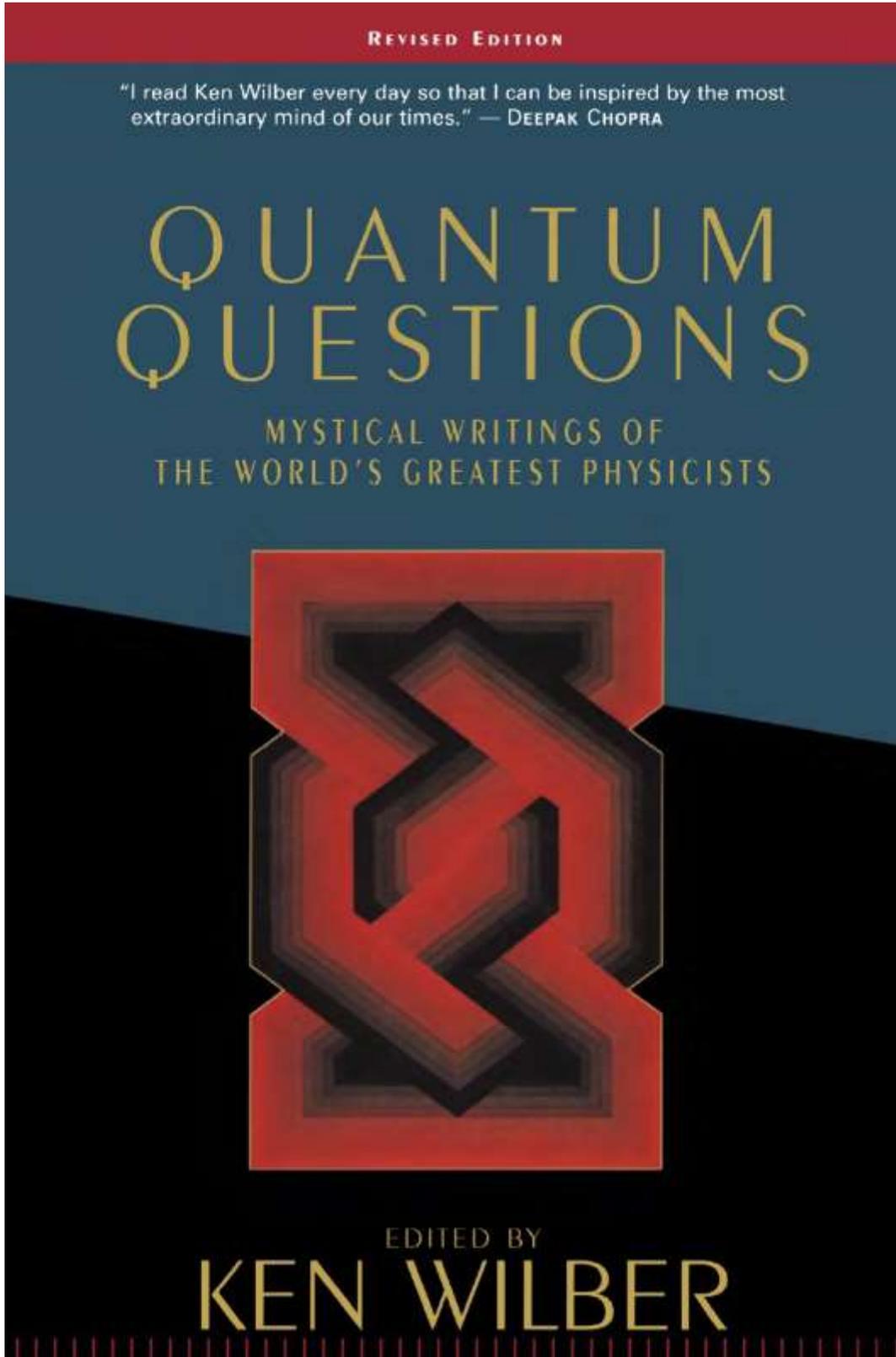


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Quantum Questions

Mystical Writings of the World's Great Physicists

By: Ken Wilber



1-Introduction: Of Shadows and Symbols BY KEN WILBER

- When relativity theory entered the scene, the whole drama repeated itself. Cardinal O'Connell of Boston warned all good Catholics that relativity was "a befogged speculation producing universal doubt about God and his creation"; the theory was "a ghastly apparition of Atheism." Rabbi Goldstein, on the other hand, solemnly announced that Einstein had done nothing less than produce "a scientific formula for monotheism." Similarly, the works of James Jeans and Arthur Eddington were greeted by cheers from the pulpits all over England-modern physics supports Christianity in all essential respects! The problem was, Jeans and Eddington by no means agreed with this reception, nor in fact with each other, which prompted Bertrand Russell's famous witticism that "Sir Arthur Eddington deduces religion from the fact that atoms do not obey the laws of mathematics. Sir James Jeans deduces it from the fact that they do." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 2]
- To attempt to bolster a spiritual worldview with data from physics-old or new-is simply to mis understand entirely the nature and function of each. As Einstein himself put it, "The present fashion of applying the axioms of physical science to human life is not only entirely a mistake but has also something reprehensible in it." [Interview contained in M. Planck, *Where Is Science Going?* (New York: Norton, 1932), p. 209.] When Archbishop Davidson asked Einstein what effect the theory of relativity had on religion, Einstein replied, "None. Relativity is a purely scientific theory, and has nothing to do with religion"- about which Eddington wittily commented, "In those days one had to become expert in dodging persons who were persuaded that the fourth dimension was the door to spiritualism." [Sir Arthur Stanley Eddington, *The Nature of the Physical World* (New York: Macmillan, 1929).] [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 3]
- Eddington, of course, had (like Einstein) a deeply mystical outlook, but he was absolutely decisive on this point: "I do not suggest that the new physics 'proves religion' or indeed gives any positive grounds for religious faith. . . . For my own part I am wholly opposed to any such attempt. " [Sir Arthur Stanley Eddington, *New Pathways in Science*, (New York: Macmillan,

1935), pp. 307- 8 .] [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 3]

- None of the physicists in this volume believed that assertion. Bohr himself stated quite plainly that "the notion of complementarity does in no way involve a departure from our position as detached observers of nature. . . . The essentially new feature in the analysis of quantum phenomena is the introduction of a fundamental distinction between the measuring apparatus and the objects under investigation [his ita!]. . . . In our future encounters with reality we shall have to distinguish between the objective and the subjective side, to make a division between the two." [Niels Bohr, *Atomic Physics and Human Knowledge* (New York: Wiley, 1958),p74],[Quoted in W. Heisenberg, *Physics and Beyond*, p. 88.] Louis de Broglie was even more succinct: "[It has been said that] quantum physics reduces or blurs the dividing region between the subjective and the objective, but there is . . . some misuse of language here. For in reality the means of observation clearly belong to the objective side; and the fact that their reactions on the parts of the external world which we desire to study cannot be disregarded in microphysics neither abolishes, nor even diminishes, the traditional distinction between subject and object." [Louis de Broglie, *Matter and Light* (New York: Dover, 1946), p. 252.] Schroedinger-and keep in mind that these men firmly acknowledged that in mystical union subject and object are one, they simply found no support for this idea whatsoever in modern physics-stated that "the 'pulling down of the frontier between observer and observed' which many consider [a] momentous revolution of thought, to my mind seems a much overrated provisional aspect without profound significance." [E. Schroedinger, *Nature and the Greeks*, p. 15.] [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 5]
- Briefly, the critique is this. The central mystical experience may be fairly (if somewhat poetically) described as follows: in the mystical consciousness, Reality is apprehended directly and immediately, meaning without any mediation, any symbolic elaboration, any conceptualization, or any abstractions; subject and object become one in a timeless and spaceless act that is beyond any and all forms of mediation. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala,

Boston, 2001. P 5]

- Now, when the physicist "looks at" quantum reality or at relativistic reality, he is not looking at the "things in themselves," at noumenon, at direct and nonmediated reality. Rather, the physicist is looking at nothing but a set of highly abstract differential equations-not at "reality" itself, but at mathematical symbols of reality. As Bohr put it, "It must be recognized that we are here dealing with a purely symbolic procedure. . . . Hence our whole space-time view of physical phenomena depends ultimately upon these abstractions."¹² Sir James Jeans was specific: in the study of modern physics, he says, "we can never understand what events are, but must limit ourselves to describing the patterns of events in mathematical terms; no other aim is possible. 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. . . . [Thus] our studies can never put us into contact with reality. " [Sir James Jeans, *Physics and Philosophy*, pp. 15-17.] [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 6]
- Eddington, as usual, put it most trenchantly: "We should suspect an intention to reduce God to a system of differential equations. That fiasco at any rate [must be] avoided. However much the ramifications of [physics] may be extended by further scientific discovery, they cannot from their very nature trench on the background in which they have their being. . . . We have learnt that the exploration of the external world by the methods of physical science leads not to a concrete reality but to a shadow world of symbols, beneath which those methods are unadapted for penetrating." [A. Eddington, *The Nature of the Physical World*, p. 282.] [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 7]
- The great difference between old and new physics is both much simpler and much more profound: both the old and the new physics were dealing with shadow-symbols, but the new physics was forced to be aware of that fact-forced to be aware that it was dealing with shadows and illusions, not reality.

Thus, in perhaps the most famous and oft-quoted passage of any of these theorists, Eddington eloquently states: "In the world of physics we watch a shadowgraph performance of familiar life. The shadow of my elbow rests on the shadow table as the shadow ink flows over the shadow paper. . . . The frank realization that physical science is concerned with a world of shadows is one of the most significant of recent advances." [A. Eddington, *The Nature of the Physical World*, p. 282.] Schroedinger drives the point home: "Please note that the very recent advance [of quantum and relativistic physics] does not lie in the world of physics itself having acquired this shadowy character; it had ever since Democritus of Abdera and even before, but we were not aware of it; we thought we were dealing with the world itself." [E. Schroedinger, *Mind and Matter* (Cambridge University Press, 1958).] And Sir James Jeans summarizes it perfectly, right down to the metaphor: "The essential fact is simply that all the pictures which science now draws of nature, and which alone seem capable of according with observational fact, are mathematical pictures. . . . They are nothing more than pictures-fictions if you like, if by fiction you mean that science is not yet in contact with ultimate reality. Many would hold that, from the broad philosophical standpoint, the outstanding achievement of twentieth-century physics is not the theory of relativity with its welding together of space and time, or the theory of quanta with its present apparent negation of the laws of causation, or the dissection of the atom with the resultant discovery that things are not what they seem; it is the general recognition that we are not yet in contact with ultimate reality. We are still imprisoned in our cave, with our backs to the light, and can only watch the shadows on the wall." [Sir James Jeans, *The Mysterious Universe* (Cambridge University Press, 1931), p.111.] [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 7-8]

- "The symbolic nature of physics," Eddington explains, "is generally recognized, and the scheme of physics is now formulated in such a way as to make it almost self-evident that it is a partial aspect of something wider." However, according to these physicists, about this "something wider" physics tells us-and can tell us-nothing whatsoever. It was exactly this radical failure of physics, and not its supposed similarities to mysticism, that paradoxically led so many physicists to a mystical view of the world. As

Eddington carefully explains: "Briefly the position is this. We have learnt that the exploration of the external world by the methods of physical science leads not to a concrete reality but to a shadow world of symbols, beneath which those methods are unadapted for penetrating. Feeling that there must be more behind, we return to our starting point in human consciousness-the one centre where more might become known. There [in immediate inward consciousness] we find other stirrings, other revelations than those conditioned by the world of symbols. . . . Physics most strongly insists that its methods do not penetrate behind the symbolism. Surely then that mental and spiritual nature of ourselves, known in our minds by an intimate contact transcending the methods of physics, supplies just that. . . which science is admittedly unable to give. "[A. Eddington, *Science and the Unseen World* (New York: Macmillan, 1929).] [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 8]

- Start with "science." As I said, we are free to define "science" any way we wish, as long as we are consistent. But it seems to me that at the very least we must distinguish between the method of science and the domain of science. The method of science refers to the ways or means that whatever it is we call science manages to gather facts, data, or information, and manages to confirm or refute propositions vis a vis that data. Method, in other words, refers to ways in which "science" (still unspecified) manages to gather knowledge. Domain, on the other hand, simply refers to the types of events or phenomena that become, or can become, objects of investigation by whatever it is we mean by science. "Method" refers to the epistemology of science, while "domain" refers to its ontology. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 10]
- Instead of asking vaguely "What is science?", let us therefore ask "What is a scientific method?" and "What is a scientific domain?" As for scientific method, general science texts seem to be in agreement: a method of gaining knowledge whereby hypotheses are tested (instrumentally or experimentally) by reference to experience ("data") that is potentially public, or open to repetition (confirmation or refutation) by peers. In bare essentials, it means that the scientific method involves those knowledge-claims open to experiential validation or refutation. Notice that this definition-which we will

accept for the moment-correctly makes no reference to the domain or objects of the scientific method. If there is a way to test a knowledge-claim in whatever domain by appeal to open experience, then that knowledge can properly be called "scientific." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 11]

- Likewise, a typical knowledge-claim in the spiritual realm is, "Does a dog have Buddha-nature?" There is a specific, repeatable, verifiable, experiential test and answer to that question-a bad answer can most definitely be refuted-but it has virtually nothing to do with physical measurement or mental intentionality. [I have dealt with all this in greater detail; see K. Wilber, *Eye to Eye* (New York: Doubleday/Anchor, 1983).] [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 21]
- As it is now, most new-age approaches simply irritate the orthodox, not because these approaches are mystical but, to the contrary, because they are so reductionistic! Thus Gould, who started out his review of *The Turning Point* by saying that "This enormously right-minded general theme surely wins my approval," ended it with: "I found myself getting more and more annoyed with his book, with its facile analogies, its distrust of reason, its invocation of fashionable notions. In some respects, I feel closer to rational Cartesians [he despises them] than to Capra's California brand of ecology." (New York Review of Books, March 3, 1983.) [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 27]

WERNER HEISENBERG: (1901-1976)

- IN THE SUMMER of 1925, suffering from a bout of hay fever and exhausted from wrestling with the perplexities of atomic spectral lines, Werner Heisenberg-then only twenty-four years old-took a short vacation from the Physics Institute at Gottingen University, where he was studying with Max Born, and traveled to the hills of Helgoland. There, in one fevered day and night, he invented what was to be known as matrix quantum mechanics. With the help of Max Born, Pascual Jordan, Paul Dirac, and Wolfgang Pauli, matrix quantum mechanics was formalized (one of the results of which was the famous Heisenberg Uncertainty Principle, which, in plain language, says

that the more we know about half of the subatomic world, the less we can know about the other half). Erwin Schroedinger, working independently and along different lines, developed a wave mechanics; these two formalisms were quickly shown to be equivalent, and, almost at one stroke, modern quantum mechanics was born. In 1932 Heisenberg was awarded the Nobel Prize in Physics for his crucial and brilliant contributions. The following sections are taken from *Physics and Beyond* (New York: Harper and Row, 1971), *Across the Frontiers* (New York: Harper and Row, 1974), and *The Physicist's Conception of Nature* (New York: Harcourt and Brace, 1955). His central point is that physics can make only statements "about strictly limited relations that are only valid within the framework of those limitations [his italics]." If we want to go beyond physics, however, and begin to philosophize, then the worldview that can most easily explain modern physics is that not of Democritus, but of Plato. Heisenberg was an excellent philosopher (probably, with Eddington, the most accomplished in this volume), and a metaphysician or mystic of the Pythagorean-Platonic variety. Capable of being rigorously analytical and empirical, he nonetheless despised mere positivism-or the attempt to be only analytical and empirical-and thus in the opening section, Heisenberg, Pauli, and Bohr lament the attempt of philosophy to ape physics. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 31-32]

2-Truth Dwells in the Deeps

- Niels had this to say: "Some time ago there was a meeting of philosophers, most of them positivists, here in Copenhagen, during which members of the Vienna Circle played a prominent part. I was asked to address them on the interpretation of quantum theory. After my lecture, no one raised any objections or asked any embarrassing questions, but I must say this very fact proved a terrible disappointment to me. For those who are not shocked when they first come across quantum theory cannot possibly have understood it. Probably I spoke so badly that no one knew what I was talking about." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 33-34]
- Wolfgang objected: "The fault need not necessarily have been yours. It is part and parcel of the positivist creed that facts must be taken for granted, sight

unseen, so to speak. As far as I remember, Wittgenstein says: 'The world is everything that is the case.' 'The world is the totality of facts, not of things.' Now if you start from that premise, you are bound to welcome any theory representative of the 'case.' The positivists have gathered that quantum mechanics describes atomic phenomena correctly, and so they have no cause for complaint. What else we have had to add-complementarity, interference of probabilities, uncertainty relations, separation of subject and object, etc.-strikes them as just so many embellishments, mere relapses into prescientific thought, bits of idle chatter that do not have to be taken seriously. Perhaps this attitude is logically defensible, but, if it is, I for one can no longer tell what we mean when we say we have understood nature." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 34]

- Niels [commented]: "For my part, I can readily agree with the positivists about the things they want, but not about the things they reject. All the positivists are trying to do is to provide the procedures of modern science with a philosophical basis, or, if you like, a justification. They point out that the notions of the earlier philosophies lack the precision of scientific concepts, and they think that any of the questions posed and discussed by conventional philosophers have no meaning at all, that they are pseudo problems and, as such, best ignored. Positivist insistence on conceptual clarity is, of course, something I fully endorse, but their prohibition of any discussion of the wider issues, simply because we lack clear-cut enough concepts in this realm, does not seem very useful to me this same ban would prevent our understanding of quantum theory. " [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 34]
- "Positivists," I tried to point out, "are extraordinarily prickly about all problems having what they call a pre scientific character. I remember a book by Philipp Frank on causality, in which he dismisses a whole series of problems and formulations on the ground that all of them are relics of the old metaphysics, vestiges from the period of pre scientific or animistic thought. For instance, he rejects the biological concepts of 'wholeness' and 'entelechy' as pre scientific ideas and tries to prove that all statements in which these concepts are commonly used have no verifiable meaning. To him 'metaphysics' is a synonym for 'loose thinking,' and hence a term of abuse."

[Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 34]

- "This sort of restriction of language doesn't seem very useful to me either," Niels said. "You all know Schiller's poem, 'The Sentences of Confucius,' which contains these memorable lines: 'The full mind is alone the clear, and truth dwells in the deeps.' The full mind, in our case, is not only an abundance of experience but also an abundance of concepts by means of which we can speak about our problems and about phenomena in general. Only by using a whole variety of concepts when discussing the strange relationship between the formal laws of quantum theory and the observed phenomena, by lighting this relationship up from all sides and bringing out its apparent contradictions, can we hope to effect that change in our thought processes which is a sine qua non of any true understanding of quantum theory. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 34-35]
- We walked on in silence and had soon reached the northern tip of the Langelinie, whence we continued along the jetty as far as the small beacon. In the north, we could still see a bright strip of red; in these latitudes the sun does not travel far beneath the horizon. The outlines of the harbor installations stood out sharply, and after we had been standing at the end of the jetty for a while, Wolfgang asked me quite unexpectedly: "Do you believe in a personal God? I know, of course, how difficult it is to attach a clear meaning to this question, but you can probably appreciate its general purport." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 38]
- "May I rephrase your question?" I asked. "I myself should prefer the following formulation: Can you, or anyone else, reach the central order of things or events, whose existence seems beyond doubt, as directly as you can reach the soul of another human being? I am using the term 'soul' quite deliberately so as not to be misunderstood. If you put your question like that, I would say yes. And because my own experiences do not matter so much, I might go on to remind you of Pascal's famous text, the one he kept sewn in his jacket. It was headed 'Fire' and began with the words: 'God of Abraham, Isaac and Jacob-not of the philosophers and sages.' " "In other words, you think that

you can become aware of the central order with the same intensity as of the soul of another person?" "Perhaps. " "Why did you use the word 'soul' and not simply speak of another person?" "Precisely because the word 'soul' refers to the central order, to the inner core of a being whose outer manifestations may be highly diverse and pass our understanding. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 38]

3-Scientific and Religious Truths.

- Of the beginnings of modern science, the discoveries of Copernicus, Galileo, Kepler, and Newton, it is usually said that the truth of religious revelation, laid down in the Bible and the writings of the Church Fathers and dominant in the thought of the Middle Ages, was at that time supplemented by the reality of sensory experience, which could be checked by anyone in possession of his normal five senses and which-if enough care was taken---could, therefore, not in the end be doubted. But even this first approach to a description of the new way of thought is only half correct; it neglects decisive features without which its power cannot be understood. It is certainly no accident that the beginnings of modern science were associated with a turning away from Aristotle and a reversion to Plato. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 40]
- The place of immediate experience, has therefore been taken by an idealization of experience, which claims to be recognized as the correct idealization by virtue of the fact that it allows mathematical structures to become visible in the phenomena. There can be no doubt that in this early phase of modern science the newly discovered conformity to mathematical law has become the true basis for its persuasive power. These mathematical laws, so we read in Kepler, are the visible expression of the divine will, and Kepler breaks into enthusiasm at the fact that he has been the first here to recognize the beauty of God's works. Thus the new way of thinking assuredly had nothing to do with any turn away from religion. If the new discoveries did in fact contradict the teachings of the Church at certain points, this could have little significance, seeing that it was possible to perceive with such immediacy the workings of God in nature. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala,

Boston, 2001. P 41]

- The God here referred to is, however, an ordering God, of whom we do not at once know whether He is identical with the God to whom we turn in trouble, and to whom we can relate our life. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 41]
- First, there is the fact that man can develop his mental and spiritual powers only in relation to a human society. The very capacities that distinguish him above all other living creatures, the ability to reach beyond the immediate sensory given, the recognition of wider interrelations, depend upon his being lodged in a community of speaking and thinking beings. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 42]
- History teaches that such communities have acquired in their development not only an outward but also a spiritual pattern. And in the spiritual patterns known to us, the relation to a meaningful connection of the whole, beyond what can be immediately seen and experienced, has almost always played the deciding role. It is only within this spiritual pattern, of the ethos prevailing in the community, that man acquires the points of view whereby he can also shape his own conduct wherever it involves more than a mere reaction to external situations; it is here that the question about values is first decided. Not only ethics, however, but the whole cultural life of the community is governed by this spiritual pattern. Only within its sphere does the close connection first become visible between the good, the beautiful, and the true, and here only does it first become possible to speak of life having a meaning for the individual. This spiritual pattern we call the religion of the community. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 42]
- The word "religion" is thereby endowed with a rather more general meaning than is customary. It is intended to cover the spiritual content of many cultures and different periods, even in places where the very idea of God is absent. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 42]
- Religion proper speaks not of norms, however, but of guiding ideals, by which

we should govern our conduct and which we can at best only approximate. These ideals do not spring from inspection of the immediately visible world but from the region of the structures lying behind it, which Plato spoke of as the world of Ideas, and concerning which we are told in the Bible, "God is a spirit." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 43]

- I have already sought to enunciate the thesis that in the images and likenesses of religion, we are dealing with a sort of language that makes possible an understanding of that interconnection of the world which can be traced behind the phenomena and without which we could have no ethics or scale of values. This language is in principle replaceable, like any other; in other parts of the world there are and have been other languages that provide for the same understanding. But we are born into a particular linguistic area. This language is closer akin to that of poetry than to the precision-orientated language of natural science. Hence the words in the two languages often have different meanings. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 43]
- Science tries to give its concepts an objective meaning. But religious language must avoid this very cleavage of the world into its objective and its subjective sides; for who would dare claim the objective side to be more real than the subjective? Thus we ought not to intermingle the two languages; we should think more subtly than we have hitherto been accustomed to do. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 43]
- Consideration of such problems has nothing to do with any watering down of ethical principles. Nor am I able to conceive that such questions are capable of being answered by pragmatic considerations of expediency alone. On the contrary, here too it will be necessary to take into account the connection of the whole the source of ethical principles in that basic human attitude which is expressed in the language of religion. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 44]
- We must try to overcome the isolation which threatens the individual in a world dominated by technical expediency. Theoretical deliberations about

questions of psychology or social structure will avail us little here, so long as we do not succeed in finding a way back, by direct action, to a natural balance between the spiritual and material conditions of life. It will be a matter of reanimating in daily life the values grounded in the spiritual pattern of the community, of endowing them with such brilliance that the life of the individual is again automatically directed toward them. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 44]

4-The Debate between Plato and Democritus.

- The philosophy of materialism, developed in antiquity by Leucippus and Democritus, has been the subject of many discussions since the rise of modern science in the seventeenth century and, in the form of dialectical materialism, has been one of the moving forces in the political changes of the nineteenth and twentieth centuries. If philosophical ideas about the structure of matter have been able to play such a role in human life, if in European society they have operated almost like an explosive and may yet perhaps do so in other parts of the world, it is even more important to know what our present scientific knowledge has to say about this philosophy. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 46-47]
- If I may already anticipate at this point the outcome of such a comparison; it seems that, in spite of the tremendous success that the concept of the atom has achieved in modern science, Plato was very much nearer to the truth about the structure of matter than Leucippus or Democritus. But it will doubtless be necessary to begin by repeating some of the most important arguments adduced in the ancient discussions about matter and life, being and becoming, before we can enter into the findings of modern science. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 47]

THE CONCEPT OF MATTER IN ANCIENT PHILOSOPHY

- At the beginning of Greek philosophy there stood the dilemma of the "one" and the "many." We know that there is an ever-changing variety of phenomena appearing to our senses. Yet we believe that ultimately it should be possible to trace them back somehow to someone principle. [Ken Wilber:

Quantum Questions, Mystical Writings of the World's Great Physicists, Shambhala, Boston, 2001. P 47]

- The founders of atomism, Leucippus and Democritus, tried to avoid the difficulty by assuming the atom to be eternal and indestructible, the only thing really existing. All other things exist only because they are composed of atoms. The antithesis of "being" and "non being" in the philosophy of Parmenides is here coarsened into that between the "full" and the "void." Being is not only one; it can be repeated infinitely many times. Being is indestructible, and therefore the atom, too, is indestructible. The void, the empty space between the atoms, allows for position and motion, and thus for properties of the atom, whereas by definition, as it were, pure being can have no other property than that of existence. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 47]
- Still, the atomic hypothesis does go a large part of the way in the right direction. The whole multiplicity of diverse phenomena, the many observed properties of matter, can be reduced to the position and motion of the atoms. Properties such as smell or color or taste are not present in atoms. But their position and motion can evoke these properties indirectly. Position and motion seem to be much simpler concepts than the empirical qualities of taste, smell, or color. But then it naturally remains to ask what determines the position and motion of the atoms. The Greek philosophers did not attempt at this point to formulate a law of nature; the modern concept of natural law did not fit into their way of thought. Yet they seem to have thought of some kind of causal description or determinism, since they spoke of necessity, of cause and effect. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 48]
- The intention of the atomic hypothesis had been to point the way from the "many" to the "one," to formulate the underlying principle, the material cause, by virtue of which all phenomena can be understood. The atoms could be regarded as the material cause, but only a general law determining their positions and velocities could actually play the part of the fundamental principle. However, when the Greek philosophers discussed the laws of nature, their thoughts were directed to static forms, geometrical symmetries,

rather than to processes in space and time. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 48]

- When Plato himself took up the problems raised by Leucippus and Democritus, he adopted the idea of smallest units of matter, but he took the strongest exception to the tendency of that philosophy to suppose the atoms to be the foundation of all existence, the only truly existing material objects. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 49]
- This whole description fits exactly into the central ideas of Plato's idealist philosophy. The structure underlying the phenomena is not given by material objects like the atoms of Democritus but by the form that determines the material objects. The Ideas are more fundamental than the objects. And since the smallest parts of matter have to be the objects whereby the simplicity of the world becomes visible, whereby we approximate to the "one" and the "unity" of the world, the Ideas can be described mathematically—they are simply mathematical forms. The saying "God is a mathematician," which in this form assuredly derives from a later period of philosophy, has its origin in this passage from the Platonic philosophy. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 50]

THE ANSWER OF MODERN SCIENCE TO THE OLD PROBLEMS

- If we trace the history of physics from Newton to the present day, we see that, despite the interest in details, very general laws of nature have been formulated on several occasions. The nineteenth century saw an exact working out of the statistical theory of heat. The theories of electromagnetism and special relativity have proved susceptible of combination into a very general group of natural laws containing statements not only about electrical phenomena but also about the structure of space and time. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 50]
- In our own century, the mathematical formulation of the quantum theory has led to an understanding of the outer shells of chemical atoms, and thus of the chemical properties of matter generally. The relations and connections

between these different laws, especially between relativity and quantum theory, are not yet fully explained. But the latest developments in particle physics permit one to hope that these relations may be satisfactorily analyzed in the relatively near future. We are thus already in a position to consider what answers can be given by this whole scientific development to the questions of the old philosophers. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 50-51]

- The mathematically formulated laws of quantum theory show clearly that our ordinary intuitive concepts cannot be unambiguously applied to the smallest particles. All the words or concepts we use to describe ordinary physical objects, such as position, velocity, color, size, and so on, become indefinite and problematic if we try to use them of elementary particles. I cannot enter here into the details of this problem, which has been discussed so frequently in recent years. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 51]

CONSEQUENCES FOR THE EVOLUTION OF HUMAN THOUGHT IN OUR OWN DAY

- The search for the "one," for the ultimate source of all understanding, has doubtless played a similar role in the origin of both religion and science. But the scientific method that was developed in the sixteenth and seventeenth centuries, the interest in those details which can be tested by experiment, has for a long time pointed science along a different path. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 53]
- The necessity of constantly shuttling between the two languages is, unfortunately, a chronic source of misunderstandings, since in many cases the same words are employed in both. The difficulty is unavoidable. But it may yet be of some help always to bear in mind that modern science is obliged to make use of both languages, that the same word may have very different meanings in each of them, that different criteria of truth apply, and that one should not, therefore, talk too hastily of contradictions. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 55]

- If we wish to approach the "one" in the terms of a precise scientific language, we must turn our attention to that center of science described by Plato, in which the fundamental mathematical symmetries are to be found. In the concepts of this language we must be content with the statement that "God is a mathematician"; for we have freely chosen to confine our vision to that realm of being which can be understood in the mathematical sense of the word "understanding," which can be described in rational terms. Plato himself was not content with this restriction. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 55]
- the language of images and likenesses is probably the only way of approaching the "one" from more general domains. If the harmony in a society rests on a common interpretation of the "one," the unitary principle behind the phenomena, then the language of poetry may be more important here than the language of science. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 55]

5- Science and the Beautiful

- Perhaps it will be best if, without any initial attempt at a philosophical analysis of the concept of "beauty," we simply ask where we can meet the beautiful in the sphere of exact science. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 56]
- Beauty, so the first of our ancient definitions ran, is the proper conformity of the parts to one another and to the whole. The parts here are the individual notes, while the whole is the harmonious sound. The mathematical relation can, therefore, assemble two initially independent parts into a whole, and so produce beauty. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 58]
- Aristotle, in his *Metaphysics*, reports that the Pythagoreans, ". . . who were the first to take up mathematics, not only advanced this study, but also having been brought up in it they thought its principles were the principles of all things. . . . Since, again, they saw that the modifications and the ratios of the musical scales were expressible in numbers; since, then, all other things seemed in their whole nature to be modelled on numbers; and numbers

seemed to be the first things in the whole of nature, they supposed the elements of numbers to be the elements of all things, and the whole heaven to be a musical scale and a number." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 59]

- Aristotle, as an empiricist, was critical of the Pythagoreans, who, he said, "are not seeking for theories and causes to account for observed facts, but rather forcing their observations and trying to accommodate them to certain theories and opinions of their own" [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 60]
- Some years later, Kepler succeeded in discovering new mathematical forms in the data of his very careful observations of the planetary orbits and in formulating the three famous laws that bear his name. How close Kepler felt himself in these discoveries to the ancient arguments of Pythagoras, and how much the beauty of the connections guided him in formulating them, can be seen from the fact that he compared the revolutions of the planets about the sun with the vibrations of a string and spoke of a harmonious concord of the different planetary orbits, of a harmony of the spheres. At the end of his work on the harmony of the universe, he broke out into this cry of joy: "I thank thee, Lord God our Creator, that thou allowest me to see the beauty in thy work of creation." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 61-62]
- "Beauty is the proper conformity of the parts to one another and to the whole." That this criterion applies in the highest degree to a structure like Newtonian mechanics is something that scarcely needs explaining. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 62]
- The significance of the beautiful for the discovery of the true has at all times been recognized and emphasized. The Latin motto "Simplex sigillum veri" - "The simple is the seal of the true" - is inscribed in large letters in the physics auditorium of the University of Göttingen as an admonition to those who would discover what is new; another Latin motto, "Pulchritudo splendor veritatis" - "Beauty is the splendor of truth" - can also be interpreted to mean

that the researcher first recognizes truth by this splendor, by the way it shines forth. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 62]

- The first passage is to be found in Kepler's *Harmony of the World*: That faculty which perceives and recognizes the noble proportions in what is given to the senses, and in other things situated outside itself, must be ascribed to the soul. It lies very close to the faculty which supplies formal schemata to the senses, or deeper still, and thus adjacent to the purely vital power of the soul, which does not think discursively, i.e., in conclusions, as the philosophers do, and employs no considered method, and is thus not peculiar only to man, but also dwells in wild animals and the dear beasts of the field. . . . Now it might be asked how this faculty of the soul, which does not engage in conceptual thinking, and can therefore have no proper knowledge of harmonic relations, should be capable of recognizing what is given in the outside world. For to recognize is to compare the sense perception outside with the original pictures inside, and to judge that it conforms to them. Proclus has expressed the matter very finely in his simile of awakening, as from a dream. For just as the sensorily presented things in the outer world recall to us those which we formerly perceived in the dream, so also the mathematical relations given in sensibility call forth those intelligible archetypes which were already given inwardly beforehand, so that they now shine forth truly and vividly in the soul, where before they were only obscurely present there. But how have they come to be within? To this I answer that all pure Ideas or archetypal patterns of harmony, such as we were speaking of, are inherently present in those who are capable of apprehending them. But they are not first received into the mind by a conceptual process, being the product, rather, of a sort of instinctive intuition of pure quantity, and are innate in these individuals, just as the number of petals in a plant, say, is innate in its form principle, or the number of its seed chambers is innate in the apple. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 65-66]
- Ideas similar to those of Kepler have been put forward in an essay by Pauli. He writes: The process of understanding in nature, together with the joy that man feels in understanding, i.e., in becoming acquainted with new knowledge, seems therefore to rest upon a correspondence, a coming into

congruence of preexistent internal images of the human psyche with external objects and their behavior. This view of natural knowledge goes back, of course, to Plato and was . . . also very plainly adopted by Kepler. The latter speaks, in fact, of Ideas, preexistent in the mind of God and imprinted accordingly upon the soul, as the image of God. These primal images, which the soul can perceive by means of an innate instinct, Kepler calls archetypes. There is very wide-ranging agreement here with the primordial images or archetypes introduced into modern psychology by C. G. Jung, which function as instinctive patterns of ideation. At this stage, the place of clear concepts is taken by images of strongly emotional content, which are not thought but are seen pictorially, as it were, before the mind's eye. Insofar as these images are the expression of a suspected but still unknown state of affairs, they can also be called symbolic, according to the definition of a symbol proposed by Jung. As ordering operators and formatives in this world of symbolic images, the archetypes function, indeed, as the desired bridge between sense perceptions and Ideas, and are therefore also a necessary precondition for the emergence of a scientific theory. Yet one must beware of displacing this a priori of knowledge into consciousness, and relating it to specific, rationally formulable Ideas. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 66-67]

- It is the amazed awe that Plato speaks of in the Phaedrus, with which the soul remembers, as it were, something it had unconsciously possessed all along. Kepler says: "HGeometria est archetypus pulchritudinis mundi"; or, if we may translate in more general terms: "Mathematics is the archetype of the beauty of the world." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 68]
- Perhaps at the very end I may remind you once more of the second definition of the concept of beauty, which stems from Plotinus and in which no more is heard of the parts and the whole: "Beauty is the translucence, through the material phenomenon, of the eternal splendor of the 'one.'" "There are important periods of art in which this definition is more appropriate than the first, and to such periods we often look longingly back. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 69]

- But in our own time it is hard to speak of beauty from this aspect, and perhaps it is a good rule to adhere to the custom of the age one has to live in, and to keep silent about that which it is difficult to say. In actual fact, the two definitions are not so very widely removed from one another. So let us be content with the first and more sober definition of beauty, which certainly is also realized in natural science, and let us declare that in exact science, no less than in the arts, it is the most important source of illumination and clarity. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 69]

6-if Science Is Conscious of Its Limits . . .

- By way of conclusion, I shall quote the introduction to the Principles of Mechanics (1876) by Heinrich Hertz (1857-1894), for here it emerges clearly how physics began to remember once more that a natural science is one whose propositions on limited domains of nature can have only a correspondingly limited validity; that science is not a philosophy developing a worldview of nature as a whole or about the essence of things. Hertz points out that propositions in physics have neither the task nor the capacity of revealing the inherent essence of natural phenomena. He concludes that physical determinations are only pictures, on whose correspondence with natural objects we can make but the single assertion, viz., whether or not the logically derivable consequences of our pictures correspond with the empirically observed consequences of the phenomena for which we have designed our picture. In other words, the hypothetical picture of a causal relationship with which we invest natural phenomena must prove its usefulness in practice. The criteria for assessing the suitability of a picture are that (1) it must be admissible, i.e., correspond with our laws of thought; (2) it must be correct, i.e., agree with experience; (3) it must be relevant, i.e., contain the maximum of essential and the minimum of superfluous or empty relations of the object. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 73-74]
- Here already we get a foretaste of the essential insight of modern physics stated with such impressive brevity by Eddington: "We have found that where science has progressed the farthest, the mind has but regained from nature that which the mind has put into nature. We have found a strange

footprint on the shores of the unknown. We have devised profound theories, one after another, to account for its origin. At last, we have succeeded in reconstructing the creature that made the footprint. And Lo! it is our own." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 74]

- I should like to stress the following: **1.** Modern science, in its beginnings, was characterized by a conscious modesty; it made statements about strictly limited relations that are only valid within the framework of these limitations. **2.** This modesty was largely lost during the nineteenth century. Physical knowledge was considered to make assertions about nature as a whole. Physics wished to turn philosopher, and the demand was voiced from many quarters that all true philosophers must be scientific. **3.** Today physics is undergoing a basic change, the most characteristic trait of which is a return to its original self-limitation. **4.** The philosophic content of a science is only preserved if science is conscious of its limits. Great discoveries of the properties of individual phenomena are possible only if the nature of the phenomena is not generalized a priori. Only by leaving open the question of the ultimate essence of a body, of matter, of energy, etc., can physics reach an understanding of the individual properties of the phenomena that we designate by these concepts, an understanding which alone may lead us to real philosophical insight. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 74]

ERWIN SCHROEDINGER (1887-1961)

- At about the same time that Heisenberg et al. were developing matrix mechanics, Erwin Schroedinger independently discovered a form of "wave mechanics" that was quickly shown to be equivalent to, but in many respects simpler and more elegant than, the matrix mechanics. It was therefore "Schroedinger's wave equation" that soon became the heart of modern quantum mechanics and its most widely used mathematical tool. For this seminal work, Schroedinger was awarded the 1933 Nobel Prize in Physics. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 77]
- The following sections are taken from My View of the World (Cambridge University Press ["C.U.P."], 1964), Mind and Matter (C.U.P.,1958), Nature

and the Creeks (C.U.P., 1954), Science and Humanism (C.U.P., 1951), and What Is Life? (C.U.P., 1947). Schroedinger's mystical insight, I believe, was probably the keenest of any in this volume, and his eloquence was matched only by Eddington's. The last selection (Chapter 10), in particular, contains some of the finest and most poetic mystical statements ever penned, and stands eloquently as its own remark. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 77]

7-Why Not Talk Physics?

- Schroedinger acknowledges that quantum mechanics shows, if anything, an interaction between objects, not between subject and object. The reason he denies the latter-and the reason he seems to have so little use for the alleged impact of quantum interaction on philosophy and mysticism-is explained in the following paragraphs. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 80]
- Cassirer's lucid discussion makes one feel so strongly the absurdity of basing free will, including ethics, on physical haphazard that the previous difficulty, the antagonism between free will and determinism, dwindles and almost vanishes under the mighty blows Cassirer deals to the opposite view. "Even the reduced extent of predictability" (Cassirer adds) "still granted by Quantum Mechanics would amply suffice to destroy ethical freedom, if the concept and true meaning of the latter were irreconcilable with predictability." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 83]
- Indeed, one begins to wonder whether the supposed paradox is really so shocking, and whether physical determinism is not perhaps quite a suitable correlate to the mental phenomenon of will, which is not always easy to predict "from outside," but usually extremely determined "from inside." To my mind, this is the most valuable outcome of the whole controversy: the scale is turned in favour of a possible reconciliation of free will with physical determinism, when we realize how inadequate a basis physical haphazard provides for ethics. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 83]
- The net result is that quantum physics has nothing to do with the free will

problem. If there is such a problem, it is not furthered a whit by the latest development in physics. **To quote Ernst Cassirer again: "Thus it is clear. . . that a possible change in the physical concept of causality can have no immediate bearing on ethics."** [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 83]

SCIENCE CANNOT TOUCH IT

- The scientific picture of the real world around me is very deficient. It gives a lot of factual information, puts all our experience in a magnificently consistent order, but it is ghastly silent about all and sundry that is really near to our heart, that really matters to us. It cannot tell us a word about red and blue, bitter and sweet, physical pain and physical delight; it knows nothing of beautiful and ugly, good or bad, God and eternity. Science sometimes pretends to answer questions in these domains, but the answers are very often so silly that we are not inclined to take them seriously. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 83]
- So, in brief, we do not belong to this material world that science constructs for us. We are not in it; we are outside. We are only spectators. The reason why we believe that we are in it, that we belong to the picture, is that our bodies are in the picture. Our bodies belong to it. Not only my own body, but those of my friends, also of my dog and cat and horse, and of all the other people and animals. And this is my only means of communicating with them. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 83-84]
- Moreover, my body is implied in quite a few of the more interesting changes-movements, etc.-that go on in this material world, and is implied in such a way that I feel myself partly the author of these goings on. But then comes the impasse, this very embarrassing discovery of science, that I am not needed as an author. Within the scientific world-picture all these happenings take care of themselves-they are amply accounted for by direct energetic interplay. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 84]
- Even the human body's movements "are its own" as Sherrington put it. The scientific world- picture vouchsafes a very complete understanding of all that

happens-it makes it just a little too understandable. It allows you to imagine the total display as that of a mechanical clockwork which, for all that science knows, could go on just the same as it does, without there being consciousness, will, endeavor, pain and delight and responsibility connected with it-though they actually are. And the reason for this disconcerting situation is just this: that, for the purpose of constructing the picture of the external world, we have used the greatly simplifying device of cutting our own personality out, removing it; hence it is gone, it has evaporated, it is ostensibly not needed. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 84]

- In particular, and most importantly, this is the reason why the scientific worldview contains of itself no ethical values, no aesthetical values, not a word about our own ultimate scope or destination, and no God, if you please. Whence came I, whither go I? Science cannot tell us a word about why music delights us, of why and how an old song can move us to tears. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 84]
- Science, we believe, can, in principle, describe in full detail all that happens in the latter case in our sensorium and "motorium" from the moment the waves of compression and dilation reach our ear to the moment when certain glands secrete a salty fluid that emerges from our eyes. But of the feelings of delight and sorrow that accompany the process science is completely ignorant-and therefore, reticent. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 84]
- Science is reticent too when it is a question of the great Unity-the One of Parmenides-of which we all somehow form part, to which we belong. The most popular name for it in our time is God-with a capital "G." Science is, very usually, branded as being atheistic. After what we said, this is not astonishing. If its world-picture does not even contain blue, yellow, bitter, sweet-beauty, delight, and sorrow-, if personality is cut out of it by agreement, how should it contain the most sublime idea that presents itself to human mind? [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 84]
- The world is big and great and beautiful. My scientific knowledge of the

events in it comprises hundreds of millions of years. Yet in another way it is ostensibly contained in a poor seventy or eighty or ninety years granted to me—a tiny spot in immeasurable time, nay even in the finite millions and milliards of years that I have learnt to measure and to assess. Whence come I and whither go I? That is the great unfathomable question, the same for everyone of us. Science has no answer to it. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 85]

8-The Oneness of Mind

- Let me quote, as an example outside the Upanishads, an Islamic-Persian mystic of the thirteenth century, Aziz Nasafi. I am taking it from a paper by Fritz Meyer and translating from his German translation: On the death of any living creature the spirit returns to the spiri-tual world, the body to the bodily world. In this however only the bodies are subject to change. The spiritual world is one single spirit who stands like unto a light behind the bodily world and who, when any single creature comes into being, shines through it as through a window. According to the kind and size of the window less or more light enters the world. The light itself however remains unchanged. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 87]
- If I say that there cannot be more than one consciousness in the same mind, this seems a blunt tautology—we are quite unable to imagine the contrary. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 88]
- I will give you the main conclusion in Sherrington's own words: It is not spatial conjunction of cerebral mechanism which com- bines the two reports. . . . It is much as though the right-and left-eye images were seen each by one of two observers and the minds of the two observers were combined to a single mind. It is as though the right-eye and left-eye perceptions are elaborated singly and then psychically combined to one. . . . It is as if each eye had a separate sensorium of considerable dignity proper to itself, in which mental processes based on that eye were developed up to even full perceptual levels. Such would amount physiologically to a visual sub-brain. There would be two such sub-brains, one for the right eye and one for the left

eye. Contemporaneity of action rather than structural union seems to provide their mental collaboration. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 88]

- This is followed by very general considerations, of which I shall again pick out only the most characteristic passages: Are there thus quasi-independent sub-brains based on the several modalities of sense? In the roof-brain the old "five" senses instead of being merged inextricably in one another and further submerged under mechanism of higher order are still plain to find, each demarcated in its separate sphere. How far is the mind a collection of quasi-independent perceptual minds integrated psychically in large measure by temporal concurrence of experience? . . . When it is a question of "mind" the nervous system does not integrate itself by centralization upon a pontifical cell. Rather it elaborates a million-fold democracy whose each unit is a cell. . . the concrete life compounded of sublives reveals, although integrated, its additive nature and declares itself an affair of minute foci of life acting together. . . . When however we turn to the mind there is nothing of all this. The single nerve-cell is never a miniature brain. The cellular constitution of the body need not be for any hint of it from "mind". . . . A single pontifical brain-cell could not assure to the mental reaction a character more unified, and non-atomic than does the roof-brain's multitudinous sheet of cells. Matter and energy seem granular in structure, and so does "life," but not so mind. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 88-89]
- Sherrington says: "Man's mind is a recent product of our planet's side. " [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 89]
- When an archeologist reconstructs a city or a culture long bygone, he is interested in human life in the past, in actions, sensations, thoughts, feelings, in joy and sorrow of humans, displayed there and then. But a world, existing for many millions of years without any mind being aware of it, contemplating it, is it anything at all? Has it existed? For do not let us forget: to say, as we did, that the becoming of the world is reflected in a conscious mind is but a cliché, a phrase, a metaphor that has become familiar to us. The world is given but once. Nothing is reflected. The original and the mirror-image are

identical. The world extended in space and time is but our representation (Vorstellung). Experience does not give us the slightest clue of its being anything besides that-as Berkeley was well aware. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 90]

- Let me briefly mention the notorious atheism of science which comes, of course, under the same heading. Science has to suffer this reproach again and again, but unjustly so. No personal god can form part of a world-model that has only become accessible at the cost of removing everything personal from it. We know, when God is experienced, this is an event as real as an immediate sense perception or as one's own personality. Like them, he must be missing in the space-time picture. I do not find God anywhere in space and time-that is what the honest naturalist tells you. For this, he incurs blame from him in whose catechism is written: God is spirit. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 91]

9-The I That Is God

- So let us see whether we cannot draw the correct, non-contradictory conclusion from the following two premises: (i) My body functions as a pure mechanism according to the Laws of Nature. (ii) Yet I know, by incontrovertible direct experience, that I am directing its motions, of which I foresee the effects, that may be fateful and all-important, in which case I feel and take full responsibility for them. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 92-93]

10-The Mystic Vision

- According to our usual way of looking at it, everything that you are seeing has, apart from small changes, been there for thousands of years before you. After a while-not long-you will no longer exist, and the woods and rocks and sky will continue, unchanged, for thousands of years after you. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 97]
- Thus you can throw yourself flat on the ground, stretched out upon Mother Earth, with the certain conviction that you are one with her and she with you.

You are as firmly established, as invulnerable, as she- indeed, a thousand times firmer and more invulnerable. As surely as she will engulf you tomorrow, so surely will she bring you forth anew to new striving and suffering. And not merely, "some day": now, today, every day she is bringing you forth, not once, but thousands upon thousands of times, just as every day she engulfs you a thousand times over. For eternally and always there is only now, one and the same now; the present is the only thing that has no end. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 98]

ALBERT EINSTEIN: (18 79- 1 9SS)

- ALBERT EINSTEIN is generally regarded, quite simply, as the greatest physicist ever to have lived. His contributions to physics are legion: special and general relativity theory, quantum photoelectric effect, Brownian movement theory, the immortal $E=mc^2$. He was awarded the Nobel Prize in Physics in 1921. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 101]
- The following sections are taken from *Ideas and Opinions* (New York: Crown Publishers, 1954). Einstein's mysticism has been described as a cross between Spinoza and Pythagoras; there is a central order to the cosmos, an order that can be directly apprehended by the soul in mystical union. He devoutly believed that although science, religion, art, and ethics are necessarily distinct endeavors, it is wonderment in the face of "the Mystery of the Sublime" that properly motivates them all. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 101]

12- Science and Religion

- For the scientific method can teach us nothing else beyond how facts are related to, and conditioned by, each other. The aspiration toward such objective knowledge belongs to the highest of which man is capable, and you will certainly not suspect me of wishing to belittle the achievements and the heroic efforts of man in this sphere. Yet it is equally clear that knowledge of what is does not open the door directly to what should be. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 107-108]

- It would not be difficult to come to an agreement as to what we understand by science. Science is the century-old endeavor to bring together by means of systematic thought the perceptible phenomena of this world into as thorough-going an association as possible. To put it boldly, it is the attempt at the posterior reconstruction of existence by the process of conceptualization. But when asking myself what religion is, I cannot think of the answer so easily. And even after finding an answer which may satisfy me at this particular moment, I still remain convinced that I can never, under any circumstances, bring together, even to a slight extent, the thoughts of all those who have given this question serious consideration. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 109]
- Accordingly, a religious person is devout in the sense that he has no doubt of the significance and loftiness of those superpersonal objects and goals which neither require nor are capable of rational foundation. They exist with the same necessity and matter-of-factness as he himself. In this sense, religion is the age-old endeavor of mankind to become clearly and completely conscious of these values and goals and constantly to strengthen and extend their effect. If one conceives of religion and science according to these definitions then a conflict between them appears impossible. For science can only ascertain what is, but not what should be, and outside of its domain value judgments of all kinds remain necessary. Religion, on the other hand, deals only with evaluations of human thought and action: it cannot justifiably speak of facts and relationships between facts. According to this interpretation, the well-known conflicts between religion and science in the past must all be ascribed to a misapprehension of the situation which has been described. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 110]
- Now, even though the realms of religion and science in themselves are clearly marked off from each other, nevertheless there exist between the two strong reciprocal relationships and dependencies. Though religion may be that which determines the goal, it has, nevertheless, learned from science, in the broadest sense, what means will contribute to the attainment of the goals it has set up. But science can only be created by those who are thoroughly

imbued with the aspiration toward truth and understanding. This source of feeling, however, springs from the sphere of religion. To this there also belongs the faith in the possibility that the regulations valid for the world of existence are rational, that is, comprehensible to reason. I cannot conceive of a genuine scientist without that profound faith. The situation may be expressed by an image: science without religion is lame, religion without science is blind. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 110-111]

- The main source of the present day conflicts between the spheres of religion and of science lies in this concept of a personal God. It is the aim of science to establish general rules which determine the reciprocal connection of objects and events in time and space. For these rules, or laws of nature, absolutely general validity is required-not proven. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 111]
- If it is one of the goals of religion to liberate mankind as far as possible from the bondage of egocentric cravings, desires, and fears, scientific reasoning can aid religion in yet another sense. Although it is true that it is the goal of science to discover rules which permit the association and foretelling of facts, this is not its only aim. It also seeks to reduce the connections discovered to the smallest possible number of mutually independent conceptual elements. It is in this striving after the rational unification of the manifold that it encounters its greatest successes, even though it is precisely this attempt which causes it to run the greatest risk of falling a prey to illusions. But whoever has undergone the intense experience of successful advances made in this domain is moved by profound reverence for the rationality made manifest in existence. By way of the understanding he achieves a far-reaching emancipation from the shackles of personal hopes and desires, and thereby attains that humble attitude of mind toward the grandeur of reason incarnate in existence, and which, in its profoundest depths, is inaccessible to man. This attitude, however, appears to me to be religious in the highest sense of the word. And so it seems to me that science not only purifies the religious impulse of the dross of its anthropomorphism, but also contributes to a religious spiritualization of our understanding of life. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*,

Shambhala, Boston, 2001. P 113]

- The interpretation of religion, as here advanced, implies a dependence of science on the religious attitude, a relation which, in our predominantly materialistic age, is only too easily overlooked. While it is true that scientific results are entirely independent from religious or moral considerations, those individuals to whom we owe the great creative achievements of science were all of them imbued with the truly religious conviction that this universe of ours is something perfect and susceptible to the rational striving for knowledge. If this conviction had not been a strongly emotional one and if those searching for knowledge had not been inspired by Spinoza's *Amor Dei Intellectualis*, they would hardly have been capable of that untiring devotion which alone enables man to attain his greatest achievements. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 113]

PRINCE LOUIS DE BROGLIE: (1892-1987)

- LOUIS DE BROGLIE is best known for his theory of "matter waves," the crucial formulations of which he presented in two papers of September 1923, while he was still a student. These papers became part of his doctoral thesis, a copy of which was sent to Einstein, who, much impressed, widely circulated the ideas. Erwin Schroedinger heard of de Broglie's thesis-that moving electrons produce waves-and that directly led him to develop the Schroedinger wave equations so central to quantum mechanics. The actual existence of matter waves was experimentally verified in 1927, and two years later de Broglie received the Nobel Prize in Physics... The following sections are taken from *Physics and Microphysics* (New York: Pantheon, 1955). In the first section, de Broglie argues (as did Einstein) that all genuine science is motivated by what, in fact, are spiritual ideals. But science itself cannot pronounce on these ideals, and thus, in the second section, he argues that, in addition to science, we need "a supplement of the soul." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 117]

13-The Aspiration Towards Spirit

- the development of science has progressively allowed for a great number of inventions and practical applications which have completely transformed,

often for good and sometimes for evil, the living conditions of humanity. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 119]

- At bottom, these distressing questions raise, above all, a moral problem. Scientific discoveries and the applications of which they are capable are, in themselves, neither good nor bad; all depends on the use which we make of them. Tomorrow, as today, it will be, therefore, the will of mankind that is called upon to decide on the beneficial or evil character of these applications. To be able to survive the appropriate progress of his attainments, mankind of tomorrow will have to find in the development of his spiritual life and in the uplifting of his moral ideal, the wisdom not to abuse his increased forces. This is what Henri Bergson has splendidly expressed in one of his last works when saying: "Our enlarged body clamours for an addition to the spirit." Shall we be able to acquire this addition to the spirit as rapidly as the advances of science will develop? [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 125]

14-The Mechanism Demands a Mysticism

- And wishing to make us appreciate the essential point and the disquieting side of the problem, he added: "Now, in this excessively enlarged body, the spirit remains what it was, too small now to fill it, too feeble to direct it," and further. on, "Let us add that this increased body awaits a supplement of the soul and that the mechanism demands a mysticism." Finally, the work finishes on these words, pregnant with meaning: "Humanity groans half-crushed under the weight of the advances that it has made. It does not know sufficiently that its future depends on itself. It is for it, above all, to make up its mind if it wishes to continue to live. . . ." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 126]
- We perceive the almost tragic magnitude of the moral problem which is here raised. "Humanity does not know sufficiently that its future depends on itself. It is for it to see first if it wishes to continue to live," said Bergson. How precise and profound a meaning these words hold today on the threshold of the unknown, and perhaps formidable, future which opens before us! [Ken

Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 127]

- Confronted by the dangers with which the advances of science can, if employed for evil, face him, man has need of a "supplement of soul" and he must force himself to acquire it promptly before it is too late. It is the duty of those who have the mission of being the spiritual or intellectual guides of humanity to labour to awaken in it this supplement of the soul. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 129]

SIR JAMES JEANS (1877- 1946)

- SIR JAMES JEANS was a mathematician, physicist, and astronomer. He made fundamental contributions to the dynamical theory of gases, the mathematical theory of electromagnetism, the evolution of gaseous stars, the nature of nebulae-to name a few. He was knighted in 1924 and went on to become one of the most popular and prominent philosophers of science.... The following is taken from *The Mysterious Universe* (Cambridge University Press, 1931). Sir Jeans concludes that, since we can only understand the physical world through mathematics, then we might rightly conclude that, to use his favorite phrase, "God is a mathematician, and the universe begins to look more like a great thought than a great machine." He makes it very clear he is talking now as a philosopher, not a scientist, but his Pythagorean mysticism inspires a style that manages to embrace both with delight, rigor, and wit. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 133]

15- In the Mind of Some Eternal Spirit

- The essential fact is simply that all the pictures which science now draws of nature, and which alone seem capable of according with observational fact, are mathematical pictures. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 135]
- Most scientists would agree that they are nothing more than pictures-fictions, if you like, if by fiction you mean that science is not yet in contact with ultimate reality. Many would hold that, from the broad philosophical standpoint, the outstanding achievement of twentieth-century physics is not the theory of relativity with its welding together of space and time, or the

theory of quanta with its present apparent negation of the laws of causation, or the dissection of the atom with the resultant discovery that things are not what they seem; it is the general recognition that we are not yet in contact with ultimate reality. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 135]

- To speak in terms of Plato's well-known simile, we are still imprisoned in our cave, with our backs to the light, and can only watch the shadows on the wall. At present, the only task immediately before science is to study these shadows, to classify them and explain them in the simplest possible way. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 135]
- When we try to discover the nature of the reality behind the shadows, we are confronted with the fact that all discussion of the ultimate nature of things must necessarily be barren unless we have some extraneous standards against which to compare them. For this reason, to borrow Locke's phrase, "the real essence of substances" is forever unknowable. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 137]
- If the philosopher now says, "What you have found is nothing new: I could have told you that it must be so all the time," the scientist may reasonably inquire, "Why, then, did you not tell us so, when we should have found the information of real value?" Our contention is that the universe now appears to be mathematical in a sense different from any which Kant contemplated or possibly could have contemplated-in brief, the mathematics enters the universe from above instead of from below. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 139]
- Two thousand years after Plato, Kepler spent much time and energy in trying to relate the sizes of the planetary orbits to musical intervals and geometrical constructions; perhaps he, too, hoped to discover that the orbits had been arranged by a musician or a geometer. For one brief moment, he believed he had found that the ratios of the orbits were related to the geometry; of the five regular solids. If this supposed fact had been known to Plato, what a proof he might have seen in it of the geometrizing propensities of the deity!

Kepler himself wrote: "The intense pleasure I have received from this discovery can never be told in words." It need hardly be said that the great discovery was fallacious. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 140]

- Considerations such as these led Berkeley to postulate an Eternal Being, in whose mind all objects existed. And so, in the stately and sonorous diction of a bygone age, he summed up his philosophy in the words: All the choir of heaven and furniture of earth, in a word all those bodies which compose the mighty frame of the world, have not any substance without the mind. . . . so long as they are not actually perceived by me, or do not exist in my mind, or that of any other created spirit, they must either have no existence at all, or else subsist in the mind of some Eternal Spirit. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 145]
- Modern science seems to me to lead, by a very different road, to a not altogether dissimilar conclusion. Biology, studying the connection between the earlier links of the chain, A, B, C, D, seems to be moving towards the conclusion that these are all of the same general nature. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 145]
- This is occasionally stated in the specific form that, as biologists believe C, D to be mechanical and material, A, B must also be mechanical and material, but apparently there would be at least equal warrant for stating it in the form that as A, B are mental, C, D must also be mental. Physical science, troubling little about C, D, proceeds directly to the far end of the chain; its business is to study the workings of X, Y, Z. And, as it seems to me, its conclusions suggest that the end links of the chain, whether we go to the cosmos as a whole or to the innermost structure of the atom, are of the same nature as A, B-of the nature of pure thought; we are led to the conclusions of Berkeley, but we reach them from the other end. Because of this, we come upon the last of Berkeley's three alternatives first, and the others appear unimportant by comparison. It does not matter whether objects "exist in my mind, or that of any other created spirit" or not; their objectivity arises from their subsisting "in the mind of some Eternal Spirit." [Ken Wilber: *Quantum*

Questions, Mystical Writings of the World's Great Physicists, Shambhala, Boston, 2001. P 145-146]

16-A Universe of Pure Thought

- This concept of the universe as a world of pure thought throws a new light on many of the situations we have encountered in our survey of modern physics. We can now see how the ether, in which all the events of the universe take place, could reduce to a mathematical abstraction and become as abstract and as mathematical as parallels of latitude and meridians of longitude. We can also see why energy, the fundamental entity of the universe, had again to be treated as a mathematical abstraction-the constant of integration of a differential equation. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 149]
- In brief, a mathematical formula can never tell us what a thing is, but only how it behaves; it can only specify an object through its properties. And these are unlikely to coincide in toto with the properties of any single macroscopic object of our everyday life. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 149]
- 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; the determination of the constants such as the radius of the universe and the number of electrons it contained imply thought, whose richness is measured by the immensity of these quantities. Time and space, which form the setting for the thought, must have come into being as part of this act. Primitive cosmologies pictured a creator working in space and time, forging sun, moon, and stars out of already existent raw material. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 150]
- 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. It accords with the conjecture of Augustine: "Non in tempore, sed cum tempore, finxit Deus mundum." 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 thought of God in the creation of time. [Ken Wilber:

Quantum Questions, Mystical Writings of the World's Great Physicists, Shambhala, Boston, 2001. P 150]

- We cannot claim to have discerned more than a very faint glimmer of light at the best; perhaps it was wholly illusory, for certainly we had to strain our eyes very hard to see anything at all. So that our main contention can hardly be that the science of today has a pronouncement to make, perhaps it ought rather to be that science should leave off making pronouncements: the river of knowledge has too often turned back on itself. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 151-152]

MAX PLANCK (1858- 1947)

- It was Max Planck's bold, brilliant, daring, and wholly unprecedented leap of genius that, in 1900, ushered in the entire quantum revolution, for it was Planck who hit upon the idea that nature is not continuous, but rather comes in discrete packets or quanta. Justly regarded as the father of modern quantum theory, Planck was awarded the Nobel Prize in Physics in 1918. Of Planck, who was deeply respected and loved by all his colleagues, Albert Einstein had these memorable words: "The longing to behold harmony is the source of the inexhaustible patience and perseverance with which Planck has devoted himself to the most general problems of our science, refusing to let himself be diverted to more grateful and more easily attained ends. I have often heard colleagues try to attribute this attitude of his to extraordinary will-power and discipline-wrongly, in my opinion. The state of mind which enables a man to do work of this kind is akin to that of the religious worshipper or the lover; the daily effort comes from no deliberate intention or program, but straight from the heart. There he sits, our beloved Planck, and smiles inside himself at my childish playing-about with the lantern of Diogenes. Our affection for him needs no thread-bare explanation. May the love of science continue to illumine his path in the future and lead him to the solution of the most important problems in present-day physics, which he has himself posed and done so much to solve." ... The following sections are taken from *Where Is Science Going?* (New York: Norton, 1932). [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 157]

17- The Mystery of Our Being

- [In the German philosophic tradition in which Planck is writing, the term "ego" means "the I," or the inward sense of "I-ness" constituting your sense of self. It doesn't mean "egotistical," but rather that irreducible, immediate, inward sense of consciousness or awareness.-Ed. Note] It is a small point in the universal realm of being, but, in itself, it is a whole world, embracing our emotional life, our will, and our thought. This realm of the ego is, at once, the source of our deepest suffering and, at the same time, of our highest happiness. Over this realm, no outer power of fate can ever have sway, and we lay aside our own control and responsibility over ourselves only with the laying aside of life itself. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 160]
- And what holds good for the present moment of our being holds good also for our own future conduct in which the influences of our present ego plays a part. The road to the future always starts in the present. It is, here and now, part and parcel of the ego. And for that reason, the individual can never consider his own future purely and exclusively from the causal standpoint. That is the reason why fancy plays such a part in the construction of the future. It is in actual recognition of this profound fact that people have recourse to the palmist and the clairvoyant to satisfy their individual curiosity about their own future. It is also on this fact that dreams and ideals are based, and here the human being finds one of the richest sources of inspiration. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 160]
- Science thus brings us to the threshold of the ego and there leaves us to ourselves. Here it resigns us to the care of other hands. In the conduct of our own lives, the causal principle is of little help; for by the iron law of logical consistency, we are excluded from laying the causal foundations of our own future or foreseeing that future as definitely resulting from the present. . [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 161]
- the ethical fruit. Science enhances the moral values of life because it furthers a love of truth and reverence-love of truth displaying itself in the constant endeavor to arrive at a more exact knowledge of the world of mind and matter around us, and reverence, because every advance in knowledge brings us face

to face with the mystery of our own being. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 161]

"THE PURE RATIONALIST HAS NO PLACE HERE"

- Planck: The churches appear to be unable to supply that spiritual anchorage which so many people are seeking. And so the people turn in other directions. The difficulty which organized religion finds in appealing to the people nowadays is that its appeal necessarily demands the believing spirit, or what is generally called Faith. In an all-round state of skepticism this appeal receives only a poor response. Hence you have a number of prophets offering substitute wares. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 162]

- Murphy: Do you think that science in this particular might be a substitute for religion?

Planck: Not to a skeptical state of mind; for science demands also the believing spirit. Anybody who has been seriously engaged in scientific work of any kind realizes that over the entrance to the gates of the temple of science are written the words: Ye must have faith. It is a quality which the scientists cannot dispense with. The man who handles a bulk of results obtained from an experimental process must have an imaginative picture of the law that he is pursuing. He must embody this in an imaginary hypothesis. The reasoning faculties alone will not help him forward a step, for no order can emerge from that chaos of elements unless there is the constructive quality of mind which builds up the order by a process of elimination and choice. Again and again the imaginary plan on which one attempts to build up that order breaks down and then we must try another. This imaginative vision and faith in the ultimate success are indispensable. The pure rationalist has no place here. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 162]

- Murphy: How far has this been verified in the lives of great scientists? Take the case of Kepler, whose 300th anniversary we were celebrating, you remember, that evening when Einstein gave his lecture at the Academy of Science. Wasn't there something about Kepler having made certain discoveries, not because he set out after them with his constructive

imagination, but rather because he was concerned about the dimensions of wine barrels and was wondering which shapes would be the most economic containers?

Planck: These stories circulate in regard to nearly everybody whose name is before the public. As a matter of fact, Kepler is a magnificent example of what I have been saying. He was always hard up. He had to suffer disillusion after disillusion and even had to beg for the payment of the arrears of his salary by the Reichstag in Regensburg. He had to undergo the agony of having to defend his own mother against a public indictment of witchcraft. But one can realize, in studying his life, that what rendered him so energetic and tireless and productive was the profound faith he had in his own science, not the belief that he could eventually arrive at an arithmetical synthesis of his astronomical observations, but rather the profound faith in the existence of a definite plan behind the whole of creation. It was because he believed in that plan that his labor was felt by him to be worthwhile and also in this way, by never allowing his faith to flag, his work enlivened and enlightened his dreary life. Compare him with Tycho de Brahe. Brahe had the same material under his hands as Kepler, and even better opportunities, but he remained only a researcher, because he did not have the same faith in the existence of the eternal laws of creation. Brahe remained only a researcher; but Kepler was the creator of the new astronomy. Another name that occurs to me in this connection is that of Julius Robert Mayer. His discoveries were hardly noticed, because in the middle of last century there was a great deal of skepticism, even among educated people, about the theories of natural philosophy. Mayer kept on and on, not because of what he had discovered and could prove, but because of what he believed. It was only in 1869 that the Society of German Physicists and Physicians, with Helmholtz at their head, recognized Mayer's work. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 162-163]

- Murphy: You have often said that the progress of science consists in the discovery of a new mystery the moment one thinks that something fundamental has been solved. Planck: This is undoubtedly true. Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are part of

nature and, therefore, part of the mystery that we are trying to solve. Music and art are, to an extent, also attempts to solve or at least to express the mystery. But to my mind, the more we progress with either, the more we are brought into harmony with all nature itself. And that is one of the great services of science to be individual. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 163]

- Murphy: Goethe once said that the highest achievement to which the human mind can attain is an attitude of wonder before the elemental phenomena of nature.

Planck: Yes, we are always being brought face to face with the irrational. Else we couldn't have faith. And if we did not have faith but could solve every puzzle in life by an application of the human reason, what an unbearable burden life would be. We should have no art and no music and no wonderment. And we should have no science; not only because science would thereby lose its chief attraction for its own followers-namely, the pursuit of the unknowable-but also because science would lose the cornerstone of its own structure, which is the direct perception by consciousness of the existence of external reality. As Einstein has said, you could not be a scientist if you did not know that the external world existed in reality, but that knowledge is not gained by any process of reasoning. It is a direct perception and, therefore, in its nature akin to what we call Faith. It is a metaphysical belief. Now that is something which the skeptic questions in regard to religion, but it is the same in regard to science. However, there is this to be said in favor of theoretical physics, that it is a very active science and does make an appeal to the lay imagination. In that way it may, to some extent, satisfy the metaphysical hunger which religion does not seem capable of satisfying nowadays. But this would be entirely by stimulating the religious reaction indirectly. Science as such can never really take the place of religion. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 164]

WOLFGANG PAULI (1900 - 1958)

- In terms of sheer intellectual brilliance, Wolfgang Pauli was probably second to no physicist of this or any period (according to Max Born, Pauli's genius exceeded even that of Einstein). Intellectual sloppiness or logical

inconsistency would bring down the wrath of Pauli on the poor soul unfortunate enough to be its author. He was a brilliant and ruthless critic of ideas, and virtually every physicist of his generation looked to the mind of Wolfgang Pauli as one of the mandatory tests to pass if a theory had any chance of survival. Pauli's own positive contributions were profound and numerous, including the famous "exclusion principle" and the prediction of the existence of the neutrino some two decades before it was discovered. He received the Nobel Prize in Physics in 1945. In spite of, or rather precisely because of, Pauli's analytical and intellectual brilliance, he insisted that rationality had to be supplemented with the mystical. I had originally planned to include in this section Pauli's essay, "The Influence of Archetypal Ideas on Kepler's Construction of Scientific Theories," which sets forth his Platonic-Pythagorean worldview, and which was written in collaboration with C.G. Jung. But his lifetime friend and colleague, Werner Heisenberg, wrote a beautiful summary of Pauli's position, which is not only briefer but considerably more elegant reading, and so I have presented that instead ("Wolfgang Pauli's Philosophical Outlook," chapter 3 in *Across the Frontiers*). [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 167]

18- Embracing the Rational and the Mystical

- A first central topic of philosophical reflection for Pauli was the process of knowledge itself, especially that of natural knowledge, which ultimately finds its rational expression in the establishment of mathematically formulated laws of nature. Pauli was not satisfied with the purely empiricist view whereby natural laws can be drawn solely from the data of experience. He allied himself, rather, with those who "emphasize the role of intuition and the direction of attention in framing the concepts and ideas necessary for the establishing of a system of natural laws (i.e., a scientific theory)-ideas which in general go far beyond mere experience." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 170]
- He therefore sought for a connecting link between sense perceptions on the one hand and concepts on the other: All consistent thinkers have come to the conclusion that pure logic is fundamentally incapable of constructing such a linkage. The most satisfactory course, it seems, is to introduce at this point

the postulate of an order of the cosmos distinct from the world of appearances, and not a matter of our choice. Whether we speak of natural objects participating in the Ideas or of the behavior of metaphysical, i.e., intrinsically real things, the relation between sense perception and Idea remains a consequence of the fact that both the soul and what is known in perception are subject to an order objectively conceived. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 170]

- The scientific pursuit of knowledge led in the nineteenth century to the limiting concept of an objective material world, independent of all observation, while at the end point of the mystical experience there stands as a limiting situation the soul entirely divorced from all objects and united with the divine. Pauli sees Western thought as strung out, so to speak, between these two limiting ideas. "There will always be two attitudes dwelling in the soul of man, and the one will always carry the other already within it, as the seed of its opposite. Hence arises a sort of dialectical process, of which we know not wither it leads us. I believe that as Westerners we must entrust ourselves to this process, and acknowledge the two opposites to be complementary. In allowing the tension of the opposites to persist, we must also recognize that in every endeavor to know or solve we depend upon factors which are outside our control, and which religious language has always entitled 'grace.' " [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 172-173]
- Pauli came to think that in the abstract territory traversed by modern atomic physics and modern psychology, such a language could once more be attempted: For I suspect that the alchemistical attempt at a unitary psychophysical language miscarried only because it was related to a visible concrete reality. But in physics today we have an invisible reality (of atomic objects) in which the observer intervenes with a certain freedom (and is thereby confronted with the alternatives of "choice and sacrifice"); in the psychology of the unconscious we have processes which cannot always be unambiguously ascribed to a particular subject. The attempt at a psychophysical monism seems to me now essentially more promising, given that the relevant unitary language (unknown as yet, and neutral in regard to

the psychophysical antithesis) would relate to a deeper invisible reality. We should then have found a mode of expression for the unity of all being, transcending the causality of classical physics as a form of correspondence (Bohr); a unity of which the psychophysical interrelation, and the coincidence of a priori instinctive forms of ideation with external perceptions, are special cases. On such a view, traditional ontology and metaphysics become the sacrifice, but the choice falls on the unity of being. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 173-174]

- No better account could well be given of Pauli's attitude to this most general of questions than that which he himself has offered in the concluding section of his lecture on science and Western thought: I believe, however, that to anyone for whom a narrow rationalism has lost its persuasiveness, and to whom the charm of a mystical attitude, experiencing the outer world in its oppressive multiplicity as illusory, is also not powerful enough, nothing else remains but to expose oneself in one way or another to these intensified oppositions and their conflicts. Precisely by doing so, the inquirer can also more or less consciously tread an inner path to salvation. Slowly there then emerge internal images, fantasies or Ideas to compensate the outer situation, and which show an approach to the poles of the antitheses to be possible. Warned by the miscarriage of all premature endeavors after unity in the history of human thought, I shall not venture to make predictions about the future. But, contrary to the strict division of the activity of the human spirit into separate departments—a division prevailing since the nineteenth century—I consider the ambition of overcoming opposites, including also a synthesis embracing both rational understanding and the mystical experience of unity, to be the mythos, spoken or unspoken, of our present day and age. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 175]

SIR ARTHUR EDDINGTON: (1882 - 1944)

- Sir Arthur Eddington made important contributions to the theoretical physics of the motion, evolution, and internal constitution of stellar systems. He was one of the first theorists to grasp fully relativity theory, of which he became a leading exponent. No mere armchair theorist, Eddington led the famous expedition that photographed the solar eclipse which offered the first proof

of Einstein's relativity theory. For his outstanding contributions, he was knighted in 1930. The following sections are taken from *Science and the Unseen World* (New York: Macmillan, 1929), *New Pathways in Science* (New York: Macmillan, 1935), and *The Nature of the Physical World* (New York: Macmillan, 1929). Of all the physicists in this volume, Eddington was probably the most eloquent writer; with Heisenberg, the most accomplished philosopher; and with Schroedinger, the most penetrating mystic. Moreover, he possessed an exquisite intellectual wit, evidenced on almost every page of his writings (it sometimes takes the reader a while to realize just how humorous Eddington is being, so set your mind in that direction now). I have divided his topics into three rough sections, the first dealing with the shadowy limitations of physical science, the second with the necessity to equate the reality behind the shadows with consciousness itself, and the third, his famous defense of mysticism. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 179]

19- Beyond the Veil of Physics

- [before we enter into Eddington's sophisticated arguments, it is necessary to allow him to speak for himself as to what exactly he is, and especially is not, trying to accomplish. His masterpiece, *The Nature of the Physical World*, was so persuasive and eloquent on the themes of physics and mysticism that his actual conclusion—namely, that the two are dealing with entirely different issues and domains—was quickly overlooked by the public (and especially the theologians), and Eddington earned the wholly undeserved reputation of claiming that the new physics supported (or even offered proof for) a mystical worldview. This rankled Eddington no end, for it was exactly the opposite of his views. When Bertrand Russell unleashed his considerable philosophic wit on Eddington's supposed derivation of mysticism from physics, Sir Arthur could no longer contain himself, and, in *New Pathways in Science*, Eddington answered sharply:] My last round will be with Bertrand Russell. I think that he, more than any other writer, has influenced the development of my philosophical views, and my debt to him is great indeed. But this is necessarily a quarrelsome chapter, and I must protest against the following accusation: Sir Arthur Eddington deduces religion from the fact that atoms do not obey the laws of mathematics. Sir James Jeans

deduces it from the fact that they do. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 181]

- One might have regarded the foregoing as a casual sacrifice of accuracy to epigram, but other passages make the same kind of accusation: It will be seen that Eddington, in this passage, does not infer a definite act of creation by a Creator. His only reason for not doing so is that he does not like the idea. The scientific argument leading to the conclusion which he rejects is much stronger than the argument in favour of free will, since that is based on ignorance, whereas the one we are now considering is based upon knowledge. This illustrates the fact that the theological conclusions drawn by scientists from their science are only such as please them, and not such as their appetite for orthodoxy is insufficient to swallow, although the argument would warrant them. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 182]
- Memories are short, and one man is sometimes saddled with another man's opinions. It seems worthwhile, therefore, to give quotations showing how completely Russell has misstated my view of the relation of science and religion. I think that every book or article in which I have touched on religion is represented in these extracts, except an early essay which does not provide a passage compact enough to quote. The starting-point of belief in mystical religion is a conviction of significance or, as I have called it earlier, the sanction of a striving in the consciousness. This must be emphasised because appeal to intuitive conviction of this kind has been the foundation of religion through all ages and I do not wish to give the impression that we have now found something new and more scientific to substitute. I repudiate the idea of proving the distinctive beliefs of religion either from the data of physical science or by the methods of physical science. (The Nature of the Physical World, p. 333.) [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 182]
- The lack of finality of scientific theories would be a very serious limitation of our argument, if we had staked much on their permanence. The religious reader may well be content that I have not offered him a God revealed by the quantum theory, and therefore liable to be swept away in the next scientific

revolution. (The Nature of the Physical World, p. 353.) [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 183]

- It is probably true that the recent changes of scientific thought remove some of the obstacles to a reconciliation of religion with science, but this must be carefully distinguished from any proposal to base religion on scientific discovery. For my own part, I am wholly opposed to any such attempt. (Science and the Unseen World, p. 45.) [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 183]
- The passages quoted by Mr. Cohen make it clear that I do not suggest that the new physics "proves religion" or indeed gives any positive grounds for religious faith. But it gives strong grounds for an idealistic philosophy which, I suggest, is hospitable towards a spiritual religion, it being understood that the guest must provide his own credentials. In short, the new conception of the physical universe puts me in a position to defend religion against a particular charge, viz. the charge of being incompatible with physical science. It is not a general panacea against atheism. If this is understood, . . . it explains my "great readiness to take the present standing of certain theories of physics as being final"; anybody can defend religion against science by speculating on the possibility that science may be mistaken. It explains why I sometimes take the essential truth of religion for granted; the soldier whose task is to defend one side of a fort must assume that the defenders of the other side have not been overwhelmed. (Article in The Freethinker). [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 183]
- I now turn to the question, what must be put into the skeleton scheme of symbols. I have said that physical science stands aloof from this transmutation, and if I say anything positive on this side of the question it is not as a scientist that I claim to speak. (Broadcast Symposium, Science and Religion). [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 183]
- [Eddington's point, as the following sections will make much clearer, is that physics-classical or quantum-can in no way offer positive support or even

encouragement for a religious-mystical worldview. It is simply that, whereas classical physics was theoretically hostile to religion, modern physics is simply indifferent to it-it leaves so many theoretical holes in the universe that you may (or may not) fill them with religious substance, but if you do, it must be on philosophic or religious grounds. Physics cannot help you in the least, but it no longer objects to your efforts. This is what Eddington meant by, "If I interpret the present situation rightly, a main-line signal which had been standing at danger has now been lowered. But nothing much is going to happen unless there is an engine." Physics does not support mysticism, but it no longer denies it, and that, Eddington felt, opened a philosophic door to Spiritbut mysticism, not physics, must provide the "engine." Eddington's view, which I fully endorse, would indeed be extremely good news-there is no longer any major physical-theoretical objection to spiritual realities-had not the new-age writers promised us the moon with "proofs" of mysticism from physics. Many people are therefore disappointed or let down by the apparently thin or weak nature of Eddington's pronouncement, whereas, in fact, this view-which is supported by virtually every theorist in this volume-is probably the strongest and most revolutionary conclusion vis a vis religion that has ever been "officially" advanced by theoretical science itself. It is a monumental and epochal turning point in science's stance towards religion; it seems highly unlikely it will ever be reversed, since it is logical and not empirical in nature (or a priori and not a posteriori); therefore, it, in all likelihood, marks final closure on that most nagging aspect of the age-old debate between the physical sciences and religion (or the geistsciences). What more could one possibly want?] [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 184]

- Einstein's law, in its analytical form, is a statement that in empty space certain quantities called potentials obey certain lengthy differential equations. We make a memorandum of the word "potential" to remind us that we must later on explain what it means. We might conceive a world in which the potentials at every moment and every place had quite arbitrary values. The actual world is not so unlimited, the potentials being restricted to those values which conform to Einstein's equations. The next question is: What are potentials? They can be defined as quantities derived by quite simple mathematical

calculations from certain fundamental quantities called intervals. (mem. Explain "interval.") [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 186]

- But I would say that when from the human heart, perplexed with the mystery of existence, the cry goes up, "What is it all about?" it is no true answer to look only at that part of experience which comes to us through certain sensory organs
- and reply: "It is about atoms and chaos; it is about a universe of fiery globes rolling on to impending doom; it is about tensors and non-commutative algebra." Rather, it is about a spirit in which truth has its shrine, with potentialities of self-fulfillment in its response to beauty and right. Shall I not also add that even as light and colour and sound come into our minds at the prompting of a world beyond, so these other stirrings of consciousness come from something which, whether we describe it as beyond or deep within ourselves, is greater than our own personality? It is the essence of religion that it presents this side of experience as a matter of everyday life. To live in it, we have to grasp it in the form of familiar recognition and not as a series of abstract scientific statements. The man who commonly spoke of his ordinary surroundings in scientific language would be insufferable. If God means anything in our daily lives, I do not think we should feel any disloyalty to truth in speaking and thinking of him unscientifically, any more than in speaking and thinking unscientifically of our human companions. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 190]
- The Definition of Reality. It is time we came to grips with the loose terms Reality and Existence, which we have been using without any inquiry into what they are meant to convey. I am afraid of this word Reality, not connoting an ordinarily definable characteristic of the things it is applied to but used as though it were some kind of celestial halo. It is, of course, possible to obtain consistent use of the word "reality" by adopting a conventional definition. My own practice would probably be covered by the definition that a thing may be said to be real if it is the goal of a type of inquiry to which I personally attach importance. But if I insist on no more than this I am whittling down the significance that is generally assumed. In

physics, we can give a cold scientific definition of reality which is free from all sentimental mystification. But this is not quite fair play, because the word "reality" is generally used with the intention of evoking sentiment. It is a grand word for a peroration. "The right honourable speaker went on to declare that the concord and amity for which he had unceasingly striven had now become a reality (loud cheers)." The conception which it is so troublesome to apprehend is not "reality" but "reality (loud cheers)." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 190-191]

20- Mind-Stuff

- The mind-stuff is not spread in space and time; these are part of the cyclic scheme ultimately derived out of it. But we must presume that in some other way or aspect it can be differentiated into parts. Only here and there does it rise to the level of consciousness, but from such islands proceeds all knowledge. Besides the direct knowledge contained in each self-knowing unit, there is inferential knowledge. The latter includes our knowledge of the physical world. It is necessary to keep reminding ourselves that all knowledge of our environment from which the world of physics is constructed, has entered in the form of messages transmitted along the nerves to the seat of consciousness. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 200]
- The mind-stuff is the aggregation of relations and relata which form the building material for the physical world. Our account of the building process shows, however, that much that is implied in the relations is dropped as unserviceable for the required building. Our view is practically that urged in 1875 by W. K. Clifford: "The succession of feelings which constitutes a man's consciousness is the reality which produces in our minds the perception of the motions of his brain." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 200]
- That is to say, that which the man himself knows as a succession of feelings is the reality which when probed by the appliances of an outside investigator affects their readings in such a way that it is identified as a configuration of brain-matter. Again Bertrand Russell writes: What the physiologist sees

when he examines a brain is in the physiologist, not in the brain he is examining. What is in the brain by the time the physiologist examines it if it is dead, I do not profess to know; but while its owner was alive, part, at least, of the contents of his brain consisted of his percepts, thoughts, and feelings. Since his brain also consisted of electronics, we are compelled to conclude that an electron is a grouping of events, and that if the electron is in a human brain, some of the events composing it are likely to be some of the "mental states" of the man to whom the brain belongs. Or, at any rate, they are likely to be parts of such "mental states"-for it must not be assumed that part of a mental state must be a mental state. I do not wish to discuss what is meant by a "mental state"; the main point for us is that the term must include percepts. Thus a percept is an event or a group of events, each of which belongs to one or more of the groups constituting the electrons in the brain. This, I think, is the most concrete statement that can be made about electrons; everything else that can be said is more or less abstract and mathematical. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 200-201]

- It is difficult for the matter-of-fact physicist to accept the view that the substratum of everything is of mental character. But no one can deny that mind is the first and most direct thing in our experience, and all else is remote interference-inference either intuitive or deliberate. Probably it would never have occurred to us (as a serious hypothesis) that the world could be based on anything else, had we not been under the impression that there was a rival stuff with a more comfortable kind of "concrete" reality-something too inert and stupid to be capable of forging an illusion. The rival turns out to be a schedule of pointer readings, and, though a world of symbolic character can well be constructed from it, this is a mere shelving of the inquiry into the nature of the world of experience. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 202]
- We try to express much the same truth when we say that the physical entities are only an extract of pointer readings and beneath them is a nature continuous with our own. But I do not willingly put it into words or subject it to introspection. We have seen how in the physical world the meaning is greatly changed when we contemplate it as surveyed from without instead

of, as it essentially must be, from within. By introspection we drag out the truth for external survey, but in the mystical feeling the truth is apprehended from within and is, as it should be, a part of ourselves. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 207]

Symbolic knowledge and intimate knowledge

- we shall have lost all inclination we may ever have had to laugh at it. It simply does not do to expose the inner workings of a joke. The classification concerns a symbolic knowledge of humour which preserves all the characteristics of a joke except its laughableness. The real appreciation must come spontaneously, not introspectively. I think this is a not unfair analogy for our mystical feeling for Nature, and I would venture even to apply it to our mystical experience of God. There are some to whom the sense of a divine presence irradiating the soul is one of the most obvious things of experience. In their view, a man without this sense is to be regarded as we regard a man without a sense of humour. The absence is a kind of mental deficiency. We may try to analyse the experience as we analyse humour, and construct a theology, or it may be an atheistic philosophy, which shall put into scientific form what is to be inferred about it. But let us not forget that the theology is symbolic knowledge, whereas the experience is intimate knowledge. And as laughter cannot be compelled by the scientific exposition of the structure of a joke, so a philosophic discussion of the attributes of God (or an impersonal substitute) is likely to miss the intimate response of the spirit which is the central point of the religious experience. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 208]

21- Defense of Mysticism

- A DEFENCE OF THE MYSTIC might run something like this. We have acknowledged that the entities of physics can from their very nature form only a partial aspect of the reality. How are we to deal with the other part? It cannot be said that that other part concerns us less than the physical entities. Feelings, purpose, values, make up our consciousness as much as sense impressions. We follow up the sense impressions and find that they lead into an external world discussed by science; we follow up the other elements of our being and find that they lead not into a world of space and time, but surely

somewhere. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 209]

- The mystic, if haled before a tribunal of scientists, might perhaps end his defence on this note. He would say: "The familiar material world of everyday conception, though lacking somewhat in scientific truth, is good enough to live in; in fact, the scientific world of pointer readings would be an impossible sort of place to inhabit. It is a symbolic world and the only thing that could live comfortably in it would be a symbol. But I am not a symbol; I am compounded of that mental activity which is, from your point of view, a nest of illusion, so that to accord with my own nature I have to transform even the world explored by my senses. But I am not merely made up of senses; the rest of my nature has to live and grow. I have to render account of that environment into which it has its outlet. My conception of my spiritual environment is not to be compared with your scientific world of pointer readings; it is an everyday world to be compared with the material world of familiar experience. I claim it as no more real and no less real than that. Primarily, it is not a world to be analysed, but a world to be lived in." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 210]
- If the defence may be considered to have held good against the first onslaught, perhaps the next stage of the attack will be an easy tolerance. "Very well. Have it your own way. It is a harmless sort of belief-not like a more dogmatic theology. You want a sort of spiritual playground for those queer tendencies in man's nature, which sometimes take possession of him. Run away and play then, but do not bother the serious people who are making the world go round." [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 210]

REALITY AND MYSTICISM

- Reality seems to concern religious beliefs much more than any others. No one bothers as to whether there is a reality behind humour. The artist who tries to bring out the soul in his picture does not really care whether and in what sense the soul can be said to exist. Even the physicist is unconcerned as to whether atoms or electrons really exist; he usually asserts that they do, but, as we have seen, existence is there used in a domestic sense and no inquiry

is made as to whether it is more than a conventional term. In most subjects (perhaps not excluding philosophy), it seems sufficient to agree on the things that we shall call real, and afterward try to discover what we mean by the word. And so it comes about that religion seems to be the one field of inquiry in which the question of reality and existence is treated as of serious and vital importance. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 211]

- Dr. Johnson felt himself getting tied up in argument over "Bishop Berkeley's ingenious sophistry to prove the non-existence of matter, and that everything in the universe is merely ideal," he answered, "striking his foot with mighty force against a large stone, till he rebounded from it, 'I refute it thus.' " [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 212]
- The conflict [between science and religion] will not be averted unless both sides confine themselves to their proper domain, and a discussion which enables us to reach a better understanding as to the boundary should be a contribution towards a state of peace. There is still plenty of opportunity for frontier difficulties; a particular illustration will show this. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 219]
- A belief not, by any means, confined to the more dogmatic adherents of religion is that there is a future non-material existence in store for us. Heaven is nowhere in space, but it is in time. (All the meaning of the belief is bound up with the word future; there is no comfort in an assurance of bliss in some former state of existence.) On the other hand, the scientist declares that time and space are a single continuum, and the modern idea of a Heaven in time but not in space is, in this respect, more at variance with science than the pre-Copernican idea of a Heaven above our heads. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 219-220]

MYSTICAL RELIGION

- We have seen that the cyclic scheme of physics presupposes a background outside the scope of its investigations. In this background we must find, first, our own personality, and then perhaps a greater personality. The idea of a

universal Mind or Logos would be, I think, a fairly plausible inference from the present state of scientific theory; at least it is in harmony with it. But if so, all that our inquiry justifies us in asserting is a purely colourless pantheism. Science cannot tell whether the world-spirit is good or evil, and its halting argument for the existence of a God might equally well be turned into an argument for the existence of a Devil. [Ken Wilber: *Quantum Questions, Mystical Writings of the World's Great Physicists*, Shambhala, Boston, 2001. P 221]

الحمد لله الذي بنعمته تتم الصالحات