

THE CHEMISTRY OF PSI

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Historically speaking, chemistry has had a long association with the occult, starting, I suppose, with the days of alchemy. Since then, experimental work and advances in theory and understanding, from Dalton's atomic theory to the more complex molecular orbital and ligand-field theory of the present day, have made of chemistry a respectable science. Meanwhile, the occult has remained the occult, although psychical research, referred to more frequently today as parapsychology, has become respectable enough for the Parapsychological Association to be affiliated to the American Association for the Advancement of Science, and certainly considerably more respectable than it was in the days of witches and spells.

During this process, psychical research has used chemistry, as it has engineering, physics and other sciences, as a tool in its investigations. The photographic process has been indispensable for recording, for presentation of information and for study. Chemical analysis has, I believe, been applied to ectoplasm, though whether the result that the sample tested contained carbon, hydrogen and nitrogen and was therefore probably of organic composition is illuminating or merely indicative of fraudulent production is a debatable point.

As an example of the use of chemical methods to find out more about psi, one might mention the Kirlian Effect,¹⁻⁴ which is currently being studied in Russia and Czechoslovakia. Photographs are produced by placing the object to be studied in a high-frequency electric field in contact with a photographic film. The patterns obtained depend on the surface electrical properties of the sample: on its resistivity, topological structure, the work function of the surface atoms, and so on. The electrical discharge registers on the film as a bright halo around the object photographed, and this has led the occult layman to hail Kirlian photography as scientific vindication of his belief in the aura.

This need not necessarily be so. Dr. Charles Tart, in a lucid survey,⁵ has distinguished between various types of aura, from the purely physical through the psychological to the psychical. It seems to me that

Kirlian photography, if it is related to the aura at all, is concerned with the physical aura, and that while it can provide useful data on the complex electrical fields surrounding the human body and other living objects, it may not be of such direct relevance to the psychic as he thinks. Even if changes in the Kirlian pictures are found to be correlated with changes in the aura as seen by the psychic, the possibility exists that this may be because both have a common origin or because changes in the physical aura are detected clairvoyantly and projected onto the perceived aura. It should be noted that the Russians and Czechs themselves do not claim that there is anything psychic about their results. They are approaching psi as a biological effect that can be studied within a discipline they call "bioenergetics," and they postulate the existence of a "biological plasma,"⁶ whose properties may eventually account for the phenomena observed. This is certainly interesting work, and if some ostensibly paranormal effects should be explained in these physical terms our understanding of them will of course be advanced.

But it might be argued that attempts to explain psi on a physical basis are doomed to failure, and for me to have called this paper "The Chemistry of Psi" might be thought a contradiction in terms. If psi, as many experimental results suggest, is largely nonphysical, how can it have any chemistry? So I should explain that my title is to some extent figurative, and that I want to discuss first, how psi can interact with matter, and second, how the ideas of theoretical chemistry can lead us to new ideas about psi.

The problem of how psi interacts with matter, by which I mean how, for example, the psychokinetic influence acts on the dice, or the Zener card on the percipient's correct guess, is a difficult one. If it could be answered, many problems of existence would be solved. Therefore you can hardly expect me to answer it! I shall content myself with asking a few questions and offering for consideration some ideas, mostly other people's, that I have found attractive or relevant.

Dr. Andrija Puharich⁷ has made a bold attempt to explain some of the facts of psi in terms of interactions involving protons. A proton is a fundamental particle and a constituent of the nuclei of all atoms. Associated with an electron, another fundamental particle, it becomes an atom of hydrogen, the simplest of all elements. Since hydrogen forms more compounds than any other element (it is present in practically all organic compounds), forms the major constituent of the sun and other stars and is present in minute quantities throughout interstellar space, there are a lot of protons about. Undoubtedly they play a major and significant role in the chemistry of life, but whether

physical interaction involving protons can explain psi is quite another matter. Despite my chemistry training, I found Dr. Puharich's paper very difficult to follow or to understand. For example, if Eileen Garrett, in the experiment he describes, really sensed by some physical process that a shower of protons was due to influence a cosmic ray detector, I fail to see how she could have distinguished between these and all the other protons in her part of the universe, for it is a fundamental axiom of chemistry that when one has a number of identical particles it is impossible to tell which is which.

The Swedish engineer Haakon Forwald has conducted many experiments in psychokinesis with himself as the subject. Briefly, his method is to roll half-a-dozen cubes down a slope onto a horizontal plane and to try to influence them to move to the left or right as they roll. Not content merely with achieving positive results, Forwald studied how the (presumed psychokinetic) lateral displacements varied when the cubes were made of different materials, or covered with foils of different thickness. He discovered an exponential dependence on foil thickness and a linear relationship with the number of neutrons per atom of the foil material.⁸ Psychokinesis is, of course, the most obvious example of psi interacting with matter. If it is a reality, somewhere along the line from the mental intention of the subject to the paranormal movement of the object the effect must become physical. Where? Forwald tested for the presence of magnetic and electrostatic fields, but found none. He postulated⁹ that a gravitational effect was involved, the necessary energy being released from the mass of the cube material by a transformation on the microphysical level triggered by the psychokinetic action.

Does psi therefore interact with some atoms more readily than with others—with the neutrons as Forwald's results suggest, or with the protons as Dr. Puharich thinks? Or does it interact with the electrons, with whose energy and arrangement chemistry is largely concerned? Can a chemical reaction be modified by psychokinesis, for example, to produce different products or to proceed at a different rate? Can psychokinetic action generate electromagnetic radiation, such as light, that will affect a photographic film? Alternatively, does psi interact with all particles equally, by changing the gravitational field in their vicinity? Forwald suggests that the interaction occurs in two stages: first, the release of suitable energy, which may depend on the material concerned, and second, the use of this energy to produce the desired effect, which may involve gravitational fields acting on the whole material of the object in question. Discussing his "placement" tests and other "die-face" tests that he has also conducted, he concludes that the

significant results obtained in both cases "indicate the presence of an extremely sensitive psychic controlling mechanism, which in the details acts unconsciously, but within the total picture acts in accordance with simple conscious intentions of the experimenter (i.e., intentions to displace a cube aggregate in a specified direction, or to get dice to fall so that a specified one of the six sides appears uppermost)." ¹⁰

A more popular suggestion for the source of psychokinetic energy than Forwald's microphysical matter-to-energy transformation is that the ambient heat energy is utilized: sensations of cooling in the presence of phenomena have been taken as an indication that heat has been abstracted. Calculations ¹¹ show that an ample supply of energy would be released if the air in a reasonably-sized room were cooled by 1° C. It remains to be shown, first, that such temperature changes do occur, and second, how the energy can be extracted in the time available and be suitably directed. For the process to proceed despite the Second Law of Thermodynamics an "ordering principle" is required. Can this be mentally induced? ¹²

I will turn now to the converse of PK, in other words, how matter can affect psi, and consider the simple but intriguing phenomenon of mediumship known as psychometry. This is remarkable in that a physical object seems to provide a link between the sitter (or an absent person in the case of proxy sittings) and the medium. How does this take place? Is there a physical basis, for example, organic traces, fingerprints and so on, left on the article by its owner? Or is the whole article somehow impregnated with his personality? Experiments in which the test articles are thoroughly cleaned to remove any such traces might show whether their presence is necessary. Further experiments might establish whether it is necessary for the owner to have been in contact with the article at all: the medium could be given a piece of tape on which his voice was recorded or his current bank statement (or other document)—something that is intimately associated with him but that he has never seen. If the medium can still give a good reading—and it is of course necessary to assess the results carefully ^{13, 14}—this would suggest that the article psychometrized acted as a focus for a telepathic link with its owner rather than as a storehouse of psychical/physical records detected clairvoyantly.

Progress in understanding psychometry may help to throw light on the phenomenon of hauntings, which seems to me to be related. Psychic impressions or hallucinations are experienced in association with a particular place. Perhaps I might mention a test in which the medium Douglas Johnson ¹⁵ recorded on tape the impressions he felt when alone in a house that he had never visited before and that was

said to be haunted. Some of these tallied closely with those experienced by the occupants, whom he did not meet until afterwards.

One of the most interesting ideas about the nature of the psi processes that I have come across was advanced by Dr. R. H. Thouless and Dr. B. P. Wiesner in 1947. They suggested¹⁶ that ESP and PK, far from being abnormal processes, were in fact merely unusual examples of processes that were themselves usual and commonplace because they were to be found as elements in the normal processes of perception and motor activity. They postulated an entity, designated by the Hebrew letter *Shin*, that they felt was most nearly described by the word *soul*, and seems to be the same as the "I-thinker" of Hornell Hart.¹⁷ This entity, which experiences what we understand as consciousness, and perceives and wills, communicates with the brain in such a way that the final physiological result of sense perception is perceived as a mental image by ESP, and the initial brain activity corresponding to a motor action is initiated by PK. What is ordinarily termed ESP (or PK) is merely an example of the special case of a *Shin* perceiving (or acting) directly without the intervention of the nervous system.

But what is *Shin*? And what is consciousness? To some extent we have a vicious circle here, for while it is hoped that psychical research may help us to answer these questions, it is also clear that we need to know the answers in order to understand and relate the facts of psychical research!

Pierre Teilhard de Chardin¹⁸ has proposed that consciousness in a primitive form is associated with all matter, the degree of concentration increasing with the complexity of the associated material system. He postulates physical and spiritual energies that, although one cannot be transformed into the other, do interact in a subtle way, such that the spiritual can influence the "arrangement" of the material. If consciousness is associated with all matter, one may wonder whether it has any analogous properties. Before considering these, however, I would like to say a little about consciousness in general. I am assuming that it has some reality in terms of Hart's "I-thinker" or Thouless's "*Shin*"; that it is to some extent what we intuitively feel it to be and is not merely an epiphenomenon of brain activity, or an illusion, as some behavioral psychologists would have us believe.

G. N. M. Tyrrell, whose clarity of thought is amply evident in his writings, has pointed out¹⁹ that cases of "traveling clairvoyance" do not necessarily require explanations in terms of "travel" by the consciously observing mind. Just as, in his view, the agent of an apparition is not present where the apparition is seen, and the apparition is "an elaborate sensory construct created by mid-level elements of the

personalities of agent and percipient working together, and not a conscious or semi-conscious being," the scene viewed by the "traveling clairvoyant" (or the percipient in the case of a reciprocal apparition) is "an apparitional drama constructed by the mid-levels of both their personalities (percipient and agent) working in collaboration."

Tyrrell goes on to say that he is not even sure that the statement that a consciousness is present at a particular point in space has any meaning. Anything that occupies a position in physical space must possess spatial properties, i.e., be spatially extended. Where is our consciousness? It appears to occupy the position of our eyes, but this is purely an illusion of our senses: "Our perceptual consciousness has constructed for it an elaborate system of sense-data, which gives it a picture of a spatial environment as seen *from* a particular standpoint, and gives it an irresistible feeling of *being in* that picture. And that, after all, is not so dissimilar from what goes on in the case of apparitions and clairvoyance."

We can hold a telephone conversation with someone and feel that in a sense we are where he is. Video contact would reinforce this illusion. To recognize that it is an illusion is to admit that information provided by extrasensory means can produce similar illusions. What Tyrrell seems to me to be saying is that consciousness does not have the properties of spatial extension that would make it a part of the material world, and that therefore to talk in terms of position and travel (i.e., change of position) is meaningless. It would follow, therefore, that we should be concerned with how and where this consciousness can interact with the physical world. For example, if it can obtain information from anywhere else but the brain with which it is normally associated, it will, by virtue of the illusion that it is located in that brain, experience the receipt of this information as a phenomenon of ESP.

In postulating that an apparition is produced by elements in the personalities of two or more people, Tyrrell gives it a measure of objectivity. He considers the possibility of an apparitional world, experienced collectively by a large group of individuals. "Each member of the group would play his part in the theme of the idea-pattern, so that the net result would be that the whole group of persons would appear to themselves to be living in whatever environment the idea-pattern impressed on them. . . . if we take a further step and suppose these persons to have shed their physical bodies, without having otherwise changed their personalities, then this impressed, hallucinatory world would have no competitor." It would seem physical and no test would be able to show that it was not. Such a world "would not be

purely subjective: it would be based upon something existing independently of the percipients, but that something would not be physical substance: it would be an all-pervasive idea-pattern. . . . the independent factor . . . might, in picturesque metaphor, be called, 'thoughts in the mind of God.' "

This intriguing picture of a hypothetical "next world" is not incompatible with descriptions received through mediumistic communications and raises some interesting questions. What sort of chemistry would it have? Would this depend on the desires and beliefs of the people, or be objective in itself? Could one (or more) of the people conduct scientific experiments and make discoveries? If the hallucinatory world is as real to its inhabitants as the physical world is to us, how can we tell that our apparently physical world is not equally hallucinatory? Could not the whole physical universe be described, "picturesquely" if you will, as "thoughts in the mind of God"?

The question of what comprises reality is a difficult one. It is certainly not synonymous with concrete physical existence, but must also include abstract concepts, such as mathematical truths. How does the abstract interact with the concrete, how do mathematical equations affect the matter whose behavior they describe, what connects mental imagery with the physical senses?

I would like to say just a few words about the problems of survival and communication. It is often hoped that the denizens of the "next world" will one day be able to communicate with us by means of apparatus. This would have the advantage of eliminating the medium and his unconscious mind, and might thus provide more evidential and trustworthy data. So far, little progress has been made. One difficulty may be that the "next world" is constituted differently from ours, perhaps in the way suggested by Tyrrell. Its people, therefore, would have even less knowledge of our world and how it works than we do, and would consequently be quite unable to suggest suitable apparatus or machines. Again, in communications through a medium, there is no means of distinguishing between potentially productive, although bizarre, ideas from the discarnate entities and the fabrications of the medium's subconscious mind. It seems to me that better progress will be made if we try to establish paranormal communication, with or without apparatus, from the living. Can a living person communicate through a medium? There have been occasional cases. Edwin Butler²⁰ claimed that he did once. He imagined himself at the meeting of the circle he attended and tried to impress on those present that for reasons beyond his control he would be late. He seemed to have failed, but when he eventually arrived they told him that they had got

his message. If Thouless's and Wiesner's theory is correct, the normal apparatus for communication is the person's own brain: hence another living brain, such as that of a medium, might be the next most suitable apparatus. Later, perhaps, some form of artificial brain could be tried, or something that functioned in a similar way. Subjects who have frequent "out of the body" experiences (which, I presume, are much the same as Tyrrell's "traveling clairvoyance") could participate in these experiments.

The popular concept of chemistry, that matter is composed of lots of tiny little atoms like billiard balls, with hooks on them, has changed, mainly, I suppose, as the result of the layman's acceptance of Einstein's demonstration of the interchangeability of matter and energy. People now say that this table, for example, is not solid at all but mostly empty space, and that matter is made up, not of any substance, but merely of "vibrations." The "next world" is then easily described, in occult science, as consisting of different vibrations, which, of course, have a higher, more refined frequency, and to communicate with us a discarnate entity has to "slow down" his vibrations to our frequency. Science having made use of the occult word *ray*, the occult has retaliated by appropriating the scientific term *vibration*. This pseudo-science is not only inaccurate, but discourages scientists from taking psychical research seriously.²¹

It is true that the present-day model of the atom is dynamic rather than static, that the nucleus, in which practically all its mass (or weight) resides, is very small compared with the distance between atoms in a solid, and that the electrons that occupy this space are, if the size of an electron can be measured, very small too. But I would hesitate to describe this space as empty. In every corner of it there is a finite chance of finding an electron, and as electrons move very fast each small unit of space will be visited many times in, say, a second. The space could therefore be considered to be occupied by an electronic cloud of varying density. The movement of the electrons is governed by the classical laws of electrostatics and kinetics, and in addition certain laws govern the amount of energy that an electron may have, and how this may be changed. These laws determine the shape and size of the electron clouds, and how they interact with those of other atoms. This table is solid to me because of the cohesive forces that hold it together and make it rigid, and because, when I try to put my hand through it, the molecules, electrons and atoms of my hand are brought into contact with others in the surface of the table and experience strong repulsive interactions.

The more we find out about the fundamental particles that consti-

tute matter, the more we find ourselves describing their behavior in terms of mathematical equations and formulae of increasing complexity, and the less we are able to visualize what is going on in simple pictorial terms. It might be of relevance to our thinking about psi to consider the following statement of the physicist Arthur March,²² translated and quoted by Forwald:²³

Elementary particles cannot be described in the conceivable three space dimensions. Contemporary physics, therefore, is forced to use abstract means for their presentation. There are those who object to these means, just because they are inconceivable. The means are, however, *understandable*. We understand a process if we can refer it back to a natural law. But the law itself we can only understand if it expresses a logical necessity, which implies that we are not confronted with a genuine law of nature, but with a law of our thinking. We do not understand the real natural laws, but have to take them for granted. Thereby there is nothing which privileges us to demand from the laws that they shall be conceivable. What we can demand is only that they shall not interfere with the laws of logic, which simply means that they shall not be contradictory in themselves.

It is my belief that consideration of the philosophy of chemistry may help us to formulate new ideas about psi. For advances in science have taught us that nothing is so simple and straightforward as it might have appeared, that the truth, when discovered, is more intricate, involved and, dare I say, beautiful, than had been imagined. Would any of the concepts of modern chemistry have been conceived by pure thought? Often they were unexpected and forced upon us to explain certain facts, being crude and arbitrary at first but later seen to be elegant and profound.

The quantum theory, relativity, the wave character of particles and the Uncertainty Principle are fundamental to wave mechanics, which is the basis for modern theoretical chemistry.²⁴ Behavior of the electrons in atoms and molecules is described in terms of wave functions and wave equations, the wave function being associated with the probability of finding the electron in any given region, and the wave equation including terms involving the energy of the electron. The success of wave mechanics lies in the fact that we can use it as a tool to make theoretical calculations of various properties of atoms and molecules—the strengths of the bonds that hold them together, the sizes and shapes of the molecules, and so on—that can be checked against the determination of these properties by accurate experiment. In other words, it provides a model by which we can understand the properties of matter. But of course the application of the theory requires an accurate, detailed and quantitative knowledge of the effects being studied,

and one might wonder how chemistry would have developed if the experimenter had been able to deal only with relatively small numbers of atoms—say a dozen or so—instead of the gram-molecule (6.023×10^{23} atoms) quantities normally available. Ordinary chemical reactions would be very hit-or-miss affairs. Sometimes they might occur, sometimes not. We could not study the effect of temperature, because temperature is almost meaningless on this scale. Thermal energy is just the manifestation of the movement—translation, rotation and vibration—of the molecules. Radioactivity can be measured on a macro-scale; we can say how many atoms in a given sample will decay in a given time. But we cannot say which atom will decay next, nor when a given atom will decay: it may happen now or it may not occur for a million years. On a micro-scale, there would seem to be no rhyme or reason to it. Those who claim that we ought to be able to demonstrate psi without recourse to statistics would do well to consider where chemistry would be without the inbuilt statistical effect of dealing with very large numbers of atoms.

How shall we apply some of these ideas to psi? First of all we might consider the Uncertainty Principle. Does this have any analogue in the rather annoying feature of psychical research that the more stringent one makes the experimental controls, the more carefully one excludes all possible natural explanations, the less likely a phenomenon is to manifest? Is there any parallel between not being able to measure the exact position and the exact momentum of a particle at the same time because, in simplified terms, the measurement of one quantity can be done only by altering the value of the other, and the mutual incompatibility of making sure that something cannot happen normally and simultaneously being sure that it does happen? It is hard to see how the second result can be quantified. One can calculate the probability that a given result was not due to chance, but how can one measure the stringency of the controls?

Let us consider another atomic-scale phenomenon, which is known as “quantum-mechanical-tunneling.” Suppose, in a simple example, that we have an electron free to move inside a box, but that it requires an energy, V_1 , to penetrate the walls of the box. If V_1 is infinite it will never get out, but if V_1 is finite, even though it is greater than V_2 , the energy of the electron, it can be shown from consideration of its wave properties that the electron has a finite chance of existing outside the box; the wave function has a small but finite value on the other side of the wall. We cannot say how the electron gets through this energy barrier, but we know that it can. The lower the barrier, i.e., the nearer V_2 is to V_1 , the more likely is the electron to penetrate it. This

effect occurs in nature and can be studied, so it is not just a theoretical idea. You might compare it to looking out of your window at five to eight one morning and seeing your car outside the garage, even though you had put it in the previous evening and closed the door. If you went out to the garage at four minutes to eight to see what had happened, you would very probably find it back inside! Applying this to psi, let us suppose that a Shin is associated with a brain in a similar way to our electron being inside its box. Occasionally it can function outside and while outside may be able to focus on a particular Zener card. On its return, the percipient may register a correct guess. If the energy barrier is lower in some subjects than in others, the respective Shins may be able to spend more time outside and hence make more correct guesses.

Dr. Lawrence LeShan has applied some of the ideas of modern physics to a consideration of the problem of survival,²⁵ and of the paranormal in general.²⁶ I am sure that by adding the resources of science, or, as it used to be called, "natural philosophy," to those of philosophy we shall be better equipped to understand this difficult and enigmatic area of experience.

REFERENCES

1. LEONIDOV, L.: "The Kirlian Effect," *J. Paraphysics* 4 (1970): 173-175.
2. ADAMENKO, V.: "Electrodynamics of Living Systems," *J. Paraphysics* 4 (1970): 113-121.
3. ADAMENKO, V. G.; INIUSHIN, V.; KIRLIAN, V. H.; and KIRLIAN, S. D.: "The Spectrum of Electrobioluminescence," *J. Paraphysics* 6 (1972): 23-25.
4. INIUSHIN, V. M.: "Biological Plasma of Human and Animal Organisms," *J. Paraphysics* 5 (1971): 50-53.
5. TART, C. T.: "Concerning the Scientific Study of the Human Aura," *J. Soc. Psych. Res.* 46 (1972): 1-21.
6. ADAMENKO, V. G.: "Seminar on the Problem of Biological Plasmas," *J. Paraphysics* 5 (1971) 106-113.
7. PUHARICH, A.: "Protocommunication," in *Proceedings of an International Conference: Parapsychology Today; a Geographic View*, St. Paul de Vence, France, August 1971 (New York: Parapsychology Foundation, 1973).
8. FORWALD, H.: "A PK Experiment with Cubes Having a Radioactive Component." Paper presented at the Sixth Annual Convention of the Parapsychological Association, New York City, September 1963.
9. ———: *Mind, Matter and Gravitation*. Parapsychological Monograph No. 11 (New York: Parapsychology Foundation, 1969).
10. ———: *Ibid.*, p. 69.
11. McMULLAN, J. T.: "A Possible Physical Source for the Energy Needed in Poltergeist Activity," *J. Amer. Soc. Psych. Res.* 65 (1971): 493-494.
12. RUSH, J. H.: "On 'A Possible Source for the Energy Needed in Poltergeist Activity,'" *J. Amer. Soc. Psych. Res.* 66 (1972): 229-230.
13. TART, C. T.: *Op. cit.*, pp. 19-20.

14. PRATT, J. G., and BIRGE, W. R.: "Appraising Verbal Test Material in Parapsychology," *J. Parapsychol.* 12 (1948): 236-256.
15. JOHNSON, D.: "Recent Experiments in America." Lecture to College of Psychic Studies, London, November 23, 1971.
16. THOULESS, R. H., and WIESNER, B. P.: "The Psi Processes in Normal and 'Paranormal' Psychology," *Proc. Soc. Psych. Res.* 48 (1947): 177-196.
17. HART, H.: *Toward a New Philosophical Basis for Parapsychological Phenomena*, Parapsychological Monograph No. 6 (New York: Parapsychology Foundation, 1965).
18. DE CHARDIN, P. TEILHARD: *The Phenomenon of Man* (New York: Harper, 1959).
19. TYRRELL, G. N. M.: *Apparitions* (London: Society for Psychical Research, 1942).
20. BUTLER, E.: Lecture at Conference "Towards Mediumship 2000," Arthur Findlay Research Institute, Stansted Hall, Stansted, Mountfitchet, Essex, England, March 10, 1972.
21. JONES, BROTHER DUNSTAN: Introductory talk to conference, "Christianity and the Paranormal," Royal Foundation of St. Katharine, London, February 12, 1971.
22. MARCH, A.: "Die Physikalische Erkenntnis und Ihre Grenzen," *Die Wissenschaft* 108 (1955): 55-56.
23. FORWALD, H.: *Op. cit.*, ref. 9.
24. COULSON, C. A.: *Valence* (New York: Oxford University Press, 1961), 2nd edition.
25. LESHAN, L.: "Human Survival of Biological Death," *Main Currents in Modern Thought* 26 (1969): 35-45.
26. ———: *Toward a General Theory of the Paranormal*, Parapsychological Monograph No. 9 (New York: Parapsychology Foundation, 1969).

DISCUSSION

SERVADIO: I want to make a factual addition to what was said, taking perhaps the title of this report more literally, the Chemistry of Psi. If we take it literally, it is only fair to recall the very few experiments that have been made to see if some chemical substances might affect psi. I will speak of a personal recollection here because, as many of you may know, in Rome for a couple of years we have done experiments using LSD and psilocybin with selected subjects, in order to see whether these substances could affect psi. This is the chemistry of psi in a more literal sense. The results were published in a monograph by the Parapsychology Foundation. Anybody who has not read this monograph, just have a look at it. The results were moderately encouraging, let's put it that way. I think this is an approach which should be taken up again, if possible.

ELLIS: I did think of it as a subject when I started writing my paper, but I imagined that someone would be dealing with the biochemistry of psi. Therefore, being a physical chemist, I left it out.

ZORAB: I was just wondering whether Mr. Ellis knew the answer to the question that the hereafter really has remained stuck in the horsepower stage. If you go through all the message literature, as it is called, describing life in the hereafter, you will never come across a motorcar.

It remains horse-structured all through the hereafter. What is the reason, I do not know. It is the wishful thinking of the middle of the last century projected in the hereafter.

ELLIS: What about traveling clairvoyance? As to projection, if you have got wishful thinking a bit more under your control, perhaps you just wish where you want to be.

ZORAB: That was also a question I wanted to ask you. Why do you pursue the proposition that astral projections only occur in human beings? For instance, there is not the slightest reason why a chimpanzee could not have astral projections. If there is an astral body connected with our corporal body, then you would say that there is such agreement between the body build of a chimpanzee and of a human, and I cannot understand why a chimpanzee or another animal have never been thought of as having an astral body.

ELLIS: Can I correct you on two points I made: (1) I did not say that I was accepting survival. I said I was considering Tyrrell's apparitional world. As study of apparitions has shown, they include material objects and animals because they are, in Tyrrell's view, part of the drama. In other words, in this world there would be motor cars and everything else, if the people there thought that there should be. (2) I did not postulate the existence of an astral body. It is just an idea.

SCHMIDT: I have two specific questions: (1) You mentioned the Forwald experiments, the search for physical parameters, which I think is very interesting, but certainly you know these problems of psychological influences. Forwald might have had prejudices, he might have some pet theory and he proved this theory, subconsciously producing these effects. Another interesting point you mentioned about object reading is the possible physical influence of the object. This is an extremely interesting question and very convenient to studies in life situations. I think Martin Johnson has done some work in this direction. It would be great if someone could pursue this.

ROGO: Again, Mr. Zorab has stepped on some of my survivalistic toes. I will respond to him at this point. About the existence of astral bodies—to use the term—in animals, there is a huge body of evidence for animal apparitions, for instance, there is the famous case of a little dog whose astral body was seen at the time it almost strangled to death on its collar.

TROMP: In connection with the effect of mind on matter, of course we know enough about psychosomatic physiology to be aware that fundamental physical changes occur because of certain thoughts and emotions. You can measure a change in the structure of the adrenal gland, and so on. I wonder if any experiments have been carried out,

or could be carried out, as following. We know that around a human being you can measure (I have done it myself) not only the electromagnetic, the static aura, but the infrared aura too. For instance, after somebody has been lying on a bed, you can go in later and you can tell on which bed that person was through measurements with a simple infrared recorder. And not only directly afterwards, but for a long time, you can still find on that bed the imprint, if I may call it that, of the person who was there. I wonder if, with the instrumentation now available to measure this infrared aura, systematic studies have been made of what changes a certain thought would make in the shape of this aura. Could you measure, with the equipment we have at present, that an object which is falling undergoes a change in its thermal condition because of a change in the infrared aura of the person who does the experiment? We know that under all kinds of mental conditions, this aura is changing; you can record this with an instrument. I wonder whether any of you have done any experiments, or known people who have made these experiments in connection with psychokinesis?

BEAL: I have heard of this being done in the case of certain diseases, and quite strong changes in the body before the onset of an attack were noticed. In malaria, for example, there seems to be quite a drop-off in the body field before an attack.

TROMP: That has been well established.

BEAL: That the mind affects the body's electrostatic field, there is no doubt because you have changes in the circulation, for instance. What we would hope to do is study this body field with better instrumentation than we have had in the past. I have personally located some very sensitive equipment to use in this regard. I think there would be some very good spin-off and we must always be observant of this in the medical and the psychological areas. Physiological factors do change. We would hope to eventually develop an infrared camera that can see the electrical field around the body. When this occurs, we will have a very good diagnostic device to detect mind-body interactions. That should come in the near future.

TROMP: I was not speaking of electric fields, but of infrared. The equipment exists; you have infrared photography. Does the aura change under different mental conditions? And can you find any imprint on objects nearby?

BEAL: In that case, there is a heat transfer, enough to raise the object above ambient thermal conditions. I have seen it myself. You can put your thumb on the table and see the thumb print come out very clearly. These do not last long.

BRIER: I have often thought it would be very good to devise a test for use with the poltergeist phenomenon, or some other manifestation repeating itself, because I have heard that there have at least been temperature changes in the vicinity of psychic phenomena. Crookes records very definite temperature changes. But it is a type of temperature change that is not registered on normal instruments.

ELLIS: Why not put a liquid on the face of your dice and photograph the experiments with a color film?

TROMP: Have these experiments been made?

ELLIS: Not as far as I know.

WEST: I wanted to go back to the topic of experimenter influence, which has been mentioned several times in the discussion on this paper and the previous paper. In the case of the Forwald experiments testing the effect of different physical parameters, an effect he would have vividly in his own mind, it is fairly obvious how the experimenter could directly influence the results. On the other hand, you can work with very much more sophisticated designs that would commonly be done in any psychological experiment, so that the person who was actually conducting the experiments would not be aware of the effect expected. Going back to animal experiments, which were referred to in connection with the previous paper, it is sometimes said that if animals can be got to make the right choice to reach a target, this is not because of their ESP, but because of their being influenced in some way by the experimenter.

You could, I think, revise animal experiments to take things a little further. For instance, as regards the suggestion that psi might be hereditary, I think it would be very much more convincing to see if you could breed a psychic strain by using more successful animals than by looking for family influences in psychic powers. Cobblers and barbers run in families, but you do not say it is an inherited thing, necessarily. However, if you do take things further, you can always say, in the last resort, that the phenomena produced in any particular experiment might be due to some form of extrasensory perception of which the participants in the experiment were unaware. Even in a double blind experiment, this is always a possibility. But, if you argue like that, then you destroy the possibility of doing almost any kind of psychological experiment. The whole literature of psychology depends on experiments in which the results are supposed to be quite independent of the mental constructs of the experimenters.

SCHMIDT: As an answer to this, it certainly is a possibility to keep in mind. Results might be coupled to unknown experimenter effects. Thus one has to keep an eye on this possibility. One could certainly

condition an experiment by systematically interchanging not just the subjects, but the experimenters also.

ALBERTI: I agree with Dr. West and I should like to stress one characteristic, one feature of ESP performance that seems to be very important in this connection. This is selective activity of the ESP function that, until now, at least by Rhine's school, has not been enunciated very well. This is the capacity, the ability of the percipient to direct, to form a channel by which it takes information from one particular source, maybe not just in clairvoyance or from a living person in a telepathic situation.

CAHN: I want to answer very briefly Dr. Tromp's question. There is a good deal of literature now available concerning Sergeev and others in the Soviet Union, who have attempted to apply either Kirlian photography or some similar force-field detectors mainly in connection with Kulagina and the other so-called PK people over there. According to the reports we get, which are a bit cryptic (at least the ones I have seen), apparently they are able to show focusing of what they call the bioplasma, whatever this emanation may be—it may be an electromagnetic field of some kind with PK effects. It is somewhat the type of thing you were asking about.

ALBERTI: I have seen in Moscow this alleged PK experiment, not by Kulagina but by Alla Vinogradova. Her physicist husband explained it as an electrostatic field built up between the subject's right hand and the objects.

CUTTEN: I would like to go back to my comment on that. I do not know why this is called Kirlian photography, because the effect was known long before Kirlian. In fact, in the early days of photography, it was considered a darn nuisance. It is a corona discharge. Dr. Moss in California also did some interesting experiments producing this effect and then finding a variation in the pattern when the subject drinks alcohol or takes drugs. Now, this is an interesting, not necessarily parapsychological, study. I think Kirlian photography is quite a misnomer.

CAHN: The point is that whether we are dealing with the paranormal or whether we are dealing with the physical, if in fact what they photograph, by whatever technique, does reflect something about the kind of processes we are talking about, then it is interesting. That is the point.