

TO BE, OR NOT TO BE? AN ANALYTICAL STUDY OF PSI AS A PHYSICAL QUANTITY

By James E. Beichler

I: Is psi a physical quantity?

It has been quite difficult for the scientific community to come to terms with paranormal and psychic phenomena and will probably remain so for at least the immediate future. While there are many reasons by which scientists justify ignoring these phenomena, some scientifically valid and others grossly invalid, the possible existence of psi presents a real problem for science. The difficulty faced by science in this regard has been exacerbated by the failure of interested scientists to precisely define psi, the scientific term that has come to represent the measurable quantity with which the various psychic phenomena are normally associated. In fact, the increasing precision of the definition of psi can be used as a barometer to measure the progress of research in the paranormal. The more that is learned about psi and how it functions, the more precise the definition becomes. Such a trend merely follows the natural evolutionary course of events in science. As psychic phenomena have been studied more carefully, and their properties determined, they have been classified either under the heading of psi or relegated as metaphysical and thus of no immediate concern to science. This has allowed a common definition of psi phenomena, although not without some controversy and dissent among even the scientists who fully accept the reality of psi.

According to R.H. Thouless, one of two scientists who is credited with first noting that a common affect acts in the many different types of psychic phenomena and calling this affect psi,

The demonstration of the reality of ESP, of precognition, and of psychokinesis is a demonstration of the presence of a series of anomalies. These are plainly occurrences not expected by the psychologist working in the field or normal psychological research. (Thouless in Pratt, p.133)

While this statement is rather vague for the purposes of scientific research, it is both understandable and accurately describes psi. This statement was first made in 1969 and it does reflect the scientific attitudes of that time, but it does not tell the whole story. Quite simply, it implies an unnecessary limit to the scope of anomalous phenomena associated with psi, or rather the paranormal phenomena studied in parapsychology, as strictly psychological in nature. While some scientists may think that psi phenomena are purely psychological, and thus only associated with the mind, this position is untenable given

the range of phenomena that have come to be associated with psi. What then are the paranormal phenomena associated with psi?

In the words of Thouless, paranormal phenomena should be considered 'a series of anomalies.' Thouless has implied that the scope of psi is limited to sciences of the mind, but these 'anomalies' are not so limited to any one branch or group of sciences. H.H. Price claims that telepathy, one form of these phenomena, isn't a form of knowing because it doesn't display knowledge's 'all or none' characteristics: "Telepathy is more like infection than like knowledge," (Rao, pp.148-9) implying that telepathy, at least, is something more than just a mental phenomenon. In the meantime, Carl Jung believed that paranormal phenomena deal with "acausal meaningful coincidences." (Pratt, p.153) However, these scientists are all psychologists or otherwise deal scientifically with the human mind rather than physicists or physical scientists, so they would tend to interpret psi phenomena within the scope of their own professional training.

On the other hand, Ruth Reinsel believes that parapsychology "restricts itself to the ways of gaining knowledge or affecting the world around us that do not involve the five normal senses." (Reinsel, p.187). The gathering of knowledge or otherwise affecting the world around us is normally accomplished by exchanges of energy. Since no energy exchange seems to be involved in the processes associated with psi, then these processes must be 'paranormal.' By designating the 'paranormal' in this manner, Reinsel has clearly taken into account both the mental and physical aspects of psi related phenomena. She further hopes that the term 'paranormal' will disappear as "some explanatory principle" is discovered and the 'paranormal' becomes a part of 'normal' empirical science.

Cyril Burt maintains that "the paranormal may be understood as either (a) occurrences which are inexplicable in terms of the classical ontology, or (b) nonphysical experience other than 'normal' thinking, memory, imagination and dream;" (Whiteman, 1977, p.748) and C.D. Broad believes an event is paranormal if it seems to conflict with a synthetic set of "basic limiting principles" which help to integrate various aspects of human experience. (Rao, p.157) No matter how accurately or inaccurately these definitions and descriptions of paranormal phenomena seem to be, they are not completely conducive to the purpose of scientific investigation of the events they purport to portray because they lack precision.

To be more specific, the paranormal events that are classified as psi phenomena are normally grouped into two main categories according to their characteristics: Extra-Sensory Perception (ESP) and Psycho-Kinesis (PK). Within the ESP group we have "telepathy or mind-to-mind communication; clairvoyance, the perception of an event hidden from the ordinary senses; precognition, the perception of future events that could not be known through rational inference;" (Puthoff and Targ, p.525) retrocognition, extrasensory cognition of a past event; and mediumship, the study of the ESP ability of an individual which suggests that the source of information is from a discarnate (deceased) personality. (Rogo, p.16) More recently, remote viewing has joined this group. All of the phenomena in this category clearly deal with perception, cognition and consciousness and are outwardly psychological in nature.

On the other hand, PK deals more intimately with the physical world since PK phenomena seem to require either a transfer of energy between mind and matter or the action of a force. While at least partly physical, PK phenomena are also partly mental. The PK group consists of telekinesis, the spontaneous movement of objects without contact or observable force or energy; psychokinesis, the direct action of mind over material objects; physical mediumship, the study of those individuals around whom PK habitually manifests or who can deliberately induce it; Poltergeists, habitual telekinetic disturbances confined to a specific location such as a home or a person; and paranormal healing, PK affecting biological functions prompting recovery from disease or biological damage. These lists are not exhaustive according to some scientists, scholars and lay people. Other psi phenomena such as apparitions, hauntings and out-of-body experiences (where a person feels he or she has left his or her body) may not be considered as valid or well established for scientific study. They may or may not fall into these categories if they are considered, since they are hybrids of the two. (Rogo, p.16)

Despite the seemingly clear-cut definitions and delineations between the various phenomena that demonstrate the action of psi, it still remains difficult to define all psi phenomena and events along such narrow lines. Many manifestations of psi overlap between two different classifications of phenomena. For example, in the case of 'knowing psychically' the details of a past event may be true retrocognition or it may result from telepathic communication with a person who has knowledge of that event. There is no scientific method for distinguishing between alternate explanations given the conditions of occurrence for various psi phenomena. It is also difficult to equate the two main categories of ESP and PK. PK is clearly physical in nature while ESP is seemingly mental. There is thought to be a clear-cut difference between the mental and physical aspects of the different psi events represented in each category. However, the various manifestations of psi are not as arbitrary and independent of each other as one may think. For purposes of deducing a theoretical model of how they operate, they can be related by two arguments: Both PK and ESP exhibit similar characteristics and follow the same principles, while people who show a higher than normal ability in one also tend to show similar abilities for the other. Thus, we have a seemingly solid and incontrovertible relationship between the mental and physical aspects of psi. (Rogo, p.13)

Even though 'telepathy' is considered purely an act of mind, no definitive model of thought has ever been established, so thought transference is at best an open question. Should thought itself finally prove to be non-physical, then ESP might be demonstrated a purely mental phenomenon. However, whether thought is itself physical or non-physical, thought must interact in some manner with the physical world represented by the human brain. Therefore, even ESP phenomena would necessitate a physical explanation at some level of understanding to explain how humans cognize the exchange of information during a telepathic event.

Taken altogether, the study of different manifestations of psi communication constitutes a branch of science called parapsychology. This science covers "behavioral or personal exchanges with the environment which are extrasensorimotor - not dependent on the sense and muscles." (Ashby, p.183; Rogo, p.13) Only recently has parapsychology

been granted the status of a legitimate branch of science in America. Despite more than one-hundred years of serious investigation and study by members of the scientific community, this effort was not officially recognized or sanctioned in the United States until the American Association for the Advancement of Science admitted the Parapsychological Association as a member in 1969.

The scientific acceptance thus bestowed upon the Parapsychological Association is more than just the recognition of a new branch of science called parapsychology. It seemed to constitute the beginning development of a whole new paradigm in science. It must be noted that "if general scientific and 'common sense' thinking will be necessary," (Ashby, p.16) such a change will be fought by the propounders of the existing paradigm. This leads to an emotional battle over the legitimacy of parapsychology as a branch of science. On one hand, we have the opponents of the scientific study of psi phenomena such as the contributors and publishers of the *Zetetic* and *Humanist* magazines. While on the other hand, we have the parapsychologists and other proponents. One such supporter of the paranormal is the parapsychologist K. Ramakrishna Rao who claims that "The scientist who is, at this stage, averse to accepting the evidence for ESP reminds one of the dogmatic professor of philosophy who refused to look at the planets with Galileo's telescope." (Rao, p.140) This statement was made two decades ago, yet there is still a great deal of skepticism and bias against the study of psi phenomena within the scientific community.

The results of a survey given at the 1971 convention of the Parapsychological Association by Gertrude Schmeidler indicated that "an overwhelming majority agreed that ESP is firmly established" (Pratt, p.141) However, it must be remembered that the people attending that convention would certainly have been optimistic supporters of ESP research. Even today, there is still no concerted movement within physics to study psi comparable to that in psychology. There is no branch of physics called 'paraphysics' which corresponds to position that parapsychology holds within the science of psychology. Granted, there are several physicists, some quite well known and respected within the scientific community at large, who take psi phenomena seriously and are actively seeking a physical model to explain psi, but their number is still extremely small compared to the overall number of physicists. Many physicists, although not totally adverse to the concept of psi, hold a wait and see attitude toward the quest for a proof of the existence of psi.

Ashby cites four different reasons why many scientists reject the reality of psi despite the statistical evidence for it: (1) Errors could occur in the recorded results of experiments because of researchers' bias for good results; (2) There is always the chance that positive experimental results could be explained by sensory cues if conditions aren't strict enough during testing; (3) Because of our own lack of knowledge about the learning processes there may be some other 'rational' explanation; and (4) There may be some deliberate fraud by the subject and/or the researcher. (Ashby, p.14) This list was compiled in the 1970s. Nearly two decades later, a meta-analysis of all of the ESP and related experiments that had been conducted since the 1930s was undertaken. The results of this analysis established an extremely high probability that some unknown factor such

as psi was acting in the numerous experiments. In spite of this newer 'evidence,' many scientists, scholars, and others still criticize research into psi phenomena along the same lines as Ashby documented.

Champe Ransom has documented other major criticisms and arguments against psi research. (Rogo, pp.19-26) Some of these criticisms are valid, and some have absolutely no scientific foundation or validity. The main valid objections deal in some manner with the lack of repeatability of psi experiments, possible fraud and the invalidity of the statistics used to evaluate the tests. Repeatability of experiments is a major tenet of the experimental method, so it offers perhaps the greatest challenge to psi research. Yet this criticism cannot be overwhelmingly accepted since many psychological and behavioral experiments upon which accepted psychological theories are based, are also non-repeatable. Whenever experimental work regarding the human mind and human behavior is conducted, absolute results are impossible to obtain. So, normal psychology is open to some of the same criticisms as parapsychology, yet it is still regarded by all as a legitimate scientific endeavor. The possibility of fraud deals with matters moral rather than scientific and critics who cannot find more scientifically valid arguments against the results of specific experiments often misuse this criticism as a scapegoat. And finally, the criticism regarding the 'invalidity of the statistics used' is untenable given the recent results of the meta-analysis of experimental results.

The possibility of fraud being committed during an experiment is especially distasteful to scientists. The implication in this criticism is that either the scientists are committing the fraud or that the subject of their experiments is duping them. The skeptic and magician, James Randi, has exploited the issue of fraud in psi experimentation. He dispatched two of his colleague conjurers to commit fraud during a legitimate psi experiment and thus prove that it was possible to dupe the scientific community. His act not only demonstrated his skepticism, but also his cynical disregard for science and the scientific method. Randi defines a parapsychologist as "one who, seated in a park near a riding academy and hearing hoof beats approaching, expects a unicorn to round the corner. He is surprised and disappointed when he sees a horse come into view." (Randi, p.349) In other words, Randi's skepticism betrays his own prejudices against science by the direct implication that a group of dedicated scientists, regardless of the veracity of their scientific claims, purposely acts in a grossly unscientific manner.

Another tactic of the critics is to claim that ESP is impossible *a priori* and that sensory cues could be used to explain the phenomena in poorly designed experiments. Such arguments are largely invalid. Science has neither the jurisdiction nor the right to claim that any type of phenomenon is *a priori* impossible. Science observes nature, it does not dictate to nature what is possible or not. Any claim of scientists that a given phenomenon is one-hundred percent impossible implies that science is able to completely understand and explain all that there is to know about our universe and nature, which is absurd. On the other hand, the possibility of sensory cues has been all but eliminated in rebuttal to the furor raised by critics of parapsychology. Parapsychologists and other investigators have long taken such criticisms to heart and now design their experiments

using methods which severely limit the possibilities of sensory cues, whether subconsciously transmitted or purposely used and willfully exploited.

Another well-known skeptic, Martin Gardner, is far more specific in his objections to physical theories of psi. In particular he has attacked several attempts to explain psi as a quantum effect. Gardner describes E.H. Walker's theory of PK in a distinctly non-flattering manner, betraying his own *a priori* prejudices against the existence of psi.

As before, Walker offers nothing resembling a scientific theory. He simply makes another quantum jump from a mere possibility to a wild assumption. The superpsychic, by an "extraordinary" and "sustained" effort of will is able to alter lots of wave packets. By altering enough packets, he or she can bring about a "highly improbable state" that is nevertheless one permitted by the macro-object's overall wave function. (Gardner, p.593)

Whether or not this description of Walker's theory is accurate, the language betrays Gardner's *a priori* prejudices. It would seem from this statement that Gardner considers a physical theory of psi, one that that part of the scientific community interested in psi accepts as legitimate, as not even resembling a "scientific theory." Science does not dictate between a "mere" possibility and a "wild" assumption. Neither 'mere' nor 'wild' are scientifically valid terms within this context, but instead reflect highly prejudiced personal beliefs. There is a belief held by some scientists that if a phenomenon is not specifically denied by scientific theory then it is a legitimate possibility for scientific consideration. Therefore, Walker's theory, even as described by Gardner, represents valid scientific inquiry. But Gardner goes much further in his transgressions and claims that Haakon Forwald's research, which is related to Walker's work, is "sloppy solo work." (Gardner, p.593) Gardner cites no specific instances or references to support this claim. Gardner seems more interested in attacking the research of scientists by adjective, innuendo, implication and unverified claims, rather than developing specific criticisms against their work that might act to help them improve their research. From these examples, it would seem that Gardner is claiming the impossibility of psi based upon his own *a priori* assumptions, rather than upon valid scientific reasoning and experiment.

Other objections may be valid, invalid or even irrelevant to the issue, depending upon any given individual's belief system. These include the arguments that psi has not been placed within a theoretical framework, that it has not been shown to be relevant to the rest of science, that parapsychologists have been unable to agree on the quality of their own evidence, and that parapsychologists are biased in favor of their own results. The notion that a few scientists are biased in favor of psi is absurd when used to argue that all parapsychologists are biased toward psi. The object of science is to be objective when considering different phenomena. Whether a scientist is biased toward one viewpoint or another should be irrelevant to their overall objective study of phenomena. Some bias is inevitable, but to tar the whole of the scientific community involved in psi research with bias implies that parapsychologists are not good scientists because they allow their biases to direct their scientific research at the expense of their objectivity.

Whether such biases exist or not is actually less important than discovering where and how possible biases have affected scientific research. All things taken into consideration, we could easily come to the conclusion that a scientist must believe, partially at least, that psi could exist, before he can establish it in his own mind as a reality. (Ashby, p.15)

If a scientist will not accept the evidence for psi unless he already has an inclination to do so, then where does the inclination toward psi originate? Our 'common sense' tells us whether or not to accept psi, and many times this is a function of our upbringing and cultural biases. Within western culture there is a strict dichotomy between the natural and the supernatural (i.e. psi). The natural is explained by science and the supernatural is usually religious in nature or otherwise considered non-existent. Even our language has no basis for psi in either the words we speak or the concepts that the words portray. So, words such as psi, ESP, telepathy, retrocognition and psychokinesis have been developed only when necessary, unlike a culture such as the Indian (Hindu), which abounds in words and concepts that can form a philosophical basis for psi and the supernatural.

Another skeptic, James Alcock, has elevated the supernatural connection between psi and paranormal phenomena to a direct criticism of parapsychology by claiming to have discovered a "quasi religious/dualistic motivation" which plays a role "in parapsychology apart from giving many parapsychologists a reason to continue their quest." (Alcock, p.561) He notes that such a motivation is not in itself a problem for parapsychology, but questions if this motivation could possibly color parapsychological research or even taint the findings of psi researchers. While the motivation of researchers is not normally important, Alcock does state that they "become important only in our understanding of the *persistence* of the quest" and further concludes that this "*persistence*" does affect the findings of psi researchers.

It is precisely here that the motivational system exerts its greatest influence: ESP is taken to be a more likely explanation than subtle cuing or some other unrecognized but normal influence when guessing is successful at a level above chance; psychokinesis is seen to be more probable than experimental artifact when subatomic events apparently violate probabilistic views. It is in the preference for paranormal explanations over any other, and the attempt to explain away failures to replicate, and the insistence by some parapsychologists that science should accept the reality of the paranormal even though the normal criterion of strong replicability has not been met, that parapsychologists often stray away from the pathways of science." (Alcock, p.561)

First of all, it would be unscientific to *a priori* deny that psi has any affect in the experiments under consideration. When psi is considered as a possible solution to anomalies that arise during experimentation, then the scientists would eliminate other possibilities before accepting psi as an explanation of the phenomena. By assuming that they do not, Alcock is claiming that parapsychologists are not good scientists simply because they accept the possibility of psi functioning, which is itself contradictory to good science. If it is demonstrated that psi is the more probable explanation of any experimental results, then to discard psi because it is an awkward explanation would be

dishonest and fraudulent science. So it would seem that Alcock is implying that scientists should be unscientific and act dishonestly by denying psi functioning in experiments where psi seems to represent a valid possibility for explaining the observed phenomena. By disguising his criticisms under the banner of a 'quasi-religious motivation' expressed by parapsychologists, he is actually implying that parapsychologists are zealots rather than scientists, willing to accept only their own fudged answers and results. One must question who the real zealots are when studying the work of parapsychologists, other scientists and their critics.

Some people believe that consciousness is the primary medium of all reality. To them, even "the external world is a posit, a projection of consciousness, which can be tested by its consistency with other items of consciousness, with the totality of human experience." (Margenau, p.215) In this case, if we accept something as true and it actually exists in nature, then we will find the evidence for it. Or, in the context of Thomas Kuhn's scientific paradigms, we tend to interpret nature along the lines of our beliefs and in the terms of our present paradigm. If our present paradigm suggests psi, then there will be room for it in our scientific community. "Psi makes no sense to us simply because our view of the universe, even our very language, is so distorted and based on misconceptions that we could never understand the universe using these senses and languages." (Rogo, p.293)

C.T.K. Chari stated "the ecological, contextual, historical and cross-cultural fallacies are peculiar to the social sciences and have no counterpart in the physical sciences." (Chari, 1977, p.808) The physical sciences are supposed to represent natural laws which are universal and therefore independent of human biases and prejudices. This may not be completely true, but at least the physical sciences are not as biased as the social sciences. In any case, wherever the human mind plays a role, the attitude of any individual involved will affect the role played by the mind. It has been shown statistically that people who believe in ESP generally score higher in ESP experiments. It has also been found that there is a higher incidence of 'waking impression cases' or spontaneous psi events in a waking state when the mind's natural blocking mechanisms (psychological) are operating to their fullest extent in cultures where the supernatural and thus 'psi' is more acceptable, such as the Indian (Hindu) culture. This leads to a belief that "psi experiences in Western Society are culturally non-acceptable due to our general scientific and mechanistic cultural pattern which prejudices against them." (Rogo, p.123) It would therefore seem that there is a cultural bias against the acceptance of psi phenomena within western culture and this bias affects western scientific attitudes toward psi.

Chari contends that "the issues about parapsychology should be of concern, not to a few specialists recruited from a few disciplines, nor even of a few privileged cultures, whether occidental or oriental, with their claimed unique perspectives ... the parapsychological issues are vital to humanity at large, which confronts a world of new political and economic conflicts and is perplexed about its status and role, while anxious to know more about the increasingly strange universe which none of the creeds quite anticipated." (Chari, 1974, p.11) Scientists must be objective and cannot let their

emotions and biases get in the way of scientific progress, yet several of the critical arguments against psi reveal that resistance to its existence is sometimes more emotional than scientific or logical. (Rogo, p.26)

We must realize that science has always been in a state of flux with changes occurring from time to time in its most fundamental tenets. Science is dynamic, not static, and it progresses. Henry Margenau, a well-known and respected physicist, believed that "the old distinction between natural and supernatural has become spurious. That distinction rested upon dogmatism, a scientific dogmatism, which supposed that everything in the way of fundamental facts and basic matters was known and that there was an obvious distinction between what was possible and what was not possible. Today we know that there are many phenomena on the fringe, at the periphery of present day science, which are not yet understood, which are still obscure, but which will nevertheless be encompassed by the scientific method and by scientific understanding in the future." (Margenau, p.213) Since it is probable that arguments against psi and the paranormal are not objective or scientific but merely cultural, there is a distinct possibility that scientists are swayed by bias and prejudice rather than cold scientific facts. This state of affairs is changing, but only slowly and would tend to seriously hamper and prejudice studies in parapsychology.

Physical science presents other problems since it is 'ideally' free of such biases. According to the 'ideal' of physical science, once physical proof of the existence of psi has been provided, psi will be accepted. The question with physics is not based on a bias against the existence of psi, but rather what constitutes an irrefutable demonstration of psi. It is the form that such irrefutable evidence must take which is questionable in the community of physical scientists. All evidence for the existence of psi has thus far been statistical, so physicists have been slow to accept the validity of psi phenomena. Both the elusive nature of psi and the relative weakness of its actions play an important role in such considerations. It is difficult (if not impossible) to directly detect and measure the physical results of psi action to the satisfaction of most physicists and physical scientists. In lieu of physical evidence, at least evidence strong enough to challenge the existent bias, a physical theory or model is necessary to convince scientists that psi research is worthwhile.

We have now come to a very special point in the study of psi. If there is bias and prejudice over the validity of psi research and parapsychology, and we have reached a point where the evidence of psi is no longer enough to convince the skeptics (Rogo, p.27), how is research in parapsychology to progress? This question exemplifies the problem of the 'prematurity' of psi research. Gunther S. Stent defined 'prematurity' as meaning that a "discovery's implications 'cannot be connected' by a series of simple logical steps to canonical or generally accepted knowledge'." (Stent in O'Regan, p.453) In other words, we have no clear-cut or acceptable theory, be it physical or mental, which collates all of the reported physical, physiological, therapeutic and psychological effects of psi. In order for progress to be made in any new scientific endeavor and especially where a new paradigm may be involved, a theory or framework must be set up in which language, experiments, data and other necessary prerequisites can be used to establish

credibility. Parapsychology has always been conducted without this framework and has thus been unable to persuade the skeptics. "(With) all the psychological trait variables we can muster, with the whole fabric of biology, and with all the known laws of physics, we cannot produce a theory of psi which is both comprehensive and credible. The field is strewn with dead and dying hypotheses and desperate expedients." (Chari, 1977, p.806) The lack of a theoretical framework is the crux of the problem in parapsychology. Therefore, although it is a science, parapsychology is still a bit premature in the sense that it has not yet arrived at its own paradigm.

At this time, it cannot even be determined whether a physical or mental theory needs to be established. For example, in his textbook on parapsychology, H.J. Irwin distinguishes between theories of 'psi mediation,' which are physical theories, theories of the 'experiential phase' of psi, which are mental in nature, and theories which seem to exhibit both. Further, there are three groups of physical theories: Energy field theories, electromagnetic theories and observational theories. This categorization stems from the fact that theories of psi must contend with two basic issues, "how information is mediated between the environment and the individual" and how "psi come(s) to manifest itself in the individual's consciousness and actions in the way that it does." (Irwin, p.167) In this manner, Irwin has not been forced to group the theories strictly according to their physical and mental natures, but has circumvented this dichotomy. The advantage he has gained from ignoring the mind-matter problem is short-lived since any interaction of psi with the "environment" would be physical. Irwin may have changed the words used to describe the psi processes, but the physical background remains.

It should be evident that this philosophical split between the mental and physical aspects of psi presents a major problem in understanding how psi works. This problem does not affect research in the paranormal alone, but is a smaller part of a much larger problem regarding all of science and philosophical thought. Western thought has developed a definite split between the mental and physical aspects of reality, each seen as operating within its own realm and not affecting the other. However, this split cannot be continued if psi is to be understood. The two main categories of psi, ESP (which is purely mental) and PK (which is partially physical), cannot have different explanations. There are also areas of physics, such as quantum mechanics, where there may be a connection between the mental and physical aspects of reality. In quantum mechanics "attempts to eliminate the observer and replace him by an unconscious recording device, plausible as they are at first glance, lead to difficulties. An infinite regress can be apparently terminated only in the consciousness of the observer." (Chari, 1974, p.6) Thus consciousness, which is purely mental, must interact with a physical system. At some level, Wigner, another physicist, believes that the non-linearity of wave mechanics may even be a sign of the presence of life and consciousness. (Chari, 1974, p.7) So, within physics there is a distinct possibility that a link between the mental and physical aspects of nature exists.

In order to consider the relations of mental and physical phenomena, Freundlich has noted four possibilities within a determinist framework of knowledge: "(1) Mental states do not exist (as conceptually distinct entities); (2) They do exist, but they are

correlates of physical states, which evolve according to laws formulated with respect to inanimate material; (3) Mental states are correlates of physical states, but the laws depicting their evolution are such as to be discoverable from the behavior of inanimate physical states; and, (4) Mental states are not correlates of physical states, and a full description of nature would require laws depicting the evolution of mental and physical states from other mental and physical states." (O'Regan, p.450) Clearly, any work done in parapsychology must include all four of these possibilities if it is to bear on any unified description of the basic duality of mind and matter in nature. Just because our 'view' of nature and reality is split along these lines, there is no reason to assume that nature and reality are also split along these lines. We can no longer consider psi phenomena to be solely attributes of a nonphysical mind.

This same argument has caused a great deal of debate among those who accept psi as real phenomena, with many arguing either for or against the dualism of mental versus physical psi. H.H. Price argues that while telepathy, the best-established form of ESP, is considered, it is easy to see that the 'Materialist' (physical) conception of human personality will not suffice. He assumes that the 'Materialists' "will no doubt try to explain them (the facts) by physical radiations of some kind," (Price, p.36) while stating that the physical radiations are impossible for three reasons: They must be detectable by the senses, either directly or indirectly by instrumentation; the detection must take place en route between the telepathic sender and receiver; and, the intensity must vary in some way with distance. However, Price does admit "something or other must be happening in space when telepathy occurs, but we have not the ghost of an idea of what it is." (Price, p.37) In order to reach these conclusions, Price has made some assumptions that need not be true. First of all, he assumes that there are no physical influences which are not detectable by the senses, yet it is feasible that if we perceive something telepathically then we are in fact 'sensing' it even though we are not seeing, hearing, feeling, smelling, tasting, sensing in some manner or otherwise measuring it. Secondly, he assumes a radiation although there are other entities or concepts in physics that are not radiations, but could account for ESP as well as radiation. And finally, he assumes that the intensity must vary with distance, an idea that is not necessarily true for non-radiation sources.

C.W.K. Mundle claims that accepting Price's arguments requires us to define 'Materialism' as claiming that present physical laws are complete. (Mundle, p.204) This is absolutely not true. The state of present physical theory is far from being complete, and has more than enough of its own anomalies and paradoxes without the incursion of psi. Before we accept dualism over Materialism, because of the failure of finding a physical law governing psi, we must first find a non-material mental law that governs psi. Hence it seems extremely unwise to accept any arguments such as Price's. To do so would be to say that we already know all about physical reality, a truly dangerous assumption and attitude in light of the absence of a purely mental theory. Therefore, there is no reason to believe that a physical theory of psi is unnecessary.

J.H.M. Whiteman was also among those who are skeptical that the solution to the most basic problems presented by psi could be found in terms of either the quantum physics or field theory as they were understood in the 1970's, at least in any sense that

physicists would recognize as relevant to their own scientific thinking at that time. Given the fact that the quantum and field theories represent the prevalent theories (and paradigms) governing research and ideas in modern physics, it would not seem that physics has much of a chance to explain psi. "Parapsychology is not identifiable on the frontier of physics, and psi phenomena are not, in any useful sense of the word, 'physical.'" (Pratt, p.142) However, he leaves the door open to a theory by assuming that it will be possible to explain psi on a higher hierarchical level than modern physics occupies, just as modern physics is on a higher hierarchical level than Newtonian physics. In this way, there is a certain relevance of the emergence of quantum theory to a position of psi in an accepted picture of reality, and Whiteman completely misses Price's pitfall of assuming that present physical theory is complete.

The fact that there may be a 'physical' explanation beyond modern physics does not rule out any non-physical or mental explanations beyond the limits and abilities of present parapsychology. Rhine considered the possible need of some as-yet-unknown "mental function capable of action independent of the limitations that define physical reality," to explain the facts concerning psi. He later expanded this to an actual mental energy not subject to the familiar conditions of space-time-mass that characterize 'physical' reality, as we know it. This mental energy would interact with or convert to other forms giving the physical effects that are exhibited by psi. A completely mental picture such as this cannot be completely discarded just as a completely physical theory or hybrid of the two cannot be discarded.

As long as it is possible that we may have to progress beyond modern physical and mental theory to explain the workings of psi, perhaps we can alter the basis of the dualism that we are trying to overcome. This dualism has been called mind versus matter, physical versus mental or Materialism versus Non-Materialism. However, it has been boldly suggested by at least one scientist, Rex G. Stanford (Stanford, pp.853-854), that we change this dualism to consider animate versus inanimate or living versus dead matter. There is an unquestioned assumption which amounts to a prejudice that psi is exclusively associated with living systems and is known as "mental phenomena" attributed to either a non-physical mind or to the emergent product of biological development. We must ask whether this is truly the case.

It will only be possible to ask whether so far we may not have vastly misconceived the nature of psi events due to the vicissitudes of our history as a science. Might it not be that we have in psi phenomena hints of certain basic interaction potentialities present even in non-living systems, but that we have never looked for them because we have been blinded by a bio-psychological perspective on psi? Should this view prove correct - and I make no claims that it is - the study of psi events would have made a major contribution to physics, and, finally, physics would probably cast new light upon the origins and developments of living systems." (Stanford, p.854)

Hence, in the search for an explanation of psi, it may be necessary to question the most basic tenets of those thought processes by which we separate everything that we sense into mind and matter.

Some parapsychologists have fallen into a trap concerning whether psi is physical or not. These scientists believe that physics accepts no limits to its expanding frontiers, it is an all encompassing science, and must therefore ultimately include parapsychology as a branch or sub-field, as it has other sciences. By the early 1960s, Pratt noted that only two physicists had entered the field of psi research (Pratt, pp.135-137) on a career level. R.A. McConnell thinks that it would be better to label psi as psychophysical rather than non-physical while J.H. Rush, without placing psi outside of physics, could not see how psi could be integrated into modern physics at the time (1943) of his first paper. Further, only two physicists, not working in parapsychology, have ventured opinions of the workings of psi. Pasqual Jordan expressed strongly that psi is not physical while Henry Margenau (as quoted above) suggested that parapsychologists strike out and reason in bolder terms than suggested by modern physics. It should be noted though that Pratt's information in this regard may not have been completely accurate. Throughout the history of psychic phenomena, physicists have been among the first to investigate paranormal phenomena, and since Pratt's article appeared many physicists have speculated on and theorized on explanations of psi. Of the better-known efforts, Harold E. Puthoff and Russell Targ began fundamental research in 'remote viewing' at Stanford Research Institute in the early 1970s. Edwin May later joined this research program. While others have joined the sparse ranks of physicists interested in parapsychology, the most notable addition has been that of Nobel laureate Brian Josephson in the early 1990s.

However, the question of the dualism between the mental and physical is answered in the end, there are certain requirements that any physical theory of psi is obligated to fulfill. Such a theory "must either explain and/or predict functional relationships governing the occurrence of psi phenomena, *and these functional relationships must be statements involving physically measurable quantities.*" (Stanford, P.826) With a theory that fulfills these restrictions as a tool, manifestations of psi would occur or not under specific conditions, and the variables of any psi event (such as magnitude or other physical parameters) could be described as a mathematical function. If and when such a theory is realized, it will be a definite breakthrough for the study of psi, although this does not seem to be happening at the present or in the near future.

One of the main problems of psi is its relative elusiveness. Psi only surfaces to consciousness when certain conditions have been fulfilled and most of these conditions have not yet been discovered or understood. Contrary to some popularizations of psychic phenomena, tests have shown that it is very hard to control psi. There have even been suggestions that ESP and subliminal processes in some ways behave extraordinarily alike. (Beloff in Chari, 1974, p.6; Dixon in O'Regan, p.464) Subliminal perception affects dreams, memory, adaptation level, conscious perception, verbal behavior, emotional responses, drive-related behavior and perceptual thresholds. ESP has also been related to these very same psychological concepts. When conducting ESP experiments it is *extremely necessary* to minimize the chances of subliminal perception being used to gain results because of this close relationship. Subliminal perception was first discovered by F.W.H. Myers at the turn of the century and used by Myers as an explanation of psychic phenomena. Subliminal perception represents the last limits of the domain of psychology before the crossover to parapsychology. It is difficult to control and psychologists are

only beginning to discover more about it. The difficulty of finding the limits of subliminal perception, the furthest outreaches of the psychological self must be overcome before the nearest reaches of psi and parapsychology can be found. A boundary must be drawn between the two, which is difficult because of their mutual elusiveness.

The elusiveness of psi and the difficulty in controlling psi and its effects during experimentation also presents another serious problem for the parapsychologist: The repeatability of psi experiments. Psi research has had to rely on two kinds of processes in the past. Both spontaneous events which cannot be repeated or laboratory controlled and the specialized experiments, such as card guessing, which give statistical results only, but can be laboratory controlled, are studied in parapsychology. In both cases the results can't be repeated because too many unknown variables are beyond the control of the experimenters (if not for other reasons). This is a serious flaw in parapsychological research, and the attitudes of scientists regarding this is summed up well by Margenau: "I believe that as long as you go around making statistical studies everywhere and on everybody, you are not likely to be convincing for a long time to come." The physicist would agree with Margenau's assessment. According to Feinberg, "I believe it would be appropriate for researchers to emphasize detailed studies of psychic phenomena rather than to concentrate on further efforts whose purpose is to convince others that the phenomena exist." (Feinberg in Mitchell, p.24) Detailing the properties of psi would be more effective in understanding psi than gathering more proof that it exists and scientists would be more apt to accept the reality of psi if a theory explaining the workings of psi could be developed.

As long as psi phenomena remain only in the experimental, data and fact-finding arena, they will not be totally accepted by the scientific community in general. This fact is recognized as much by parapsychologists as by physicists. "We should expect them (ESP, PK and precognition) to be rejected until a new explanatory system is put forward which will accommodate them; it is not expected that rejection will be overcome merely by the accumulation of stronger evidence in favor of their reality." (Thouless in Pratt, p.133) Such statements pinpoint a major failure of parapsychology and emphasize the need of a theory that would delineate the boundaries between subliminal perception and psi, could be tested in the laboratory (rather than the reverse) and could set the stage for the development of repeatable experiments fulfilling the philosophical demands of the scientific method. It should be remembered by all parapsychologists and investigators of psi that "no amount of empirical evidence, no mere collection of facts, will convince all scientists of the veracity and the significance of parapsychologists' reports. He must provide some sort of model, to use Dr. Murphy's word; he must advance bold constructs - constructs connected within a texture of rationality - in terms of which ESP can be theoretically understood." (Margenau, p.210)

According to Pratt "surely everyone would agree that the repeatable experiment, when it is possible, is the most effective means yet found for the advancement of knowledge," (Pratt, p.139) but he goes on to stipulate two requirements for this scientific tool: (1) The phenomena observed must lend themselves to experimental study, and (2) knowledge of the conditions for influencing and controlling the phenomena in an

experiment is necessary. It is questionable whether all psi phenomena fulfill these two requirements, because of psi's inherent elusiveness and the unknown demarcation line between subliminal and psi effects. This raises the question of whether or not the criterion of repeatability should even be considered appropriate for occurrences of psi. If the criterion of repeatability of psi occurrences were ever dropped, then one of the major arguments against the existence of psi, as now demonstrated experimentally, would evaporate. Pratt further states that if we consider as fundamental what we call the law of 'recurrence,' where the intermittent and unpredictable natures of psi become characteristics of psi, then persistence and inevitability may be to psi events as predictability and repeatability are in classical physics. (Pratt, p.144)

Perhaps this is too large a change for modern science. It is enough that parapsychology is challenging other paradigms of the scientific establishment without challenging the basis of the scientific method itself. This is of course a legitimate argument and may lead to fruitful results, but it doesn't seem as sure of results as the establishment of a theory, physical or not, would be to the progress of psi research. Alternately, the intermittence and unpredictability of psi could be explained by and incorporated into a physical (or quasi-physical) theory. It is unfortunate, as Rhine has cited, "that we can only study ESP scientifically by using methods of investigation dictated to us by other sciences. However, we are not entitled to believe that ESP will conform. Because psi is so elusive, a basically unconscious process, and perhaps even a physical process, the psychological approach may actually be a deterrent to the study of psi." So Rhine, who is considered the father of modern parapsychology, freely admits that psi may not only be a physical process, but if it is, psychological studies of psi are harming our understanding of the phenomena. Thus does not mean that psychological studies be stopped as detrimental to science, but rather that too much emphasis is put on parapsychology at the expense of paraphysics.

All of these factors show some of the failures of a purely psychological or mental attack on the problem of psi. Perhaps the physical sciences can offer no better a solution, but in so far as psi events are real, they are occurring in a physical reality, in physical space and time. Even if psi proves in the end to be non-physical, it is intimately related to the physical world in the very least analysis. Thus, any attempt to develop a physical theory seems to be in order, if not a sheer necessity for the advance of science into the domain of psi.

Parapsychology could be characterized at present as experiencing acute prematurity. This prematurity is at least partially due to the fact that physics has not yet played a great enough role in the development of research on psi. According to Stent (O'Regan, p.453), this prematurity is evident when "a discovery's implications cannot be connected by a series of simple logical steps to canonical or generally accepted knowledge." Kuhn also points out that "In the absence of a paradigm or some candidate for paradigm, all the facts that could possibly pertain to the development of a given science are likely to seem equally relevant. As a result, early fact gathering is a far more nearly random activity than the one that subsequent scientific development makes familiar." It can therefore be surmised that with our present knowledge of psi phenomena

and parapsychology, we are in this stage of fact gathering prematurity, awaiting a theory or candidate for a paradigm.

Such a theory must conform to the same metaphysical criteria that are expected of all the various sciences. Among these are the following: (1) They must be fertile, in that they make a difference in what you are observing or explaining; (2) They must be extensible in that they can cover a great deal of information; (3) They must form an interconnected relation to each other to form a complete whole, besides merely explaining the facts; (4) They must be simple; (5) There must be a certain elegance inherent in the scientific constructs which serve to explain the known facts; and (6) There is the principle of causality which must play some role. (Margenau, pp.210-212) Beyond these criteria, they must also conform to the non-metaphysical, empirical criterion of verifiability, which manifests itself as experimental or observational confirmation. These criteria should be applied equally to any theory of psi that is offered whether or not that particular theory is considered an end product or a stepping-stone that will lead to further theorizing.

Science is not absolute. Nor are its propositions and basic tenets beyond change for all of time. Science is constantly in a state of flux. In fact, in the past century there has been a great deal of change as one of the more basic criteria has been withdrawn. The withdrawal of this particular criterion has implications for psi research: No longer do the models used in modern science need to be couched in terms of visual concepts. This is evident in both quantum mechanics and in the general theory of relativity. Many of the microscopic phenomena of the subatomic world not only fail to conform with visual concepts, but even the languages that we use fail to be adequate in describing them. This is especially significant for psi research, both in that it is possible to alter the above criteria if a viable theory is given and in the fact that psi phenomena have little or no previous language adaptation and do not submit to visual conceptualization.

Pratt spoke of the future "Einstein for Parapsychology" and informed us that Thouless also recognizes the present prematurity of psi research by placing this "Einstein" far in the future. However, theories are still needed at this present point in time to organize and direct research toward specific objectives. There is a need for basic insights, not only to help present research directly, but also to influence it indirectly by gaining the acceptance of other scientists. This "acceptance of the findings of parapsychology by other scientists will not occur until a theory is available that 'makes sense' of psi-phenomena." (Pratt, p.134) This presents an acute problem in parapsychology since "No theory has yet been adequately confirmed by later experimental tests, nor has any been accepted in the field because of its logical consistency and strength. Some of them, however, are still receiving respectful attention and may ultimately offer something of value for the future Einstein." (Pratt, p.134) Hence, the lack of, the value of and the need for a basic theory of psi is well recognized.

The acceptance by the scientific community as a whole seems to necessitate some theory or framework that is at least capable of linking and explaining all of the various types of psi manifestation. This fact has a parallel in one apparent trait of psi. "It looks as

if telepathically received impressions have some difficulty in crossing the threshold and manifesting themselves in consciousness there seems to be some barrier or repressive mechanism which tends to shut them out from consciousness, a barrier which is rather difficult to pass, and they make use of all sorts of devices for overcoming it." (Dobbs, p.239) This compares closely to the hurdles over which a theory or paradigm must go to gain the acceptance of scientists, and shows a scientific bias against psi's acceptance. Once this difficulty is removed by a valid theory, hopefully a greater "science" will emerge. Some have even gone further in their hopes to state that "it is likely that when the maturity gap between current psychic research and the physics of the near future is closed, psychic research, if it did not already exist, would have to be invented to fully explore the 'new' experimental paradigm of 'undivided wholeness'." (O'Regan, p.462)

Despite the general acknowledgment that a theory of psi is completely necessary, there remains some debate as to what form such a theory should take. Should it be a mental theory or should it be a physical theory? The very fact that "psi phenomena are observable is to say that they interact with physical systems. If they interact with physical systems, it is to be expected that they can be observed by physicists and that they in some way enter into their theories." (Roll, p.44) Therefore we should expect a physical theory. Eccles (Dobbs, pp.240-244) even contends that some channel or mode of spatial connection is involved in psi and the psi agent's consciousness is located in the brain, which is separated in space from the percipient (in telepathy). Thus, "he definitely commits himself to saying that the influence must itself have a spatial- temporal pattern; and that it must be located in 'physical' space and time in which the cortex upon which it operates is located." (Dobbs, p.244) To be located in this manner in the physical universe also seems to necessitate a physical interpretation of psi, or, in the least, the two research fields of physics and parapsychology must be parallel or 'resonant'; "hence the study of the relationship between them comes to be also of paramount importance. (Whiteman, 1977, p.730)

No adequate physical theory has ever been proposed, experimentally verified and accepted, despite the fact that the 'physical' hypotheses, directed toward finding a new medium of psi communication, are the ones which are most likely to reveal the limiting conditions of psi. (Rao, p.170) However, science now finds itself in a situation where contending theories of psi are being developed. These limiting conditions are necessary, as has been pointed out, to delineate the demarcation between the psychological and the parapsychological. It is also true that "One cannot relate physics to telepathy, clairvoyance, precognition, or other specific paranormal aspects, unless one has a clear means of distinguishing these one from another." (Whiteman, 1977, p.746) This could also be accomplished by establishing a physical theory as boundary conditions for the various observed phenomena. This, however, creates a maddening circle. The boundary conditions and limits of psi are needed for a complete physical theory, yet a physical theory of psi may be needed to define these same limits. Therefore, we can recognize a desperate need in parapsychology for a meta-theory that prescribes the criteria, lines and the limits for theories of psi phenomena. (Chari, 1977, p.810) This meta-theory could then be used to direct research until an "Einstein" for parapsychology comes along to put

everything in order. There seems to be every reason to accept the possibility that this meta-theory will be physical in nature.

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E-mail comments and suggestions to Jim Beichler, editor, *YGGDRASIL*, at
jebcolst@aol.com

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