Part 5: Presidential Address

PSI: ITS PLACE IN NATURE*

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The Scottish philosopher David Hume, who stated unambiguously that no evidence is sufficient to establish a miracle, is in a sense the grandfather of the contemporary critics of parapsychology. The more sophisticated of these critics, however, find it expedient on occasion to disclaim their Humean legacy. For example, Paul Kurtz, chairman of the Committee for the Scientific Investigation of Claims of the Paranormal, which spares no effort to debunk the whole field, has argued that we cannot "legislate antecedent to inquiry, what is true or false. One must always be open to unsuspected possibilities, novel theories, new kinds of discovery. The history of science vividly demonstrates the fact that revolutions in thought can overturn even well-established beliefs, and that ideas once rejected may eventually be verified" (Kurtz, 1977, p. 42). Another critic of ESP research pointed out that "modern parapsychological research is important. If any of its claims are substantiated, it will radically change the way we look at the world" (Diaconis, 1978, p. 135). Obviously, this opinion is not shared by all the critics. For example, Ray Hyman says that "if ESP were proven to be a reality it would not provide a serious threat to science or other accepted views" (Hyman, 1977, p. 18), and its import will tend to be "methodological, rather than theoretical or substantive" (Hyman, 1978).

There is a degree of dissonance in our critics' attitudes--the belief in the openness of science on the one hand and the belief that psi is a priori impossible on the other. Such dissonance leads one to consider, irrespective of significant data, that the evidence is inadequate or that the phenomenon is too trivial to merit consideration. For the same reason, the incongruence between their general statements of principles and their comments on specific issues tend to be overlooked by the critics. One hopes that an agreement on general principles and approaches would provide the necessary frame of reference for a meaningful dialogue. But this is often frustrated because of the underlying prejudices that can become more important in determining one's beliefs than any stated principles.

Phillip H. Abelson, editor of Science, is quoted as saying that "extraordinary claims require extraordinary evidence" (US News

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and World Report, 31 July 1978, p. 41). The logical implication of this statement is that the strength of evidence required to establish a new phenomenon is proportional to its incongruence with our prior notions concerning its existence. In extreme, then, if one considers a phenomenon to be impossible, it is within one's right to demand evidence that is impossible to obtain. This is what some critics of parapsychology have attempted to do. When the requirements set by a critic for acceptable evidence are met by further research, another critic will come up with new ad-hoc explanations for positive results. This can go on endlessly because their unstated assumption is the one made by David Hume concerning miracles. The history of science is replete with examples that render Hume's assumption untenable. However, some of our critics who readily see the weakness of any a priori denial of psi do no better than mask their implicit Humean prejudice by assertions of the openness of science to anomalous phenomena while making demands that are impossible to satisfy.

I can speak from my own personal experience how well-intentioned, intelligent and informed men and women can have mental blocks when their long-standing belief systems are questioned.

I have two long-time Indian friends who in their gentle way tried to persuade me to change my research interest in parapsychology to something more conventional and consequential. They made no secret of their disdain and displeasure at what they perceived to be an able man going astray. They sincerely wanted to help. We had long, sometimes difficult, discussions on this subject. The central thesis of one of them was that psychic phenomena are too anomalous and incongruous with the current corpus of science to be true, no matter what the evidence is. His method of disposing of the evidence for psi was somewhat similar to that of B. F. Skinner, who lamented, "The genetic endowment responsible for our behavioral processes cannot fully protect us from the whims of chance, and the statistical and scientific measures we devise to bring our behavior under the more effective control of nature are not adequate for the extraordinary complex sample space in which we live. Science has not ignored some underlying order; it has not yet devised ways of protecting us against spurious evidences of order" (1977, p. 11).

The other friend, who would patiently listen to my side of the story, finally conceded on statistical grounds that psi probably exists but then he exclaimed, "What good is this stuff--it is too trivial to be of any value or interest!" One would think that the manifest contradiction between the respective positions of these men would be sufficient to expose the weaknesses in their arguments and that a confrontation between them would have settled the questions of the existence and importance of psi phenomena. Unfortunately, the outcome would not be as simple as that. Our intellectual biases, like our emotional prejudice, tend to make us overlook those arguments which conflict with our prior beliefs and make us reinforce those which are congruous with our biases. Consequently, to

one of my friends, psi appeared to be profound but unreal, to the other it seemed real but trivial. In either case it was not worth the effort, they thought.

I wish to share with you this evening my reasons for disagreeing with my well-meaning friends. I will argue that psi is neither nonexistent nor trivial. It is both real and profound. It is real because the evidence is inescapable and the criticisms of it are unfair, false and unable to explain away much of the experimental evidence. It is profound and exciting because it has substantive implications for our understanding of the nature of man and his place in nature.

I

To this audience it is hardly necessary to review in any detail the reasons for my belief in the reality of psi. Psi experiences have been reported throughout the recorded history of humankind. Evidence for the existence of psi has been obtained under controlled conditions by dozens of scientists widely scattered across the globe. Psi effects such as declines and missing (Rao, 1977a) that are not anticipated by the original investigator have later been discovered in the data. People who were too afraid or too reticent to publish their data because of their controversial nature are known to have obtained significant psi results. I do not really see how someone like Dr. Kurtz could have any alternative to accepting the reality of psi. C. E. M. Hansel, who is often referred to for a final word on parapsychology by those who do not believe in it, concluded his magnum opus ESP: A Scientific Evaluation thus: "a great deal of time, effort and money has been expended but an acceptable demonstration of the existence of extrasensory perception has not been given. Critics have themselves been criticized for making the conditions of a satisfactory demonstration impossible to obtain. An acceptable model for future research with which the argument could rapidly be settled one way or the other has now been made available by the investigators at the United States Air Force Research Laboratories. If 12 months' research on VERITAC can establish the existence of ESP, the past research will not have been in vain. If ESP is not established, much further effort could be spared and the energies of many young scientists could be directed to more worthwhile research" (1966, p. 241).

If these are the final words of the critic, no one who is familiar with the recent parapsychological research could reasonably doubt the existence of psi. Helmut Schmidt and the work that followed his first experiment involving the random event generators and the automatic recording devices, which are no way inferior to the VERITAC, meet all the demands made by Hansel for an acceptable psi experiment. The overwhelming evidence that Dr. Schmidt and others have accumulated should suffice to convince an open-minded skeptic.

Informed skepticism has a place in science. If the best of parapsychological research is among the best in behavioral research from the standpoint of design and data collection, part of the credit should go to the critics who did their best to find possible loopholes and artifacts. Occasionally, however, one wonders whether they did not go beyond the limits of rational discourse, as when G. R. Price (1955) attributed significant psi results, which were not otherwise explainable, to "a few people with the desire and the ability artfully to produce false evidence for the supernatural," a statement which he has since retracted (Price, 1972).

The same journal which published the article by Price, has in a recent issue (July 14, 1978) another critical article by Persi Diaconis who describes himself as both a statistician and a magician. It would appear that it is just as easy to publish in Science if you are a critic of parapsychology as it is difficult if you wish to present some evidence in favor of psi. One of the common strategies of the critics, the one that Diaconis unhesitatingly embraces, is to set up straw men and shoot them down, to raise pseudo-problems or problems the parapsychologists have long ago recognized and solved.

I will refer to the article by Diaconis (1978) in some detail because it exemplifies both the dissonance of many of our critics toward psi as well as the inherent weakness of their arguments once they abandon the Humean position.

Diaconis states unambiguously that "modern parapsychological research is important." He acknowledges that Feller's criticism of the statistics used by J. B. Rhine and his coworkers was wrong, and concedes that many parapsychologists are statistically sophisticated. He even credits the parapsychological community with solving "numerous statistical riddles in its own literature." Yet, in the same breath, he accuses parapsychologists of violating elementary statistical assumptions. He writes as though parapsychologists are unaware of the statistical problems related to feedback and multiple analyses. The fact of the matter is that these problems have been discussed in the parapsychological literature, and procedures for correcting for any artifacts arising from them are well known to most parapsychologists.

"A common problem in the evaluation of ESP experiments," Diaconis states, "is the uncertainty about what outcomes are to be judged as indicative of ESP" (p. 131). On the face of it, this statement is tantamount to saying that parapsychologists do not conduct experiments, but only make ad-hoc observations. Obviously, this is not what he means. He seems to say that parapsychological experiments are so loose-ended that it is difficult to make any sense of the evidence. This is simply not the case and displays on the part of Diaconis a serious lack of understanding of the way parapsychological experiments are carried out.

The first book any student of parapsychology needs to read

is Parapsychology: Frontier Science of the Mind by Rhine and Pratt (1957). This book makes a clear distinction between exploratory research methods and methods of verification. A critic who does not grasp this distinction between exploratory and confirmatory studies has simply not done his homework and cannot talk meaningfully about parapsychological experiments. It is suggested in the book that a pilot experiment be carried out before undertaking any elaborately designed project because "the many uncontrolled variables ... are especially likely to cause trouble in investigations with so elusive a capacity as psi" (Rhine & Pratt, 1957, p. 26). The triviality of Diaconis' criticism becomes obvious if one looks at the two statistical requirements of the Journal of Parapsychology, a leading journal in the field:

> (1) The precise statistical formulation of the hypothesis (or hypotheses) being tested in a research report should be concisely stated and listed in advance of the presentation of the results. It is recommended that the type of statistical test(s) that are planned be given along with the hypothesis.
>
> (2) Any statistical analysis not previously stated as preplanned should be accompanied by a brief statement of the motivation or circumstances leading to that analysis, and the probability value should be in close enough proximity to this statement that its association is obvious [Cover, page 3, March 1978].

It is amazing that Diaconis should commit the same errors which he wrongly accuses parapsychologists of making. His criticisms of psi experiments are not applicable to much of the serious research in the field and where they are applicable they have already been discussed in the parapsychological literature itself. "The confusing and erratic experimental condition" he has witnessed at the Harvard demonstration would seem to anyone well acquainted with psi research to be more an indication of the limitations of his exposure to parapsychological experiments than a true and typical picture of the field. To be brief, I shall confine my comments to his remarks regarding the experiments with the special subject, B. D., carried out at the Institute for Parapsychology.

His criticism of the Kelly and Kanthamani experiments (1972; Kanthamani & Kelly, 1974a, 1974b) is two-fold. It concerns informal design and cheating by the subject. The evidence for these criticisms is not obtained either by an examination of the actual experiments or of their reports in professional journals, but from his own observations of B. D.'s informal performance in another place and setting.

It would seem that the accusation of "informal design and evaluation" is more apt to the observations of Diaconis relating to the Harvard demonstrations than to the experiments of Kelly and Kanthamani, since the critic's arguments are almost wholly based

on observations obtained under conditions more informal than any he chooses to criticize. What he refers to as uncontrolled experiments were, in fact, informal presentations to a group at Harvard. They can in no sense be construed as experiments. It is difficult to see how observations made during such informal presentations could be cited to invalidate the results obtained under a different set of experimental conditions which he does not even attempt to criticize.

Apart from this fatal methodological flaw, one wonders how relevant are his observations to the findings claimed by Kelly and Kanthamani. "A major key to B. D.'s success," states Diaconis, "was that he did not specify in advance the result to be considered surprising. The odds against a coincidence of some sort are dramatically less than those against any prespecified particular one of them. For the experiment just described, including as successful outcomes all possibilities mentioned, the probability of success is greater than one chance in eight. This is an example of exploiting multiple end points" (p. 132). The implication of this statement is that in the experiments reported by Kelly and Kanthamani, B. D.'s results are at least in part due to "exploiting multiple end points." This is patently false.

Not surprisingly, Diaconis refers only to a part of the first report of Kelly and Kanthamani which deals with their exploratory work with cards, leaving out other parts where B. D. could not have used any tricks. The fact of the matter is that this report also presents significant results obtained with Schmidt's four-button machine and with a dice machine which leave no scope for sleight-of-hand tricks. Kelly and Kanthamani (1972, p. 188) specifically state that B. D.'s card trials in their exploratory research cannot be considered as scientific evidence for ESP. Subsequent research as reported in the second paper (Kanthamani & Kelly, 1974) was aimed at confirming under controlled conditions the suggestions that came out of the exploratory work. In the second report to which Diaconis refers, the subject B. D. obtained three times more the number of exact hits than expected by chance. Such a result gives a Z score of 12 and one does not have to be a professor of statistics to appreciate the fact that an inconceivably large number of multiple end points would have to have been available to the subject or experimenter to dig up such an improbable result on the hypothesis of coincidence. However, the fact is that neither the subject nor the experimenter was allowed such multiple ends as Diaconis wants us to believe.

The second criticism is based on cheating by the subject. Diaconis accuses B. D. of employing sleight-of-hand tricks in the Harvard presentations that he had witnessed. Among the observations he made are "I saw him glance at the bottom card of the deck he was shuffling" and "BD secretly [emphasis added] counted the number of cards between the card he had seen and the selected card" (p. 132). To accuse someone publicly of cheating, I would think that we should have something more evidential than "I saw

him glance at the bottom card." The critic cannot use one set of standards for evaluating evidence for psi and another set for convincing himself there was fraud in the experiment. Would Diaconis be convinced that B. D. has ESP if someone with training and a background similar to that of Diaconis has testified that he did not see B. D. use sleight-of-hand when he obtained significant psi scoring?

If one of my colleagues who is also a professional magician had told me that his broken watch was paranormally mended by Geller and that he saw Girard paranormally bend an aluminum rod, it would not convince me that Geller and Girard are psychics; we need to have something more than informal observation. We need data and we need to know the conditions under which the data were obtained so that we can reach sound conclusions. The hypothesis of Diaconis is more ad hoc and multiple ended than anything he criticizes. In support of his accusation, he should provide more objective evidence than he has. It would have been a simple matter if the subject's movements were monitored through video recording, if they had any reason to believe that B. D. would use such sleight-of-hand tricks. Again, one would ask what evidence Diaconis had for concluding that B. D. had "secretly counted." One would hope that he appreciates the difference between the statement, "BD could have secretly counted," and the one he actually makes, "BD secretly counted...." If one could confuse inference for observation, is it not possible that one could also mistake imagination for actual perception?

Apart from the ad-hoc hypotheses and post-hoc surmises he makes, the shallowness of Diaconis' criticism becomes obvious when one looks into the actual experimental set-up and realizes that none of these hypothetical tricks are appropriate for explaining the results obtained in the Kelly-Kanthamani experiments with B. D. To dismiss the results of controlled studies on the basis of speculative inferences drawn from ad-hoc observations made at informal "performances" is just another indication of the Humean prejudice against those phenomena that do not seem to fit into the current corpus of science. And that Science chose to publish a paper with such glaring gaps between evidence and conclusion, gaps which can be filled only by one's prejudice against parapsychology, makes one wonder whether Science itself is free from the Humean inheritance.

The criticisms of Diaconis have not shaken in the least my belief in the existence of psi. In fact, if the arguments of Diaconis are the best any critic can muster, I believe the case for psi is strong and irrefutable. This does not mean that everyone will find the evidence convincing. Given a fertile imagination, even intelligent and stable individuals who are neither paranoid nor disoriented tend to engage in all kinds of ad-hoc reasoning. Adolph Baker illustrates this beautifully with reference to his friend who refused to believe, at one time, that the Russians orbited an astronaut because "they are perfectly capable of fabricating such a story out of whole cloth" (1970, p. 103).

II

My second friend, who has the necessary scientific training, sees the pitfalls of ad-hoc reasoning and is therefore willing to concede that psi may exist. But his initial prejudice leads him to raise questions of a different sort. What difference does it make, really, he asks, even if one accepts that psi exists, as long as it is so elusive, unpredictable and inconsequential? In a typical card-calling experiment, he argues, it is not even possible to pinpoint a trial and say that "here is ESP." In several experiments that gave significant results, parapsychologists themselves were unable to agree who was, in fact, the source of the effect--the subject or the experimenter. There is little hope of learning to use psi for practical benefits; repeatable experiments are still not in sight. The information that is supposed to be gained through ESP is too trivial, insignificant and uncertain to hold any hope that it would displace or supplement sensory communication. What is it, then, queries my friend, that you hope to accomplish in your research, besides perhaps convincing a few more people?

My friend, of course, knows that I do not generally contribute to and am not fascinated by the science-fiction projections of what psi might accomplish in the future. I have little fear that psi, in the near future, will be used to control the minds of men. I do not believe that psi will ever be a substitute for our sensory-motor functions. I doubt whether psychic healing is anywhere near competing with conventional therapies. I do believe, however, that psi interacts with our normal functions and to some degree, determines how we function. And this is important because a greater understanding of psi may contribute to our better functioning. Also, psi seems to point to levels of reality and of our being that we have so far ignored. And this will have revolutionary consequences for our understanding of man and his place in nature.

Before I take the quantum leap and discuss the implications of psi, I will briefly go over some of the basic things that we seem to know about psi. These may provide the empirical grounding or at least the starting point to some of the speculations I will subsequently discuss.

At various times during the past quarter of a century of my involvement in parapsychology I have asked myself the questions, What do we know about psi other than that it exists? and What have been the lines of progress so far and what areas hold promise for the future? One of my first exercises to answer these questions was to analyze and compare the bibliographic entries in my card file for the first two decades of my active involvement in the field, 1955-1974. In 1975 I attempted to make a comparative review of published parapsychological reports during the years 1955 to 1964 and 1965 to 1974. At the outset, I found a 50 per cent increase in published research papers from the first to the second decade. Interestingly, even though most parapsychologists consider that psi had been conclusively shown to exist well before 1955, a number of

papers whose main objective was to provide further evidence for the existence of psi continued to be published in our professional journals. During the years 1955 to 1964 more than 40 such experimental reports appeared. There does not seem to be any slackening of such effort during the subsequent 10 years. There were as many as 53 papers whose main contribution was limited to providing further evidence for psi. Thus, while our professed objective is one of attempting to understand psi, we have not given up the endeavor to obtain more and better evidence. Reporting such evidence did not preclude criticisms of research. There were nearly 25 published reports critical of parapsychological research in the period 1955 to 1964. In the following decade there were as many as 35 reports of criticism and countercriticism. A recent and welcome trend is for parapsychologists themselves to criticize each other's research on methodological grounds.

There have been perceptible increases in reports on the following areas from the first to the second decades: altered states of consciousness; historical and review papers; methodology; personality, psi and cognitive processes; and the relation of parapsychology to other disciplines. Papers on spontaneous cases, survival and theory remain at about the same level. The only area where there is a marked decline in the number of published reports is the one involving target variations, experimenter differences and differences in test conditions.

There has been a significant increase in the use of free-response target material in ESP research. In PK research, significant departures from the traditional dice experiments were made with the introduction of random event generators. Also of interest are investigations on the effect of PK on living systems and greater openness to the study of static PK.

Despite technological advances allowing new types of psi experiments and increased methodological sophistication in experimental research, the riddles of psi are still with us. The effect of subject variables such as personality is far from being conclusive. We still do not seem to know whether it is a better strategy to work with selected or unselected subjects. As for target content and conditions, not much of any consequence has been added to our knowledge of such variables since 1955. The initial assumptions that the physical aspects of targets and their location in time and space may not have any intrinsic effect on psi functioning continue to be entertained by most researchers in the field. The role of the experimenter has come to be increasingly complicated with the realization that his psi may be the source of the observed effect. The evidence for unintentional psi has further blurred the neat distinction between the subject and the experimenter.

What has impressed me most, however, was the fact that what seemed to be a salient finding at one time appeared to be quite trivial at another time. Take for instance, the question of telepathy versus clairvoyance. The conceptual distinction between

these two terms was made quite early in the history of systematic parapsychology. For many years there was a controversy over the state of evidence for one against the other. One could even identify national stereotypes on this question, the British by and large favoring the telepathy hypothesis and the Americans, clairvoyance. My very first experiment in parapsychology was prompted by my youthful enthusiasm to solve the question of telepathy and clairvoyance once and for all. This attempt proved abortive as the "beautifully" designed experiment gave no evidence of psi.

After years of intense attempts to demonstrate "pure" telepathy and "pure" clairvoyance and the heated exchanges to explain telepathy by clairvoyance and precognition and clairvoyance in terms of telepathy, we are now led to a position where the traditional distinction between the two as two distinct modes of psi seems to be rather pointless and where telepathy and clairvoyance simply appear as a single ability operating on diverse target materials. The range of targets seems to be immense indeed, as subjects are known to succeed in guessing images in someone's mind as well as electromagnetic activity inside a computer. Again, recent evidence seems to suggest that the distinction between ESP and PK may be misleading in some crucial ways. Already theoretical attempts to reduce one to the other have been made with some degree of plausibility (Schmidt, 1975; Stanford, 1977, 1978; Walker, 1975).

I recognize that we may not all agree on what is the most significant aspect of psi we have been able to discover so far. It seems to me that the most salient findings have in some sense a negative tone. We seem to know more about the conditions that do not constrain psi functioning than those that would enhance it. This is somewhat paradoxical because the occurrence of psi itself is sporadic and elusive. I have come to think that these findings are quite important in that they may lead us to an appreciation of the true place of psi in nature. The physical aspects of psi, such as size, shape, color and form of the targets, do not seem to have any intrinsic effect on psi. Neither do space and time and the causative complexity of the psi task. Any hypothetical relationship of distance to ESP must assume that there is some energy transmission between the subject and targets which is inhibited by the distance factor. But if precognition is a fact, as we have strong evidence to believe that it is, what is the nature of this transmission that occurs between the subject and the not-yet-existing target? Thus, the evidence for precognition and the success of ESP experiments over long distances lead me to believe that space and time are not constraining variables as far as psi is concerned. Another significant negative is the relative ineffectiveness of task complexity in constraining psi. Stanford (1977) has reviewed the relevant literature and concluded that "the efficiency of PK function is not reduced by increases in the complexity of the target system" (p. 375).

If psi is unconstrained by space and time and the complexity of the task and if the psi situation is such that distinctions between

thought and matter, cognition and action, subject and object become less than meaningful, it would seem that psi may function beyond the familiar categories of understanding, and point to a state of being which cannot be properly classed as mind or matter. Psi phenomena raise the question whether there exists a realm of reality beyond the phenomenal world of appearance that is primarily a product of our information-processing capabilities and mechanisms. One may rightly wonder whether we are not dealing here with the Kantian "thing in itself." Also, it would seem that it is just for this reason J. B. Rhine (1953) and others have emphasized the notion of the nonphysicality of psi.

Another characteristic of psi phenomena is the apparent lack of any discernible connection between a psi event and its assumed cause. This led C. G. Jung to postulate that psi belongs to a class of synchronistic acausal events (Jung & Pauli, 1955). In order to make any sense of synchronicity as an explanatory hypothesis, we have to assume a kind of omniscience on our part and regard archetypes as nonlocal in the sense that they can function independently of space-time constraints (Rao, 1977). Yet the problem of communication between the individual and the archetypes remains unresolved. We need to explain the dirigibility aspect of psi--i.e., the synchronization of archetypal activity with the wishes of the subject or the experimenter in a successful psi test.

Unlike spontaneous psi, laboratory effects involve a connection between someone's intention and the subsequent observation of an effect. Without such an intention or expectation, observed effects would be no more than improbable coincidences. It is this intentionality, often stated in terms of expectations and experimental hypotheses, that gives meaning to coincidences. But the intention itself, it seems to me, is not the cause of the observed effect in the sense of a formal or efficient cause. Only in a teleological sense can the intention be considered a cause of a psi effect. This point is becoming increasingly apparent in the attempts to regard psi as goal oriented.

What about, then, nonintentional psi effects? In the sense of an effect obtained in a planned laboratory experiment, nonintentional psi is a misnomer. The usefulness of this concept is at best limited to focussing attention on the possibility that the source of a psi effect may not be the subject as is traditionally assumed. Insofar as the experimenter intends or wishes a particular outcome in an experiment, whatever psi that may be evidenced by that experiment is largely intentional.

III

If you now allow me to leave the stable empirical base of research and take a flight to not-so-secure heights of intellectual fantasy, I will share with you my distant gaze of psi from the skies of speculative thought. The gaze at this point is somewhat hazy as

our conceptual framework is still misty. My vision is to a degree obscured by the clouds of acquired biases in favor of an orderly universe compatible with commonsense world views. So I cannot promise to present to you a clear, much less an accurate picture of psi. Perhaps we can gain a perspective that would stimulate further search for psi laws when we return to our base and resume our research. If some of you fear at this point that I am about to palm off on you some Oriental nonsense, I am afraid your fears may not be unfounded. I assure you, however, that I will attempt to match such nonsense with an equal amount of its Occidental counterpart.

Our attempt to understand psi in some ways parallels the attempts of some of the Indian thinkers to understand the nature of the Brahman, the supreme self. It is suggested, for example, that the best way to grasp the Brahman is to strip it of all the contents of experience through a process of elimination. This process of successive denial of attributes in describing Brahman is expressed in the famous formula "neti, neti (not this, not this)." The denied attributes include all the things and relations we find in the world, including spatial, temporal and sensory attributes. Brahman is something which is neither limited in space and time nor is distinguished from other objects. It is both the subject and the object. In a sense, it is undifferentiated subjectivity or non-objective consciousness.

Brahman is the same as Atman for the Advaita Vendantins. Atman is undifferentiated pure consciousness, timeless and spaceless. It underlies each and every individual person. Atman as supreme consciousness is devoid of such distinctions as subject and object that are so characteristic of our normal consciousness. Ordinary consciousness or thought is a process whereas Atman is a state of being. The statement in Chandogya Upanishad, "tat tvam asi (thou art that)" referred to as the mahavakya, or the "great saying," expresses the relationship between the individual consciousness and the supreme consciousness. The relationship is one of identity but represents a progression from phenomenal consciousness to pure consciousness. In a sense the supreme consciousness constitutes the ground for our individual consciousness. Thus, tat tvam asi is the assertion of a common ground that links the individual to the Brahman.

The individual is a curious combination of both reality and appearance. Insofar as Atman constitutes the ground of the individual, it is real, but in its phenomenal aspect with its stream of experience, the individual is mere appearance. The phenomenal consciousness according to Sankara continually strives towards one end or another. It acts like an agent controlled by the upadhis (mental processes) that limit our understanding. Thus, the individual consciousness that manifests a systematic unity of experience constitutes the empirical being or self that is defined in terms of bodily conditions. But this empirical being is not all that we have because within each of us we have also a supreme consciousness that acts as the

ground and witness or sakshin. The Atman is called sakshin when the mind of the individual acts as a limiting adjunct to the supreme consciousness. The sakshin is thus conceived as the constant witness of the individual's experiences, a screen on which the experiential phenomena are played. It is important to note that according to Sankara, the individual person is neither a part of, nor different from, nor a modification of the supreme consciousness. It is Atman itself steeped in avidya or nescience. It is the upadhis within us that limit the understanding of the Atman. According to this theory of limitation, known as the avacchedavada, the individual person is the Atman limited by his mind. There is also another theory, called pratibimbavada, to account for the relationship between the individual and the supreme consciousness. According to this theory, the individual consciousness is a reflection of the supreme consciousness in the mirror of avidya or nescience. The reflection is as real as the image but its clarity is a function of the state of the individual. Just as the reflection of a person in a pool of water differs depending on the state of the water, whether it is clear or dirty, calm or turbulent, the reflection of the supreme consciousness in an individual self depends on the state of the avidya of the individual in whom it is reflected.

To sum up, then: the ultimate reality is the pure being and it is the supreme consciousness. The empirical being or the individual consciousness is a phenomenal manifestation of the supreme, limited by the mind, the intellect, the senses and the body. The supreme consciousness not only provides the necessary support to the individual but also acts as the witnessing consciousness throughout the life history of the individual. It is possible to transcend the limitations of our bodily conditions and achieve understanding of the supreme.

Advaita distinguishes between four states of consciousness. They are the waking state, the dream state, the state of deep sleep, and the transcendental state. In the waking state the content of our consciousness is largely determined by external objects. It is the state where consciousness is processed by the whole set of our psychophysical system. Dream consciousness is made up of the same stuff as the waking consciousness but unlike waking consciousness its content is not empirically real. The deep-sleep state is characterized by the abeyance of all distinctions including the distinction of subject from object. The Mandukya Upanishad describes the fourth state of consciousness thus:

> They consider the fourth to be that which is not conscious of the internal world, nor conscious of the external world, nor conscious of both the worlds, nor a mass of consciousness, nor simple consciousness, nor unconsciousness, which is unseen, beyond empirical determination, beyond the grasp (of the mind) undemonstrable, unthinkable, undescribable, of the nature of consciousness alone wherein all phenomena cease, unchanging, peaceful and nondual [Mandukya Upanishad, 6].

Recently Karl Pribram (1971), the distinguished neuropsychologist, proposed a holographic model of brain and consciousness. There are striking similarities between some of Pribram's ideas on the relationship between the brain and the world and the advaita speculations on the Brahman and the individual self.

According to Pribram, the brain function is holonomic in that it partakes of both computer and optical information processes. "The brain is like a computer in that information is processed in steps by an organized and organizing set of rules. It differs from current computers in that each step is more extended in space--brain has considerably more parallel processing capability than today's computers" (Pribram, 1978). Again, unlike today's computers, memory storage in the brain is holographic. Pribram believes that his holonomic theory, besides providing models that would help us precisely explore in the laboratory such cognitive processes as memory, attention and problem solving, has possibilities for the study of consciousness. Ordinary consciousness, he says, is "achieved by a mechanism (somewhat like a hologram) that disposes the organism to locate fresh experiences and performances at some distance from the receptive and expressive interfaces that join organism and environment." One of the reasons for this conclusion is the similarity between sensory processing and physical holography as, for example, in Bekesy's findings (1967) in which the subject projected the somato-sensory source into space when a set of phase-related vibratory stimuli were applied to two of his limbs.

Pribram goes on to suggest that the world itself may be a hologram. Following David Bohm's (1973) distinction between explicate and implicate organizations relative to structural and holographic processes, Pribram makes a similar distinction for perceptual processes. Our current scientific analysis gives us knowledge about extrinsic properties of the physical world. Pribram argues that even the intrinsic properties (such as the stoneness of stones) are knowable. In fact, he says

> they are the 'ground' in which the extrinsic properties are embedded in order to become realized.... [T]he intrinsic properties of the physical universe, their implicate organization, the field, ground or medium in which explicit organization, extrinsic properties, become realized, are multiform. In the extreme, the intrinsic properties, the implicate organization is holographic. As extrinsic properties become realized, they make implicate organization become more explicit. This implies that the uncertainty of occurrences of events is only superficial and is the result of holographic 'blurring.' Thus, a random distribution in as much as it is based on holographic principles is not haphazard but determined.

All this makes Pribram conclude that there is "no more mystery to

the mystic than to the induction process that allows selective depression of DNA to form now this organ, now that one."

Obviously, much of the above is as speculative as advaita metaphysics, even though the language of Pribram is closer to a scientific formulation. I do recognize that even if it is the case that the brain processes involved in such activities as memory retrieval are in some sense holographic, it does not follow from this that the universe itself is a hologram. One would hope that Pribram would work out the implications of the enlarged holographic model encompassing the entire universe to man's nature in general and paranormal phenomena in particular.

The similarity between Pribram's ideas and the advaita speculations concerning the nature of the universe is quite apparent. The holographic universe is very much like Sankara's Brahman, the ultimate or first-order reality. The holonomic brain resembles in essentials the individual self, the jiva. The advaita belief that the world of our experience is a mere appearance or a second-order reality is also implied in Pribram's theory. Both seem to hold that the primary reality provides the ground, the field or the medium for the secondary reality as it manifests in our experience, and that the form of the processed reality is very much a function of our physical system. Again, they seem to hold that while the primary reality in itself is in principle unknowable at the level of our sensory awareness, it may be knowable in another dimension. There is thus the possibility of transcending the ordinary state of awareness and achieving consciousness without content. When such a state is achieved, the brain may function as a hologram of the universe so that it attains a state of omniscience. In the language of advaita, when the veil of avidya is removed, we have the knowledge of the absolute. It is interesting to note that according to advaita vedanta, perception involves the mind's taking on the form of the object perceived. Antahkarana (the mind) is of the nature of light and is capable of assuming various forms so as to give us corresponding perceptions of objects. The mind in advaita occupies an intermediary position between conscious subject and unconscious matter and thus makes the interaction between the two possible at the empirical level.

It is the potential for omniscience on the part of an individual organism that makes the advaita and holographic theories attractive to a psi theorist. However, the concept of omniscience implies a kind of determinism which is in a sense negated by some parapsychological phenomena. While ESP can be contained within a deterministic framework, PK, it would seem, requires more than a closed block universe; PK requires an open system that enables mental effort to bring about physical changes that cannot be accounted for in cause-effect sequences.

I shall not attempt to pick loopholes (of which there are doubtless many) in the advaita theory or the holographic model or to draw out more explicitly their implications for parapsychology.

These are better left to their opponents and proponents. Instead I will attempt to reconstruct a necessarily simplistic and mostly speculative picture of the universe in which psi may make some sense--a picture, it may readily be seen, inspired by Sankara vedanta and to a lesser degree by Pribram and Bohm. At this stage the picture may not be as elegant as the advaita theory or as provocative as the holographic model. But, hopefully, it may lead us to a line of research that will enable us to understand psi a little better.

IV

Reality, it seems to me, has many layers. In the core, it is undifferentiated and stable. On the surface it has distinct forms that are ever changing. The core reality is progressively differentiated so as to give us the appearance we have of it in surface reality. In the outer layers things are relatively insulated from each other. The interaction between them can be understood in causal terms. But within the inner layers distinctiveness and individuality are obscured and even obliterated as things merge into each other. Subject-object dichotomies become meaningless. Consequently, causality as it is commonly understood and the space-time characterization of reality lose their significance and relevance. The reality as actualized in the outer layers is implied in the inner layers in the same way the oak tree is implied by the acorn. The relations between things across a layer are causal and the relations between layers themselves is teleological.

In other words, the outer layers of reality are explicate forms of what is implicate in the inner layers. The process of the universe is one of making explicate what is implicate in the core reality. To put it differently, reality at its core contains the grand plan or design to which the unfolding universe conforms. The process by which the grand plan gets implemented, I venture to hazard, is psi. So conceived, psi is a fundamental process in nature, a process through which nature communicates with its constituents. Nature is so organized that its constituents inevitably conform to the grand design.

A crucial stage in the differentiation of core reality, i.e., the evolution of the universe, is the emergence of the self that can perceive itself as distinct from the rest. From such self-perception arises subjective awareness. The self, it would seem, is a nucleus which interacts with the contiguous constituents which provide the material for weaving around itself a world of its own. This weaving is accomplished by the structures that process reality, which at once mask the essential reflexivity of the self to relate as a nucleus to core reality and create the notion of the individual agent. The flowing stream of experience represents the encounters of the self with what is perceived to be reality. Insofar as we share similar structures, our experience of reality tends to be similar and we are able to meaningfully communicate with each other.

An essential feature of the self is its intentionality which enables the differentiated being (individual organism), now only remotely related to the core, to carry on the process of becoming. There is then, in the self, an instance of an interface between the implicate and explicate organizations. The implicate organizations are mediated through psi and are essentially teleological. The explicate organizations are bound by chains of causation. The intentionality of the self reflects both the teleology of implicate structures and the causality of surface reality in which it partakes. The interface between the implicate and explicate structures established in a selfhood makes a reciprocal relation possible. Not only do the intentions of the self reflect the grand design, but they also influence on appropriate occasions the peripheral phases of the design itself. Thus, we find that the constituents of nature conform to its design and that the intentions of the constituents, when suitably directed, have tangible effects on the design itself.

Intentions then have two sorts of effects. They affect surface reality directly through sensory-motor operations. They can also affect surface reality by affecting the reality plan to which all constituents of nature must conform. The former is achieved through what may be called "temporal" processing, while the latter seems to involve "depth processing," namely, a psi-mediated "reverse" contact that is established by the self as it is sinking back into its primordial condition of unity with the rest of reality. The "live" intentions of the submerged self get assimilated into the periphery of the grand design. As the constituents of nature conform to the design, the intentions bring about "paranormal" changes in surface reality. Depth processing may be holographic in the sense Pribram has implied, or it may involve the process of abaissement, as Jung put it, which makes the psyche open to the direct impact of archetypal factors.

The processes that generate immediate experience of surface reality are fundamentally temporal in nature. Our most immediate experience seems to be a product of integrating temporally separate events with an interval of approximately 100 milliseconds into a unitary impression. Compatible events are fused in experience and the incompatible and structurally different ones are omitted. This is accomplished at rapid speeds by our central nervous system. There is evidence that alterations of the interval of integration could result in changes of experience. These unitary impressions are further integrated with past and future events to give us experiential continuity and even to establish or select goals. Attention deployment or volition, central to cognitive control, has two dimensions, attentional focusing and attentional scanning. I suspect that these same dimensions of our cognitive control when applied to a mental event in a nontemporal way may enable us to have access to psi. A nontemporal application of our cognitive structures may enable us to experience the effects of our implicate organization.

It would seem that yoga may be a means of achieving control of nontemporal cognitive functioning. According to yoga, the chitta,

or the psyche, is in a state of continuous change or fluctuation. These fluctuations are called chitta vrittis. The purpose of yoga is to attain a state in which these fluctuations are completely restrained and controlled. We are told that such a state can be achieved by practicing certain psychophysical exercises that include meditation and concentration. The object of most of these exercises is to enable one to concentrate and attain attentional control. Dharana, or concentration, results in narrowing the focus of attention, perhaps to a single event. Controlled expansion of this focus is achieved by meditation or dhyana. And a prolongation of dhyana results in a standstill state called samadhi where one has consciousness without content, or attains a state where one perhaps can more directly partake in the implicate structures of core reality. Yoga and similar techniques may enable us to do such depth processing as is necessary to have access to nature's grand plan. It is claimed by certain practitioners of yoga that during the higher stages of yoga one loses personal identity, transcends subject-object dichotomies and gains an intuitive grasp of reality as well as paranormal experiences.

I am not sure that at this stage any of us are willing to bet that such control over psi is ever possible. But results of experimental research (Schmeidler, 1970; Osis & Bokert, 1971; Dukhan & Rao, 1973; Matas & Pantas, 1971; and Rao, Dukhan & Rao, 1978) involving meditation and similar techniques to alter the normal mode of our cognitive function have met with a fair amount of success warranting some optimism, if not conviction. Honorton's (1977) review of experimental studies bearing on psi and internal attention states in general and meditation in particular makes a strong case for a possible relation between psi and the control of attentional processes through such means as meditation.

V

Two kinds of psi are implied in what has been said so far. I propose to call them constitutive and epistemic psi. Constitutive psi is involved in natural processes. Epistemic psi is mediated through the intentionality of nature's constituents. What we now study in the laboratory is of the latter kind. Since psi is essentially a process that belongs to implicate organizations, it is logical to raise the question whether we can ever study and understand psi by means of methods that manipulate only physical or psychological variables. J. B. Rhine (1975), who more than anyone else is responsible for the development of research methods in parapsychology, himself has wondered whether such methods would ever lead to an understanding of psi, and has stressed the need for developing parapsychological methods that would make use of what he called psi "fingerprints." I do not believe that the true import of Rhine's revolutionary stance on parapsychological methodology has received its due among parapsychologists. It seems to me that Rhine's call for psi methods is his recognition of what appears to be psi's essential feature of manifesting in certain identifiable ways.

Inasmuch as our behavior is determined by the ongoing explicate as well as implicate organizations, it follows that psi is involved to a degree in our daily activities. In a few rare instances psi is the sole determinant of an outcome in our behavior. Sometimes the explicate and the implicate organizations act independently and may conflict with each other, resulting in the suppression or distortion of the input of one or the other. More often the inputs from both the sources mix and fuse and result in behavior that is indistinguishable from the normal but at the same time unexplainable in terms of meaningful explicate organizations.

I postulate that there is nothing that is purely random either in the universe or in our behavior. All behavior is determined either by the explicate organizations or the implicate organizations or by a combination of both. It is likely that apparent random behavior is an area where we may more likely encounter psi. The fact that the logically derived theories of probability are neatly supported by empirical data suggests a balancing function in nature. It would appear that such a balancing is essential for keeping intact the integrity of our cognitive function. The differential effect and similar psi effects seem to be a consequence of such a balancing.

That psi may be involved in more ways than in recognizable psi experiences has implications for understanding not only certain facets of our behavior but also some of the basic processes in nature. This fact renders parapsychology one of the most interdisciplinary of all subjects. There is perhaps no subject of inquiry that has no connection with psi. Take for example evolution. There are no agreed probability formulae among mathematicians and biologists to satisfactorily explain how our biosphere has evolved the way it did by mere random mutation and selection. The inherent difficulties involved in the classical Darwinian position has led at least one eminent biologist, Sir Alister Hardy (1965), to speculate that psi may interact with the physical system in the evolutionary process and thus, would account for some of the gaps left by the classical selection theory. Others, like John Randall (1975), see the possibility that psi may have even a more direct role in the origin of life and its subsequent mutations. Jule Eisenbud argues that "any psi-mediated factor that could work in confluence with and complement normal determinants influencing behavior might just tip the balance in one direction or the other" (1976, p. 45). He suggests that psi may effect the balance of adjustment "by facilitating the coming into each other's range of those predatory pairs whose ultimate encounter would tend to fulfill particular ecological requirements" (1976, p. 45).

In physics, Walker (1975) and others have suggested that "will," identified with hidden variables, may determine the collapse of the state vector for a physical system at the quantum level with infinitely small diverse potential states.

A basis for psi in our normal volitional processes is sug-

gested by John Eccles (1977). Again, Jan Ehrenwald argues eloquently in a recent book that "psi phenomena do not stand apart from the rest of human experience. They are part and parcel of the same overreaching psychosomatic continuum ranging from the mindless strivings of the instinct to Samadhi or satori, from metabolism to gut feelings, from transcendental meditation to artistic creation" (1978, p. x). He suspects the presence of psi in psychotherapy not only in striking experiences where psi may be involved, but also in what he calls doctrinal compliance, in which a patient seems to provide evidence for the therapist's theories; in mutual reinforcement of emotionally-charged attitudes resulting in the patient's positive therapeutic responses, and in the blocking of beneficial therapeutic effects in a manner analogous to psi-missing.

The intertwining of psi with some of the normal psychological processes may be illustrated in connection with Robert Rosenthal's (1975) interpersonal expectancy effects. Of course, Rosenthal himself did not claim any such connection. For those who are familiar with psi effects and experimenter expectancy effects, the connection is not, however, too strenuous to make.

The influence of the experimenter on the performance of the subjects was recognized almost from the beginning of systematic psi research. J. B. Rhine et al. (1940) wrote:

> The kind of experimenter actually in contact with the subjects may be of the first importance. His personality may be a determinative factor in the experimental environment. The investigator, then, may find it most advantageous to conduct his first exploration in the selection of assistants whose personalities and attitudes are suitable.
>
> The methodology at this important point may consist in great part of the art of handling people successfully. All the skills and methods that can be devised by the experimenter for conveying encouragement, inspiring confidence, implanting a realization of the importance of the tests, and arousing and maintaining an ambition to perform well in the tests will be decidedly to the point [p. 341].

Recent reviews of experimenter effects in psi research (Kennedy & Taddonio, 1976; White, 1976) have referred to some 75 studies in which the experimenter seemed to be a significant variable. In some of these studies, however, variables other than experimenter's expectancy (such as attitudes and personality) have confounded the results.

There appears to be three kinds of experimenter effects in psi research. First, the experimenter-subject interaction at the psychological level seems to be a significant variable. These effects are like the ones Rosenthal and his associates attempted to

study. In a study by Honorton et al. (1975) for instance, the subjects with whom the experimenter interacted in a "friendly," "casual" and "supportive" manner obtained significantly higher ESP scores than those whom the experimenter treated in an "abrupt," "formal" and "unfriendly" way. As expected, the subjects with positive interactions guessed significantly better than chance expectation and the subjects with negative interactions scored significantly below chance expectation.

Second, some subjects are able to receive psi signals and are able to act in response to them unintentionally. A good example is an experiment by D. J. West and G. W. Fisk (1953). The subjects in this study, who did not know that two experimenters were involved in the preparation of targets, obtained, as predicted, highly significant results when they were guessing the targets prepared by Fisk, while their scores on the targets prepared by West were at chance.

Third, there is evidence that the experimenter or his agent could intentionally influence the subjects' physiology through the mediation of psi. Recently William Braud (1978) was able to obtain significant evidence suggesting that the electrodermal activity of his subjects could be influenced from a distance and with precautions taken to eliminate conventional sensorimotor and energetic interactions.

Therefore, it is not unreasonable to expect that at least some of the experimenter expectancy effects described by Rosenthal could be mediated by psi. That the experimenter expectancy effects may have a psi source is also suggested by the apparent similarities between familiar psi effects and the experimenter expectancy effects:

Apart from their somewhat elusive and evanescent nature, these effects seem to occur more frequently with certain experimenters than with others.

With some experimenters the effect may be the opposite of what was expected.

The experimenters who produce negative effects seem to share some psychological characteristics as distinct from those who produce positive effects (Rao, 1966; Rosenthal, 1976).

If it is the case, then, that expectancies create situations where they become realized, and if some of these realizations cannot be accounted for in terms of sensory-motor interactions, one may, with some imagination, see the substantive implications of psi for the study of interpersonal relationships. As a mediator of expectancy effects, psi may have important implications for those processes that are intended to influence behavior, such as propaganda, psychotherapy, persuasion and education. Again, psi may be just as significant as such nonverbal interactions as gaze and mutual gaze, in mediating feedback during interpersonal encounters. This vast area of interpersonal behavior is still untouched by para-

psychologists. The role of psi in bringing people together or in breaking their ties is something that we should look into.

The ideas I have attempted to outline have two other implications for research. First, the locus of psi control may lie in our attention-deployment mechanisms. Therefore, experimental manipulation of variables that influence attentional processes may provide us with insights bearing on the connection between psi and cognitive functioning. Second, insofar as psi functioning is basically teleological and acausal, the question of the complexity of the psi task cannot be stated in causal terms. Therefore, it is not surprising that causal complexity appears to be irrelevant as a psi-limiting condition. According to our theory, volitional and teleological complexities and not causal complexities would affect psi. The greater the volitional strength and congruence and the lesser the dissonance between the experimental "goal" and nature's grand design, the greater is the probability of the occurrence of a laboratory psi effect. Thus, I see a necessary complementarity between epistemic and constitutive psi. The congruence between nature's design and the purposes of its constituents, I venture to speculate, would speed up the evolutionary process. Also, microscopic psi effects could have significant consequences in the surface reality because the complexities that seriously limit interactions at the surface level cannot act as psi deterrents.

I do not know if my stated purpose of arguing for the importance of psi and finding for it a significant place in the universe is somewhat obscured by my excursions into Oriental philosophy and speculative theorizing. If there is any sanctimonious breast-beating, not uncommon among Indians writing on Indian thought, it is wholly unintended. Psi is important not because the Orientals have thought so for centuries. It is important not because it is anomalous and questions some of the so-called basic laws. Rather, its importance lies in its potential for making the interface between the volitional self and the brain more meaningful and purposive and in providing empirical grounds for believing that the picture of the universe as painted on the space-time canvas with the colors of our senses is not the only possible one. The restoration of the self as an active interface between explicate and implicate structures in the universe is bound to have a profound impact on the future of psychology, and perhaps of science in general.

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