matter to the monism of the continuous field concept—an ontological view of holism, rather than atomism —to underlie the nature of the real world.

¶52. Fully incorporating Spinoza's philosophical outlook[18] would then imply a natural extension of the basis of Einstein's principle of relativity so as to include mankind and consciousness. This is conceptually similar to the ancient Asian views from India and China, more than twenty-five centuries ago, and from later developments in Japan, and in the West by Plato and Parmenides in ancient Greece, the Kabbalists of the ancient Jewish tradition, thence to Spinoza in the seventeenth century and to Einstein and Buber of our own time.

¶53. Because there is this overlap of ideas from such diverse cultures at different times of human history and expressed in different languages and with respect to different contexts, perhaps my thesis is true—that Einstein's principle of relativity does extend from physics to all of the other domains of human knowledge. A particular implication of this philosophy is that perhaps there is objective truth in the holistic approach to the universe rather than in the opposite views that have dominated most of Western philosophy and science to this point in the history of ideas.

END NOTES

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