

# TO BE, OR NOT TO BE?

## [Continued]

### II: How are psi and physical concepts related?

Scientists developing physical theories of psi have so far employed quite a wide scope of methods. Their theoretical attempts range from considering physics to have solved the philosophical problem of perception (Whiteman, 1977, p.744) to basing consciousness on 'hidden variables' in quantum mechanics as E.H. Walker has done. However, the common element in all of these theories seems to be either proposing analogies between psi and variables or quantities already known in physics or inventing wholly new physical variables and quantities to account for psi. Clearly, the better method is demonstrating parallels between ideas in modern physics and phenomena in parapsychology and thus explaining the physical aspects of psi by analogy. In some cases, the analogies and parallels have led directly to physical theories while in others they were introduced only as explanatory devices used to pinpoint philosophical problems inherent in both disciplines and demonstrate that the existence of psi is not so unthinkable given the anomalies, paradoxes and unknowns in present day physics. The ultimate goal of all such analogies is to lead to theories and if they do not do so then they are of no real value in science.

In the first case we have analogies that have already resulted in physical theories of psi. 'Hidden variables' were first suggested in physics by David Bohm to bring the principles of causality and determinism into line with quantum theory. Walker later attempted to reduce consciousness to a theory involving these 'hidden variables.' He reasons "since the hidden variables are unlocalizable in the brain or outside, and are not accessible to physical measurement, they are taken to correspond to paranormal faculties of consciousness." (Whiteman, 1977, p.751) Haakon Forwald has taken another path and drawn analogies between gravitation which seems to be non-energetic (in that it depends on geometry or is non-particulate, therefore not subject to the same space-time limits as moving particles) and the fact that an object thrown in a gravitational field (disregarding friction) travels in a parabola to psi's apparent failure to conform to space-time limits (as electromagnetic waves do) and a parabola he has obtained when graphing the results of his PK-dice throwing experiments. Meanwhile, Adrian Dobbs has drawn an analogy between psi and the physics of physical communication in which information is exchanged in the order of five elements: Information, input to transmitter, channel, receiver of information, and output of receiver. These are only a few examples of how analogies between psi and physical quantities have led to some theories of psi.

Among others, both Henry Margenau (Margenau, p.244) and Dobbs (Dobbs, p.217) have drawn analogies between virtual particles and psi, either as being subject to physical laws and not directly observable or measurable or as entities invented to fill a gap in physical laws. In quantum electrostatics and elementary particle physics, the

conservation of energy is necessarily breached. In order to overcome this difficulty virtual particles or processes have been invoked since they do not conserve energy, follow no ordinary laws, are confined to extremely short durations and surround all charged particles such as electrons as clouds of unobservable virtual photons. Philosophically, these may correspond to psi processes that are also unobservable or unmeasurable. And, like psi particles and or psi processes, whatever form the carrier of psi might eventually take, they seem to exist while remaining so elusive as to defy direct detection while breaching known physical laws. Another idea in physics that seems to bear some relevance to psi is the concept of a phase velocity versus a group velocity. When studying the mathematical model of wave phenomena, these two velocities are derived from the relationship  $uv=c^2$ , where  $v$  is the wave velocity and  $u$  the group velocity. The wave velocity is physically real and must have a value less than  $c$ , the velocity of light, whereas the group velocity, or velocity of the wave packet as a whole, must be greater than  $c$  and thus can have no physical existence given the present state of physics. In this case of group velocity, we have a real entity (mathematically) that has no physical counterpart. This idea bears a similarity to psi that has so far gone undetected in its own right, but is only known by its resulting interaction with matter, energy and thoughts.

William Roll enumerates six areas that deserve special mention among the many similarities between psi and physical processes: (a) association with physical objects, (b) structural unity and organization, (c) interaction with physical systems, (d) statistical character of phenomena, (e) apparent action at a distance, and (f) apparent cause-effect reversal. (Roll, p.39) But these are only several among the many similarities, analogies and parallels. The important point being that "there does exist" an interaction between psi and physical processes and therefore there exists some relation to physical laws and theories.

Physics itself is quite different now than it was a century ago. As physics has developed, some of its basic ideas have become increasingly difficult to grasp as well as impossible to visualize. This fact offers perhaps the greatest analogy to parapsychology, where a mind can supposedly influence a material object without the physical contact of a body, machine or physical entity, defying spatial limits and can predict an event in the future defying temporal limits and causality. These concepts are just as difficult to grasp and visualize, as are some of the new and paradoxical results of modern physics.

The most evident point of a connection between the paranormal and the physical comes in the case of PK phenomena. With PK we have direct physical reactions, which seem to occur through the actions of thought only. Therefore, PK cannot be separated from the physical theories or laws and may be the easiest door to developing a complete physical theory of psi. Several scientists have developed PK experiments for the specific goal of developing a physical theory of psi. However, there are a great many diverse results attributed to PK, which would necessarily have to be explained by a complete theory. "Any sufficiently generalized PK hypothesis must produce first principles capable of accounting for not only the physical forces acting paranormally on tumbling dice in obedience to conscious or unconscious volitions, but also for the rumored potent

influence exercised by Uri Geller and Vinogradova on electric and magnetic fields, by Nina Kulagina on floating hydrometers and Crookes' radiometers, and by Jurgenson on magnetic tape, as well as for some puzzling results of 'laying on of hands,' for the alleged paranormal effects of fungus cultures ..., for the claimed phenomena of thoughtography ..., and for massive psi healing running contrary to medical precepts. (Whiteman, 1977, p.807) Therefore, a theory such as Forwald's which bases PK phenomena on gravitational effects in atomic nuclei, although a noteworthy beginning, is only that, a beginning, since it only seeks to explain the PK effects as an influence on rolling dice and does not directly address any other kind of PK phenomena.

Yet PK is only one side of the story of psi. We still have to consider ESP. Here we have no direct physical results as we do with PK and therefore a physical theory is not so easily implied. Psi phenomena seem to have some independence of time, which proves to be one of the most difficult of its aspects to assimilate into any physical theories. This property bears directly on precognition, or foreknowledge of an event or object's existence, which is one manifestation of ESP. Precognition flies in the face of our everyday experience of nature so there are many common sense objections to precognition. (Rao, pp.164-165) For example, how is it possible to know of an event or object before its existence? Or, in order for the foreknowledge of the event or object to be precognitive rather than inferential, there can be no causal connection. Precognition also implies a predetermined future, which seems contrary to our basic ideas of free will. Of these three simple objections to precognition, the causal objection is the most difficult to cope with in a physical theory, yet precognition is not completely without any physical analogies.

In the classical worldview "everything in nature is characterized by a precise position and a precise time in a unique space and a unique time." (Whiteman, 1973, p.348) It is then assumed that is all if these positions and times were known everything else in the future could be predicted. This view, first expressed by Simone de Laplace two centuries ago, represents the classical deterministic or naturalistic view to which modern physics no longer adheres and to which many parapsychologists such as Price tend to wrongly relegate any physical theory or concept of psi. A physical theory of psi based at least in either the higher level of modern physics or the physics of the future would seem to be in order, but still a physical theory in every sense of the word.

In quantum mechanics causality also disappears as chance takes over and probabilities reign over future events. In field theory, proponents of the fundamental reality of the space-time continuum point out that we cannot use verb tenses when speaking in terms of the fourth dimension, but must only use the present tense since past and future tenses denote a comparison of time of events which does not exist in the space-time continuum. This indicates that our ideas of causality may also fail in dimensions higher than the three that we normally sense. Harold Puthoff and Russell Targ note "the idea that 'causality' is a fact observed in our lives or in the laboratory and not a law of the universe," and therefore feel that precognition will be the least difficult aspect of ESP to assimilate with contemporary physics. (Puthoff and Targ, p.525) One theory of psi that they have suggested is based on a symmetrical argument that if one is

sufficiently close in time to an event, the event, even before it happens, can be perceived just as it could be at a point in time after the event. Even in basic electromagnetic theory, solutions to equations yield waves traveling both forward and backward in time, but the back traveling solutions are usually discarded as physically impossible. Does this act represent truth or the bias of our limited notion of reality? This notion that precognition can be easily assimilated in physics is contrary to C.T.K. Chari's opinion that precognition "calls for an unprecedented revolution in our modes of interpreting the status and functions of symbol-using sentient organisms in the universe." (Chari, 1974, p.5) Thus, there is some evidence that precognition may be adaptable to physics, but not without grave difficulties and changes in the scientific attitude toward time as well as cultural attitudes toward nature.

Psi phenomena also seem to flaunt our common concept of causality, which is basic to the mechanistic, deterministic (Whiteman's one-level) worldview. For two events to be connected causally, they cannot be farther apart in space than the distance light would travel in the time between the events. In other words, when two events happen completely independent of each other, they cannot cause each other if they happen at the exact same instant, because the effects of one would be unknown to the other until a material signal could travel between them at the speed of light or slower. Quantum mechanics, because it is based on the probability of occurrences, also fails to conform to causality, and "it is now being realized that general relativity embodies causality violations also." (O'Regan, p.455) This failure of causality may be used as a point of convergence for physics and parapsychology.

Inevitably, the question whether causality is a basic principle in the universe or only an observed fact of experimentation (until recently) and daily observation arises. Causality assumes a forward movement of time, yet Ya. P. Tertelskii (O'Regan, p.455), B. Brier (Whiteman, 1977, p.809) and others state that there is no preferential direction for the flow of time. As a consequence of this a "backwards causation" would not be logically incoherent or impossible. Bob Brier and Maithili Schmidt-Raghavan have met the problem of causality and precognition head on and argued from philosophical premises that 'backward causation' is possible. While their belief in 'backward causation' can be traced to experimental results, their explanation of those results involves "a revision of the concept of causation." (Brier and Schmidt-Raghavan, p.243) Quite simply, they believe that "it is possible for causes to come after their effects ... ." (Brier and Schmidt-Raghavan, p.244) This atemporal view is based upon two separate theses. First, that there is no 'temporal priority' for assuming that acts must be linked causally from past to present. And secondly, if no logical contradictions occur from assuming this backwards causation, then it is a logical possibility that science must deal with. (Brier and Schmidt-Raghavan, p.246) A scientific explanation of precognition then becomes a simple matter, given this view of 'backward causation.'

Harold Puthoff and Russell Targ have also noted that "in physics, everything that is 'not' forbidden occurs" which allows a flow of information backwards in time, a fact which can be used to explain precognition. (Puthoff and Targ, p.526) Helmut Schmidt has also found with the results of precognition and PK tests that "the future can directly

affect the present in a manner quite inconsistent with our notions about the order of nature in terms of causes and effects." (Schmidt, p.302) Causality as it is presently conceived in physics has little significance for the parapsychologist. Perhaps then, as modern physics begins to question the basis of causality as gap is being made for a linking of psi with physics; not the 'materialistic,' deterministic, mechanistic and one-level, 'naturalistic' physics which most people assume physics to represent, but the most advanced physics of today and tomorrow. This gap may very well be filled by a physical theory of psi, thus breaking parapsychology out of its bondage to a state of prematurity.

However, there may be precedents to precognition within modern physics that are far more fundamental than these previous arguments suggest. Margenau states that "no physical theory is qualified ... to say anything about the structure of subjective time. Physics deals with measured, objective time, which means the construct." (Margenau, pp.222-223) Therefore we can see that there are two levels of time that precognition has to deal with, objective physical time and subjective conscious time. Richard Feynman has theorized on the objective level that positrons may be electrons that follow trajectories in which the time-axis is reversed. So, there is a definite physical possibility of a negative direction of time which would be conducive, if only philosophically, to arguments for precognition.

There is still another phenomenon associated with quantum theory that bears a striking similarity with various psi related phenomena. This phenomenon is generally called the tunneling effect. In the tunneling effect, particles can exit potential wells even though they do not have sufficient energy necessary to exit the wells from a Newtonian point of view. In other words, under the proper conditions, as described by quantum mechanics, material particles can change their positions in a strictly non-Newtonian manner, even if that change includes moving through physical barriers. In ESP, information is transferred between locations and in PK objects are moved in similar non-Newtonian manners. The same could be said for the case of precognition whereby the tunneling effect may represent information moving backward in time rather than space. The tunneling effect is a widely known and accepted phenomenon explaining everything from nuclear decay to the transition of electrons between different energy levels in an atom. Over a century ago, under different circumstances, Ernst Mach stated that he would not consider a hyperspatial explanation of spiritualistic phenomena unless objects began to pop into and out of space. It would now seem that objects, at least in the form of elementary particles, do exactly that as explained by the tunneling effect.

While considering the other manifestations of ESP, such as clairvoyance and telepathy, C.W.K. Mundle places a heavy distinction between the two rather than stressing their similarities. (Mundle, pp.207-208) He assumes that if all forms of ESP were reducible to telepathy, where telepathy is ESP whose source is in the mind or 'brain' of another person, clairvoyance could not be so reduced and must be defined as ESP whose source is physical objects other than another person's brain. Thus, to him it would seem "possible TO REFORMULATE Physics to accommodate telepathy..., but well nigh impossible to do this for clairvoyance." (Mundle, p.207) So an explanation of clairvoyance would necessitate a major revolution in physics. (Mundle, p.203) Yet it

might also seem that if clairvoyance were defined as Mundle has stated, it would rather be easier to assimilate it into physics since there is a physical connection where the source is an inanimate physical object as opposed to an animate physical object such as 'the brain.' This does not, of course, preclude the fact that both of these aspects may not prove possible to assimilate in modern physics without further advances in modern physics.

Some scientists have adopted the name of paraphysics to denote the adaptation of parapsychology to physics, but many scientists do not seem to accept this new branch of physics regardless of their personal attitudes toward the reality of psi phenomena or the possibility of a physical interpretation of psi. Paraphysics is simply the study of the physics of paranormal processes. Yet even this simple definition is embedded with controversy. Part of the controversy stems from the fact that the definition "may seem to imply primacy of the physical processes in which the meta-physical and its relationship to the physical is clearly what is actually at issue." In simpler terms, it comes to the same old argument of mind versus matter and whether or not mind can be reduced matter and motion through physics. (O'Regan, p.449) J.G. Pratt's claim that paraphysics "seems to be based upon the existence of unsolved mysteries about the living organism and the hope that modern electronic technology will allow science to move more rapidly in directions in which progress until now has been very slow" (Pratt, Review, p.69) is undeserved. This attitude seems to beg the question of whether or not Pratt seems to think that the only contribution physics can make to psi research is by lending electronic equipment to attempts to solve the mysteries of living organisms. Any science (including physics) that puts itself above other sciences runs the possibility of slipping into a stagnant discipline reeking of scholasticism and unwarranted dogma. Whether a new branch of science called paraphysics evolves or psi is incorporated directly into physics is not important. As long as physics contributes everything it can to help psi research in a progressive manner, the scientific study of psi can only be enhanced.

The fact that there is an argument over so little an issue as to whether or not it is proper to adopt the name of paraphysics to a new branch of physics only emphasizes how little has been done along a physical line regarding psi. There seems to be an attempt to consider all the physical theories together with a view to ascertaining their scientific status. The only attempts made have been by K.R. Rao (in a single chapter of his book) and by Hans Bender (Chari, 1977, p.803), as unsystematic and incomplete as they are. This makes it especially difficult for anyone interested in physical theories of psi to gain information on previous work done along this line.

J.H.M. Whiteman claims that there are vast amounts of research literature dealing with psi in relation to physical concepts or techniques, but further notes that these lack the mathematical rigor and philosophical analysis needed to throw light on the experimental evidence. (Whiteman, 1977, p.730) The truth of this statement depends on how the word 'vast' is defined. There are many scattered papers, but few offer more than speculations regarding a physical theory of psi and fewer still offer actual theories or the bases upon which such theories can be built. One problem is the lack of trained physicists entering a career in parapsychology. Pratt noted during the 1960s that only two trained

physicists who had actually made careers in psi research: R.A. McConnell and J.H. Rush both entered the psi arena three decades earlier. And only two physicists, Pasqual Jordan and Margenau have ventured to offer their explicit views on psi research. (Pratt, 1974, pp.136-137) However, there seems to be much more activity recently in this area with such men as Whiteman, Chari and Forwald, among others, entering the field of the study of paranormal phenomena during the 1960s and Puthoff, Targ, Edwin May, Jack Sarfatti, Brian Josephson and others entering during the 1970s and thereafter.

Hopefully, as more people with a background in both physics and parapsychology come forward, parapsychology and physics will come closer together to their mutual benefit. As of yet, no theory has been adequately confirmed and no known physical theory that covers, even in principle, the manifold aspects of psi, even exists. (Chari, 1974, p.1) This lack of any ideas regarding the whole collection of psi phenomena emphasizes the inadequacy of our present understanding of psi. May has even gone so far as to suggest that the term 'psi' has never been adequately defined. So he prefers to use the phrases 'anomalous cognition' and 'anomalous phenomena' to replace ESP and psi phenomena. Yet a further refinement of the term 'psi' would seem to mark the progress of science so the abandonment of the term seems far too extreme, at least until more is known of the phenomena associated with psi.

Chari has suggested, "instead of asking whether present-day physics can contribute to a new understanding of psi, it may be more profitable for us to ask whether psi can hint at some reinterpretation of present-day physical theory." (Chari, 1974, p.5) In this sense, the term paraphysics may have more meaning if we go far enough beyond the body of physics to the point where we couldn't consider the change just a new paradigm of physics independent of anything else. If we consider that psi interacts with natural physical order, psi may be something beyond our reckoning and our present physics, but also of our physics in its normal interactions with nature. Before we do this we must make sure that we do not limit our inquiries and decisions on psi to the present state of physics. Price has done so by claiming that any "physicalist" theory must be attributed to a physical radiation. An attitude such as this is disastrous in its dogmatism and has shown the possibility that past ideas about psi and its relationship to physics as well as other sciences may suffer from a shared inherent weakness. "This is the fact that these efforts provide models for psi phenomena that are derived from existing scientific paradigms, and this is a crippling weakness if it should be the case that an adequate theory for psi will only be achieved by breaking free from the limitations of familiar frameworks of thought and boldly facing the challenges of the findings." (Pratt, 1974, p.151)

Whiteman follows a similar line of reasoning by considering a one-level universe of impersonal cause and effect, which he regards as a 'naturalistic' worldview. Price's assumption that psi can only be attributed to a physical radiation seems to conform to this low level interpretation of the phenomena, even though physics had already progressed beyond that level in its own delvings into the strange realms of the microcosm and macrocosm and the concepts which are found therein before he made the statement. As a parapsychologist, rather than a physicist, Price would not have been privy to all the latest advances in physics when he made his statement. That is the primary reason why

physical theories of psi as well as statements regarding the physical nature of psi should be left to the physicists and those parapsychologists who have taken the time to delve into the finer aspects of modern physics.

The assumption is wrongly made by many non-physicists that modern physics is naturalistic or one-level deterministic which would demand an explanation of psi along the lines of a very mechanistic physical world, but many physical scientists and philosophers believe this naturalistic worldview to have been overthrown. This makes it clear that "the task for parapsychology, in countering attacks on its alleged 'non-physical' character, is not to try to devise naturalistic explanations, but to show how the critics might see that parapsychology is compatible with modern physics, if only they knew enough about both." (Whiteman, p.2) Thus, it remains possible that psi can be completely explained in a physical theory as long as 'physical' is not limited to a single view of reality when this view is assumed to actually BE reality to the exception of all other views of reality.

Contemporary physics uses abstract means to describe concepts that can no longer be visualized, and it is now considered acceptable to explain the inconceivable in this manner as long as physical phenomena are made understandable. "We understand a process if we can refer it back to a natural law. But the law itself we can only understand if it expresses a logical necessity, which implies that we are not confronted with a genuine law of nature, but with a law of our thinking. We do not understand the real natural laws, but have to take them for granted." (Forwald, p.13) Our physical laws, then, are only approximations of nature that carry many inherent weaknesses depending on the logic on which they are built. As more data is obtained and measurements become more exact, our laws change. Such a change causes our laws of nature to progress ever closer to the logic of nature, assuming there is a coherent logic of nature, not by the logic of man. This leaves a great area in nature beyond human awareness and immediate detectability, an awareness upon which human logic is based and as such his physical laws and knowledge are derived, leaving a place for psi to fit into the overall scheme in nature without being 'naturalistic' in the sense of mechanistic and 'classical' deterministic. However, it would still be considered inappropriate to invent new physical quantities or variables just to explain psi, such as Roll's psi-fields or Ninian Marshall's resonances, because these do not 'refer back' to 'a natural law' in the manner described above. Yet the method of associating psi with physical quantities such as 'hidden variables,' tachyons, virtual particles and extra dimensions is still valid, even though their existence has not yet been verified, since these quantities do refer back to known 'natural laws.'

One common criticism of the physical theories is that psi doesn't seem to conform to the inverse square law whereas common forces such as gravitation, electricity and magnetism with which we are familiar do follow an inverse square rule. Margenau points out "only interactions between physical points follow an inverse square law, and strictly speaking there are no physical points. (Margenau, p.218) There are basic principles in modern physics that also fail to obey this law. Mach's principle bases the inertia on any material object as a consequence of the total mass of the universe about it, yet there is no known physical effect to convey this information to a single material object when it



undergoes an accelerating force. The Pauli exclusion principle, another basic principle in modern physics, is based purely on symmetry, yet "it is responsible for most of the organizing actions that occur in nature." The exclusion principle cannot be detected in its own right, in the same manner as a physical force. In other words, it has no dynamic aspect to it. Yet it acts like a force by limiting which electrons can enter into a symmetric orbit with each other in an atomic shell, yet it requires no mechanical action and is not a true force. It is simply a symmetry imposed by mathematics. So, both Mach's principle and the Pauli exclusion principle seem to share the most mysterious characteristic that psi has so far demonstrated, undetectability while showing calculable and observable results and causality, without themselves being related to the inverse square law.

There would seem to be a great number of physical analogs for psi, either within the present context of physics or in the expected physics of the near future. It would further seem that there is no need for physicists to neglect psi because its existence is in dispute, since they seem willing to adopt other questionable concepts and/or quantities when it suits their theoretical purposes to explain some event or phenomenon. These conclusions indicate that physicists would be more receptive to psi and the paranormal if the existence of psi was a necessary conclusion of their own theoretical work. If psi could be demonstrated as evolving out of a physical theory or if a proper physical theory of psi could be developed, then the community of physicists as a whole would take psi more seriously. Gerald Feinberg has acknowledged this fact to a degree by declaring that parapsychologists would get more support from physicists if they would stop trying to prove the existence of psi and more carefully develop the scientific knowledge of the properties of psi. Feinberg's statement to this effect was made in 1974 and since then his suggestion has been slowly becoming a reality as more physicists begin to study psi phenomena.

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E-mail comments and suggestions to Jim Beichler, editor, *YGGDRASIL*, at  
[jebco1st@aol.com](mailto:jebco1st@aol.com)

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