PHYSICAL ASPECTS OF PSI

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I will confine my remarks mainly to physical aspects of psychical research, such as psychokinesis, as I feel not sufficient attention has been given to this, admittedly narrow, field; and I have myself witnessed a number of events for which good reason existed for supposing them to be non-illusory and for which normal explanations appeared to be ruled out. In some respects it is a more satisfying form of research than ESP. In ESP it is difficult to find a subject giving high and consistent scores. One often obtains a lucky run of high scores, submerged in a sea of results at the chance level; or one may have to work on vague data, such as an attempt to guess at the theme of a painting; and the level at which scoring is deemed to become significant is quite arbitrary and open to debate. One may of course raise the same objection in experiments such as dice-throwing; but the situation is totally different in another class of physical phenomena, in which chance plays no part, or at least can be excluded in principle.

The signal-to-noise ratio is the key of the problem. In the case of ESP, the brain of the agent is subject to random thoughts and impressions that would take place whether or not an experiment is being conducted; this is the "noise" and may be at quite a high level; against this background one has to pick out the signal. In the case of thrown dice, we have what are presumed to be random events which would take place whether or not an agent were present, and again we have an unfavorable balance of signal to noise. To overcome this initial disadvantage, very long runs are attempted; the agent becomes bored or fatigued, in spite of efforts to provide a "play" environment of rewarding targets.

I would not wish to belittle the many invaluable experiments which have nonetheless been carried out with varying degrees of success, and the very subtle techniques employed in recent years. I would, however, desire to point out the great advantage to be gained by eliminating noise entirely, if that is possible. In the absence of noise, then just one

successful hit becomes highly significant. In the field of physical phenomena, we also have the great advantage that any degree of instrumentation can be brought to bear, to monitor the physical parameters.

To consider an example of the elimination of noise, I would cite the experiments with Rudi Schneider, in which an infrared beam was occluded under carefully controlled conditions. As far as I am aware, no normal explanation of these experiments has been advanced. You will rightly object, of course, that people such as Rudi Schneider are few and far between. We have in fact at the one extreme as in dice-throwing, an attempt to create a large number of events, with a low signal-to-noise ratio, with results of marginal improbability, and at the other extreme, events which are highly improbable, and of high signal-to-noise ratio, which may be classed as very rare events. This is to say more than the obvious statement that unlikely events hardly ever happen. It is to say that events which are by normal standards virtually impossible, such as are alleged to take place in spontaneous phenomena, are observed so rarely under conditions in which noise may be eliminated, that few people believe they ever happen at all.

This brings us to the theme of this meeting, the state of psychical research, the progress or lack of same in recent decades, in the narrow field I have chosen. I have given the reasons why in some respects we seem to have moved backward rather than forward. I would like to probe more deeply into this situation, and will endeavor to suggest new paths to follow, in the hope of obtaining more fruitful results.

Let us turn again to Rudi Schneider. As he was investigated by highly qualified researchers, we can assume that the noise level was reduced to an insignificant degree; but in addition, the conditions of the experiment eliminated a further complication—namely, the conscious activity of the agent, Schneider. For it did not really matter what he was trying to do, consciously or otherwise; there was no need to relate his volition to the events produced; it was sufficient that an occlusion was manifest, at any time during the proceedings. It is true that an oscillation of the instrumental readings took place, related to Schneider's rate of breathing, and it is clear that he was somehow involved; but how it simplifies the procedure if we are not specially concerned as to what the agent is supposed to be trying to achieve.

We have in effect managed to disengage the agent in some degree; and the next and final step in this train of thought is to do without the agent entirely; that is to say, to set up the infrared detection apparatus and leave it running under automatic registration with pen-recorders for a month or so, remove everyone from the vicinity, and then examine the records to see if any inexplicable occlusion has taken place. For indeed, there is a certain amount of evidence that paranormal activity

is not always associated with the human organism, and in view of the difficulties in finding a suitable agent, and the difficulties of sustained attention and the great number of observations required, it would be of great advantage if research could be carried out in the absence of an agent.

To summarize, we can conceive of three different types of experiment. Firstly, we set up some apparatus and place an agent before it; he is instructed to influence it in some way at given intervals and instruments measure his degree of success. If the agent is some distance away, there is no difference in the principle involved. Secondly, we can set up some apparatus, such as the infrared beam, and introduce the agent, who makes no conscious effort to influence the arrangement, and we see whether in his presence anything unusual occurs. And finally, we can set up our apparatus in some isolated place, perhaps a haunted house, evacuate the area as far as possible, leave it running for a period, and wait for anomalous results. If unusual events are recorded, it will be up to the engineers in charge to satisfy themselves that normal causes are not adequate. In actual practice we use instruments to detect a variety of physical parameters, such as changes in magnetic field and electrical field, temperature, or sounds, spreading our net widely, as it were, in the hope of catching the fish.

Are we then to assume two different types of paranormal activity, one type associated with the human organism and the other independent of human agents? To answer this question I would like to examine the present conceptual framework which is substantially the same as it has been since the beginning of the century. I find among many researchers the deep-rooted conviction that in order to obtain a paranormal event capable of being observed, one must first of all find what is called a good "medium"; this is a person with rare talents who is capable under the right conditions of producing so-called physical phenomena. (I would like to remind you I am dealing only with this narrow field at present.) These researchers regard psychical research as a branch of psychology; thus we have expressions such as parapsychology, psychokinesis, and even telekinesis, which suggests the power to move objects at a distance from the agent. I would propose to commence with a different set of concepts, which do not in the first instance present such a preconceived notion; thus the term parakinesis would indicate an explicable movement of an object without suggesting that an agent must as a matter of course be involved; and, more generally, the term paraphysics, with the accent on physics rather than psychology, is the study of anomalous physical events. Psychokinesis should be reserved for situations in which the agent is clearly involved.

If the entire population of the world were to perish in a future war, I

would think it likely that paranormal events would continue to happen; that is, mysterious events that appear to lie outside the established order of things. I am not considering at present whether or not these events may have some intelligent non-human cause; we will regard them at present as random perturbations of physical patterns, the explanation for which will require a new cosmological theory, to be discussed later. We will label this class of events paraphysical. I will now suppose that the human organism is sometimes capable of a weak interaction with these perturbations, i.e., some people, mediums or agents, may be able to sense when they will take place, or even very weakly to influence them in some degree. When this occurs, we are entitled to use the expression psychokinesis, or precognition, and so on.

This notion does not help us unless it points the way to more fruitful research, and this should take place along two converging paths; firstly, a study of psychokinesis (and for this purpose ESP could be included), involving a much greater variety of physical parameters than has been employed hitherto, and secondly, a study of paraphysical events in which human agents do not appear to be involved. In my view, more progress will be made in the latter, as we do not have the very complicated human organism in the way, as it were, creating "noise" and temperamental distractions. Now paraphysical forces, if such exist, affect matter in some way, otherwise they could never be observed objectively. They are part and parcel of the cosmos, and must somehow be incorporated into the rest of human knowledge, though it may well be that new theories will have to be advanced to this end. One such theory is that of additional spatial or temporal dimensions, which concept has been very much in the air since the time of Professor Zollner onwards. This helps to explain cases in which objects disappear and later reappear, and locked-room type of phenomena, where a disturbance takes place in a closed room, which has to be broken into, and with no normal means of entry found. If one imagines a flat world of two dimensions, inhabited by worms constrained between two plates of glass, so that they had no experience of up and down but only of left and right, forwards and backwards—to these worms, we three-dimensional creatures (I am here ignoring for simplicity the time-dimension) would be as gods or ghosts; the worms could have a locked room consisting of the four sides of a square, and we, by removing one sheet of glass, could drop into this closed room some object, which would materialize suddenly from nowhere. To them this would be an apport, and if the worms are intelligent, they would form a Worms' Society for Psychical Research to investigate this mysterious event. Suppose two such worms are confined to the surface of a sheet of paper,

and the two worms are ten inches apart; if unknown to them, the sheet of paper is curved, then it is possible that the two worms could be brought much nearer to each other, say half an inch apart, by bending the paper far enough; and if the worms' subconscious minds possessed a three-dimensional sense, they could communicate with each other as if they were close together instead of being widely separated. Other less gifted worms, who had to communicate by channels confined to the surface of the paper, would say the first pair of worms possessed ESP. If the extra dimension is orthogonal not only to space but to time, then precognition would be possible.

In theory, one may visualize any number of extra dimensions, with any degree of curvature; in the extreme case, from the point of view of a higher dimension, the whole universe may appear as a sheet of paper which has been folded and crumpled many times until every point of space and every moment of time are brought together into one enormous Here-Now.

A clairvoyant with a hyperdimensional sense could see the contents of a locked box buried in the ground, or the hidden side of a playing card. It is therefore a useful concept as it provides some kind of picture to aid the mind in understanding most of the phenomena encountered in psychical research.

At this point we must ask ourselves whether, apart from alleged paranormal events, we can find any independent evidence for the existence of hyperspace. The answer is in the affirmative, as in fact the whole of modern physics and cosmology is based upon this concept. There are of course many cosmological models, such as the expanding, the stationary, contracting or oscillating models, and many space-time models involving non-Euclidean geometry. For our present purposes it is sufficient if we consider the universe to consist of the surface of a five-dimensional sphere. A simple picture of this may be obtained by omitting two dimensions and coming back to our flat worms; suppose the sheet of paper on which they exist is curved so as to fit upon the surface of a three-dimensional globe; they would find that if they traveled in what appeared to them to be a straight line, they would eventually traverse the entire globe and return to their starting-point. So their universe is not bounded; i.e., it has no edge, yet it is finite in extent. In the same way in our universe, it is supposed that if we set out in a rocket and traveled in a straight line, we would sometime arrive back at the earth. In fact, Jan-Erik Solheim of Oslo University announced in *Nature* (Vol. 215, p. 41) that some stars may be seen twice, once by rays traversing the universe in one direction, and a second time by rays traversing in the opposite direction.

Some astronomers regard this fifth dimension purely as a mathemati-

cal abstraction, a shorthand way of saying that the universe is finite; but others on the contrary have supposed that the fifth dimension denotes some kind of reality outside our space-time. Sir James Jeans as long ago as 1928 wrote: "It is difficult to resist a suspicion that the spiral nebulae are the seat of forces entirely unknown to us. . . . The type of conjecture which presents itself is that the centers of the nebulae are of the nature of singular points at which matter is poured into our universe from some other, entirely extraneous, spatial dimension, so that, to a denizen of our universe, they appear as points at which matter is continually being created." More recently in the *Scientific American* (Nov. 1966, p. 143) J. A. Wheeler suggested that when a dense star collapses under its own weight, the gravity puckers the local space-time into a blister, which pinches off at the neck. The mass then falls out of our space into hyperspace, releasing energy, thereby producing a quasar.

So then, if we are living on the surface of a hypersphere, it is permissible to inquire what may be existing within the hypersphere; could it for instance consist of layer after layer like an onion, with many parallel universes side by side as described in H. G. Wells' novel *Men Like Gods*? It is possible to calculate, by using the principle of the conservation of energy, that in such a case, a skin or surface tension effect would exist between two universes, preventing the easy passage of matter from one universe to the next, which would explain why we do not have apports every minute of the day.

This may in fact easily be seen by means of a *Gedanken Experimente*. In the simplest possible case, let two universes A and B lie side by side. We begin by observing that if it is not possible for energy or matter (a form of energy) to be transferred from one universe to the other, then there is little point in talking about two such universes, for we inhabit one of them and could never obtain information concerning the other. We will therefore assume that energy or matter can be transferred. In the simplest case, we may assume, for the purpose of this illustration, that the direction of gravity in A is exactly opposite to the direction of gravity in B, in certain areas of each which correspond to each other. It is easier if we think of two-dimensional universes such as two pages of a book lying in contact with each other. A straight line CD is drawn on page A and another line C_1D_1 is drawn on page B so that when the book is closed, C touches C_1 and D touches D_1. In A, let C be "up" and D "down" so that gravity pulls from C to D; and in universe B, let gravity be reversed, so that D_1 is "up" and C_1 is "down." Let us further suppose that at points C and D are two hyperspace doors, or Esaki tunnels, so that at these two points an object can be transferred if required.

Now commence with an object in universe A, placed at C, and let it fall to D; now open the door at D and transfer the object to D_1; it is now in universe B, and we allow it to fall to C_1; now transfer it back to A, i.e., to the point C; we may now let it fall again to D, and so on. In other words we have perpetual motion, which most will agree is an absurdity. To avoid this, we could assume we made an error in suggesting that gravity in A is opposite to that in B; we would have to assume that gravity is not only the same in direction but the same in value at all corresponding points in the two universes; but this would imply that the two universes are identical in all respects. If that were the case, no one could tell them apart; we would have no means of deciding which universe we were in at any given moment, in fact from any point of view there would not be two universes, but only one. The only way to avoid this would be to assume that energy is needed to transfer the object from one universe to the other. This implies a "skin" effect, like surface tension. It may happen that, at some special location, by chance an object may accidentally penetrate a point of low resistance; but at other locations it will remain in one universe or the other unless impelled by some extraneous force. And what about radiation? Could signals of some sort pass from the surface through the hypersphere, to emerge again at some other point on the surface, which would circumvent physical obstacles and facilitate clairvoyance?

In formulating cosmological models, we like to simplify matters by supposing space to be filled with a uniform gas or fluid in the first instance. Suppose our hypersphere is a globe of liquid. Wave-motion in a three-dimensional liquid can assume two forms, (a) a ripple on the surface of the liquid consisting of transverse molecular oscillations, i.e., particles which oscillate in a direction perpendicular to the direction of travel of the wave-motion, as anyone can see by dropping a pebble into a pond, and (b) a propagation into the interior of the liquid by compressional waves, in which the particles oscillate in the same direction as that of the wave-motion. A pebble dropped into water sets up both types of wave-motion simultaneously; a microphone at the bottom of the pond would pick up the compressional wave as sound. If we pursue this analogy, the electromagnetic waves by which we communicate, in light or radio signals, are transverse in nature, and resemble the ripples on the surface of a pond—in this case, the hypersphere; and something corresponding to compressional waves could at the same time penetrate beneath the surface of the hypersphere. These waves would doubtless manifest a different velocity and different laws of reflection and refraction, and could return to the surface, even if traveling in a straight line, at some different point, and thus circumvent any screening. If the compressional (longitudinal) amplitude is small in

comparison to the transverse, its effect upon neuron circuits in the brain would normally be unnoticeable; but if the brain is protected from the transverse waves by means of some screening devices and also has its attention withdrawn from the peripheral senses because of mental relaxation, dissociation, or a state of trance, then the weaker amplitudes of the compressional oscillations could then be apparent. Such results in fact appear to have been observed in the experiments of Professor Vasiliev and Mrs. Garrett in Faraday Cages; originally in the U.S.S.R. it was supposed that ESP would be diminished by screening but on the contrary it appears to have been increased, which lends support to the hyperspherical model.

This may possibly explain why in the 19th century, if we are to believe reports, certain psychic phenomena were more in evidence, and more strongly marked, than they are today. I think I am right in saying there is a general feeling that in recent decades there has been a falling off in ESP scores. According to my theory, this circumstance is scarcely surprising; in the modern world, we are bombarded with transverse electromagnetic vibrations, radio waves, mains hum, automobile ignition and so on; in crowded cities there is little escape; small wonder that the human brain is losing its power to react to the subtler hyperspherical radiations. I would say for example that a room in a New York skyscraper building is just about the worst possible place in which to conduct an ESP experiment. My group in the New Forest operates in an area remote from roads and from mains supplies, for this reason. In daytime especially we have the radiation from the sun to contend with, stimulating our peripheral senses, distracting us from the carriers of ESP. Hence the general popular idea of the "witching hour" of midnight, when the bulk of the earth shields us from the sun and much electrical machinery is shut down. Perhaps the dark side of the moon is the best place of all! We ourselves have carried out experiments in caves with some slight success. Quite a number of "haunted" houses are in isolated situations in deep valleys, as in Sandford Orcas, where the most interesting phenomena take place between midnight and 3 A.M.

Radiational theories of telepathy are often criticized because they assume, it is said, the presence in the brain of some decoding or detecting device, and no such mechanism is known. We need however only postulate a one-to-one correspondence between the transverse and associated longitudinal vibrations, then no such additional device is necessary; for the brain is known already to incorporate some decoding device for orthodox neuron oscillations. This one-to-one correspondence would in fact arise naturally, from the circumstance that a disturbance on the surface of the hypersphere would result in a train of waves on the surface and another train of waves spreading into the interior, and

these two trains would have the same frequency as they arise from the same source.

The Backster Research Foundation (New York) claims evidence that a basic primary communication exists between the individual cells of all forms of plant and animal life. If this is the case, we must examine the chemical structure of cells for mechanisms which may enhance hyperspherical radiation.

It is known, for instance, that organisms contain very long chains of DNA and associated structures and linkages. Syntex Research of California has succeeded in manufacturing novel "threaded" compounds; they have threaded the ring compound 2-hydroxycyclotriacontanone by a 10-carbon chain secured at both ends by a bulky triphenylmethyl group. These threaded compounds have peculiar properties midway between mixtures and compounds. Dr. B. Libet of the Mount Zion Neurological Institute, San Francisco, has demonstrated that subliminal impulses, too small in amplitude to be consciously experienced, have nevertheless been registered by EEG in the somato-sensory complex. Threaded chains, if they occur in nature, are most likely in the complex organization of the brain, or in the control areas of cells. Let us suppose that the two ends of a looped or threaded knot in a DNA structure are connected via synapses to the two ends of a second similar knot, but knotted in the opposite sense, i.e., we have intertwined a left-handed knot and a right-handed knot. As the synapses fire, the magnetic lines of force associated with a sequence of impulses would oscillate between two intertwined configurations, mirror-images of each other; at a certain critical frequency, they may take the path of least resistance and pass from one configuration to its mirror image by rotation through hyperspace, thus giving rise to a hyperspherical impulse; just as a 3-D knot can be most simply unraveled by rotation in 4-D. I have no evidence at all to support this suggestion, which is only mentioned to show that it is not impossible to conceive of mechanisms in the brain which could act as a source, and conversely as a receiver, of 5-D signals. Recently the *New Scientist* has announced the discovery of loops of DNA threads, in support of the above hypothesis.

Turning now from pure speculation to something more concrete, let us consider whether anything resembling the more bizarre phenomena of psychic research, such as materialization or apportation, can be demonstrated; indeed this is the case in the emission of an alpha-particle, which is the nucleus of helium and composed of two protons and two neutrons. Alpha-particles are emitted in the process of radioactive decay of a class of heavy nuclei including uranium and radium. This is a non-reversible process; if you fire the alpha-particle back towards the nucleus from which it emerged, it cannot re-enter the nucleus. The

alpha-particle in fact does not possess sufficient energy to emerge in the first place; it is as it were trapped in a sealed box, yet somehow it manages to escape. This is remarkably like an apport; it is the fashion to explain this Houdini-like feat by calculations involving De Broglie waves, but a mathematical treatment involving a higher dimension would probably work just as well. The same remarks apply to the apparently impossible escape of electrons in the Esaki tunnel diode, and certain phenomena occurring in Zener diodes. They are called "tunnel" effects precisely because they suggest that the particle is somehow tunneling its way through another dimension to escape. Let us now consider apparitions, I mean that type of apparition which appears to be objective in nature, can be seen by different observers, and appears to have some specific relationship to ordinary space; it may walk down a staircase through a stretched thread; it can be seen through a mirror and from different angles; and there is some evidence that it can be photographed. Can we produce any such phenomena? Again, we may say yes, in the form of holographic images which recreate a solid image exactly resembling the original object, with the difference that you can pass your hand through it. The TV set of the future will in fact produce solid-seeming moving images which you can walk around, examine from different angles, and walk through.

In one experiment we sealed a room, alleged to be "haunted," at Sandford Orcas Manor, filled with instruments connected to a control room some fifty feet away. Measures were taken to ensure that no one could approach the room without being detected. During the hours of midnight and 3 A.M. unusual sounds were tape-recorded in the room, and during the same period a fall of temperature of ½ degree C. was recorded; before and after the period, the temperature was the same as that recorded in surrounding rooms and corridors. Midway through the period we moved the thermometers around in case one was at fault, but this made no difference in the readings.

This was an attempt to ascertain if the fall in temperature so often reported in haunted houses and séance rooms is an actual physical event or merely physiological or imaginary. Now the mechanical equivalent of heat is approximately 1400 ft.-lb. for each degree C. rise or fall in temperature of 1 lb. of water. If a room contains furniture weighing only 11 lb. and the temperature falls by only ½ degree, the resulting energy will be 70,000 ft.-lb. Let us say the energy conversion efficiency is only 10%, that will still be 7,000 ft.-lb.—more than enough to produce the most violent poltergeist phenomena. I would suggest therefore that the energy required to upset furniture, make tables rise and so on, derives not from the people present but from the heat energy absorbed which manifests itself as a fall in temperature. This is

supported by the fact that in some reported cases, the physical energy required far exceeded the physical capability of those present.

In short, I would say we should give more attention to the physics and a little less to the psychology of a situation, if we wish to make more rapid progress. As well as monitoring the temperature, brain rhythms, respiration and so on, of a medium, we should check the ambient temperature. If the ambient temperature falls for no evident physical reason, perhaps when the medium is in a state of trance, then we have a variation of the Rudi Schneider experiment. Again, we would not have to persuade the medium to do this or that, but merely watch our thermo-couples. Given suitable physical control, noise could be completely eliminated. Another possibility would be to ascertain if a medium would react to the switching on of an Esaki diode. I trust I have shown how a whole new range of experimental research could be instigated.

A further line of thought is that no two experimenters conducting a physical experiment ever obtain exactly the same results, as is well known. It is too often assumed that experimental results cluster around what is taken to be the "true" values, for purely random reasons; some other interpretation may lie hidden in these variations. I suspect that paraphysical events are taking place much more frequently than is supposed; the brain works on averages and probabilities and tends to overlook any slight variations from the norm, and even to suppress such signs, as having little survival value. If something takes place, such as an odd noise, in most cases we automatically assume a normal cause and think no more of it. If an object under our noses suddenly cannot be found and turns up the next day where it should have been, we assume we are the victims of malobservation and dismiss the matter. We are simply not alerted to the possibility of events not quite fitting into established patterns, and may often thereby miss opportunities of interesting discoveries. This may mislead us into thinking that paranormal activity is much rarer than it actually is.

I have tried to indicate a variety of new approaches which may bring more fruitful results to our investigations, suggested by the concepts I have outlined. I will conclude with some remarks concerning a particular case, that of the "Poltergeist Man," reported in the *International Journal of Parapsychology,* Autumn, 1964. In this very interesting case, Mrs. Williams undertook research on a patient, called Roger, who was psychotic, and afflicted with a "poltergeist" which chiefly manifested itself by raps and opening of cupboard doors. The case illustrates many of the points I wish to make, regarding the general attitude towards physical phenomena.

Firstly, the attitude towards the poltergeist is that it is something

unpleasant, unwanted, something to be got rid of; Mrs. Williams states that the raps seemed to serve no function except to interrupt communication; when the cupboard door opened by itself she states she felt "irrationally annoyed"; she "metaphorically put her foot down at furniture moving." She did not like it because it distracted her from the real business in hand which to her was psychoanalysis. She did not even bother to tape-record the raps, to ascertain if they were objective, though she had ample opportunity to do so. It is really exactly the same attitude as in the 19th century when poltergeists were regarded as "evil spirits" and had to be disposed of at all costs, "exorcised." Instead of holy water, Mrs. Williams employed psychoanalysis for her exorcism. My attitude would be that a poltergeist is something rare and wonderful and to be preserved.

Because she herself heard the raps, she began to wonder if her unconscious mind was picking up the affliction, as it were; she seemed positively to resist the idea that they could be physical and objective. Later she discovered that Roger's girl friend and his mother also heard the raps in his absence and she hinted at the possibility of an autonomous complex detached from Roger's body in space, and producing the phenomena. At no time did she ever consider that the poltergeist may have been something independent of Roger entirely. She preferred to think that Roger had the power of bilocation or even trilocation. If indeed a person can unconsciously produce physical events in localities distant from his physical body then anyone could cause any event in the world without being aware of it. This would reduce everyday life to chaos. I find this a difficult concept to entertain.

I will end with a little fanciful speculation; the vast spaces within the hypersphere, infinitely greater than our own space-time, may well be peopled by alien creatures, to whom our universe would appear as a thin, unreal cross-section or shadow, of debatable reality, and probably dismissed by many as a mathematical fiction.