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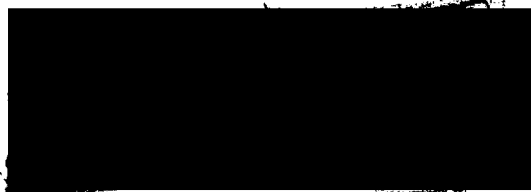
QUANTUM PHYSICS AND PARAPSYCHOLOGY

The 23rd Annual International Conference of the Parapsychology Foundation, Inc.

Hotel La Reserve, Geneva, Switzerland August 26-27, 1974

An interpretative conference report containing some comments about prospects in parapsychological research.

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I. INTRODUCTION

The 23rd Annual Conference of the Parapsychology Foundation was held at the Hotel La Reserve, Geneva, Switzerland on August 26 and 27, 1974. The subject of the conference was "Quantum Physics and Parapsychology", a topic selected at the instigation of Arthur Koestler, the well-known author, who in recent years has interested himself in the subject of parapsychology. His recent book, The Roots of Coincidence, reflects this interest. The putative relation between quantum physics and parapsychology arises because the apparent non-common sense features accepted in quantum physics may be analogous to the non-common sense features observed in parapsychological phenomena. In any case the conference was ostensibly devoted to an exploration of the physical bases for parapsychology.

Complete texts of all ten of the papers presented at this conference have previously been supplied. A summary and critique of the contents of each of the ten papers appears in the Appendix of this report. At the conference a discussion period followed the presentation of each paper, and at the conclusion of the conference another more general discussion took place. The proceedings of this conference, containing both the submitted papers and the verbal discussion, is scheduled for publication in June 1975 by the Parapsychology Foundation, Inc., 29 West 57th Street, New York. A brief official account of the conference will appear sooner in their "Newsletter of the Parapsychology Foundation".

The following discussion of conference content is based upon attendance

at all the sessions, subsequent study of written versions of the papers, and private conversations with nearly all of the personalities present.

II. ANALYSIS OF THE PURPORT OF THE CONFERENCE

The reality of ESP was an accepted fact at this conference. When discussion of the reality of the phenomena occurred, it was concerned only with methods of securing public acceptance and belief in paranormal cognition. Some doubt was expressed of the usefulness of public demonstrations to "blue-ribbon panels", but all agreed on the necessity of more research support.

It became clear that there exists at present no adequate theory of paranormal perception which can furnish a physical basis for the phenomena. The existing attempts at physical theories are speculative, incomplete, at at best poorly substantiated; although some ideas were presented which might furnish the seeds of fruitful investigation. These ideas are discussed in more detail below.

The conference evidenced a rough division of attitudes toward parapsychology into two schools of thought. Researchers share a general acceptance of the strangeness of it all, but on the working level some believe progress in understanding can be achieved through extension and use of existing scientific knowledge and methods, perhaps by some new synthesis. The others basically favor a more philosophical and mystical approach, and believe that nothing short of a complete revolution of thought, maybe into more spiritual directions, can cope with the challenge. The "mystics" characterize the physical approach as

naive reductionism. The "reductionists", for lack of a better term, retain their faith in the efficacy of traditional scientific methods. These categories are a convenient simplification of complex attitudes and some individuals show traces of both orientations.

In view of the conference topic it was surprising that the "mystics" were strongly represented. The presentations of Chari, Firsoff, Whiteman, and Bastin seem to fall in the mystical category. Verbal comments of Arthur Koestler would place him also in this group. At the conclusion of the conference he expressed disappointment that the ideas were not "crazy" enough and voiced scepticism at seeking explanation of ESP in existing physical theories. These contributions to the conference seem to offer no avenues of physical understanding and will not be discussed further.

The remaining papers presented at the conference are more physical in content. Of the theoretical papers Costa de Beauregard gave the most general and perhaps the best formulated analysis of a possible physical basis for ESP. His presentation consisted of words, and not equations, but the concepts discussed were readily understandable by a theoretical physicist. No specific mechanism was proposed, but information theory was interwoven with some established physical principles to describe a framework within which ESP might be understood. The ideas of Costa de Beauregard are unifying in character, rather analogous to the unifying character of the energy concept in conventional physics, and like the concept of energy could establish broad guidelines without supplying a detailed mechanism. For example, the idea discussed by Feinberg, that precognition is a memory propagated from the future, is subsumed in

Costa de Beauregard's thinking. Puthoff presented some speculations about apparent features of his PK experiments which are also consistent with the same overall picture. Indeed if any common thread emerged from the physical side of the conference, it was that somehow information theoretic concepts must play an important role in ESP. The connection is established through the equivalence of information theory with physical probability and its role both in quantum theory and in macroscopic entropy.

A detailed and partially quantitative physical theory of ESP was presented by Walker. This theory may err through its use of overspecific and poorly justified assumptions. It relies heavily on some explicit conjectures about neural activity in the brain, and also postulates an essential function in consciousness and psi communication for the so-called "hidden variables" of quantum theory.

A simple empirical method of quantifying the results of ESP experiments was proposed by Schmidt. This quantification, if appropriate, would permit the various experimental manifestations of ESP (precognition, clairvoyance, PK, etc.) to be interrelated.

Experimental papers describing striking PK and remote viewing experiments with gifted paragnosts were presented by Puthoff and Targ.

In terms of normal standards of scientific conferences the gleanings of theoretical understanding from this conference are somewhat sparse, particularly if a physical basis of ESP is the object. The phenomena of ESP have undergone a great deal of experimental verification, but a basic understanding of paranormal perception is evidently still lacking. The material presented at this conference only indicates a bare beginning of a rational, physical, interpretation of parapsychological phenomena.

III. GENERAL CONCLUSIONS AND GUIDELINES

The picture of ESP research derived from attendance at this conference and supplemented by a study of publications in the open literature forms the basis of the following general comments.

1. Knowledge of normal perception and neural data processing in the brain is still limited, even though the physical basis of normal perception is well-founded. The wide area of ignorance or partial knowledge surrounding even normal mental function is indicative of the possible impediments to attaining a coherent understanding of paranormal perception. The physical paradoxes of ESP are severe, but even were a physical basis of ESP established, much would remain unknown. In short, progress in this area may require not only increased understanding of the physical basis of the phenomena, but also advances in cybernetics and neurophysiology as well.
2. The ideas of Costa de Beauregard form the most auspicious point of departure for development of a physical understanding of ESP. These ideas are favored because of their broad physical base, their use of general information concepts, and because they contain a minimum of ad hoc assumptions. Although some elementary deductions are immediately possible, this theoretical framework is, as yet, insufficiently articulated. Additional analysis and calculation is needed to explore detailed consequences of the basic general idea. Experimentally verifiable predictions and relations should be sought, and the theory should be scrutinized for guidelines to meaningful experimental efforts. Such

a program would represent a firm physically-based attempt to understand some of the mechanism of ESP, but could not be expected to produce immediate results.

3. For practical purposes the investigation and experimental verification of empirical regularities governing the occurrence, content, and reliability of paranormal events should not be disdained. Although theory is always valuable, it may not be absolutely essential. It is quite possible to know enough about a phenomenon to use it effectively, or to evaluate its use, without possessing any deep understanding of its nature. The human race used fire for thousands of years without understanding chemistry. Identification and quantification of physical and psychological conditions for inhibition and enhancement of psi effects is especially desirable. The apparent spontaneity of these phenomena and their independence of most referents poses the most serious obstacle to their application. It is difficult to perceive the purpose served by research in parapsychology which does not attempt to relate the phenomena to controlling conditions. Parapsychology may have application provided such relationships exist on some level, even the level of total empiricism.
4. Regardless of the level of understanding of paranormal perception it is clear that information derived by this means is incomplete, subject to error and distortion, and sometimes completely erroneous. In many cases the accuracy is amazing, but complete errors are also frequent. A percipient may be unable to reliably estimate his own accuracy.

These inherent features raise the fundamental problem of how such erratic information can be utilized. How can the output of paranormal perception be assessed according to its completeness and/or reliability so as to optimize its use and minimize the effect of errors? The peculiar features of ESP derived information demand that these problems be addressed if such information is to serve a useful function.

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APPENDIX

A Summary and Critique of Each Paper Presented at the Conference

1. FOUNDATIONS OF PARAPHYSICAL AND PARAPSYCHOLOGICAL PHENOMENA.

Evan Harris Walker, BRL, Aberdeen Proving Grounds, Maryland.

SUMMARY:

The oral talk consisted only of an outline summary of ideas and results. Study of a written version (69 pages) of this talk together with previous papers referenced therein is required to evaluate the thinking of Dr. Walker. The written version of this talk explains a theory of psi phenomena resting upon several foundations:

1. A theory of consciousness developed by Dr. Walker (referenced but not explained) in which triggering of nerve synapses is influenced by single quantum-level processes, and in which there are computed 3 basic rates of data processing in the brain,
 - a.) Subconscious data rate $2.4(10)^{12}$ bits/sec.
 - b.) Conscious data rate $7.5(10)^8$ bits/sec.
 - c.) Attention set or "will" data rate $3(10)^4$ bits/sec.
2. The notion of "hidden variables" in quantum theory. These "hidden variables" are not present in standard quantum theory, and are called "hidden" because they are inaccessible to direct measurement. There is no experimental verification of necessity for such variables, but they have been conjectured solely for philosophical or logical motives. The roll of these variables is to fix the precise outcome of a quantum event (or measurement), an outcome which in standard quantum theory is only determined in terms of its probability. The outcome of a quantum event must be the same for all observers regardless of location or time lapse, so "hidden variables" potentially provide a communication channel independent of space and time.

3. The assertion that the attention set or "will" data rate in the brain is the rate at which "hidden variable"-governed quantum processes are influencing the mind, or at which the mind can influence quantum processes. Such a mind-mind or mind-object link provides a "hidden variable" theory of psi phenomena, suitable for telepathy, clairvoyance, precognition, and PK.

Since according to this theory the "will" or paranormal data rate, $3(10)^4$ bits/sec, is a very small fraction of the conscious data rate, $7.5(10)^8$ bits/sec, the rarity of paranormal cognition is explained. Assuming a perceptive cue may occur at random from either data rate permits a calculation of the incidence of psi ability in an individual or a population. Fair agreement results.

A detailed calculation is presented of the effect of quantum uncertainties in the initial position and velocity of a cubical die which bounces down an inclined plane. This experimental situation amplifies initial quantum uncertainties into macroscopic differences in the final position of the die. The results of PK placement experiments on rolling dice are consistent with these calculations, lending credence to the belief that PK operates by resolving quantum uncertainty.

CRITIQUE:

1. The somewhat dubious contention that the triggering of nerve synapses is a quantum process requires more substantiation. The author's arguments leading to this contention, though published or reported, are not readily accessible. A like statement applies to his calculation and interpretation of the three fundamental data rates in the brain. All the author's ideas form an interlocking system which has evolved over several years. To secure acceptance, or even objective consid-

eration, these thoughts should be combined into a single, concise, and self-contained presentation, which the present paper is not.

2. Hidden variables are controversial and by no means form a part of accepted physical theory. No compelling physical evidence requires them, unless psi phenomena itself constitutes such evidence. Invocation of physical hidden variables for a theory of consciousness is a radical assumption, justifiable only by successful results.
3. The theory has not yet predicted anything. The calculations of the incidence of psi ability, and of the influence of quantum uncertainties upon dice rolling, show consistency with experiment but do not test the fundamental assumptions of the theory. The former calculation depends only upon a single number (the ratio $1:10^4$), and the latter is a physical calculation.
4. Regardless of its validity, Dr. Walker's theory is the most explicit, detailed, and quantitative theory of psi phenomena presented at this conference; though perhaps not the most fundamental. Unlike some of the other papers its contents are sufficiently explicit to permit detailed criticism and evaluation, and to at least offer some possibilities of experimental assessment.

2. PRECOGNITION-A MEMORY OF THINGS FUTURE?

Gerald Feinberg, Department of Physics, Columbia University, New York.

SUMMARY:

The suggestion is advanced that precognition may be knowledge of a future state of the percipient's mind rather than prior knowledge of an objective state of the physical world. Thus, like memory where the past state of the mind is recalled, precognition is perception of a future state of the mind. Professor Feinberg notes that the theory of electromagnetic radiation, and other physical theories, in principle permits both time retarded and time advanced solutions. The time advanced solutions which propagate information from future to past are customarily excluded for the reason that they have not been observed experimentally. The possibility exists of some small admixture of time advanced solution together with the dominant time retarded solution. In the case of electromagnetic theory experiments are presently testing this possibility to the accuracy of one part in 10^{17} .

If one assumes that the mechanism of memory, whatever it may be, likewise permits a small admixture of time advanced solutions as well as the usual time retarded ones which we call memory, we have the phenomena of occasional precognition based upon perception of a future state of the mind. Precognition of events is possible only if the percipient learns of the event at some time in the future.

These speculations would receive experimental substantiation if precognition is influenced by the same factors as influence memory.

CRITIQUE:

Basically a trivial paper, containing one idea expressed in the title,

together with some standard physics which is only related to psi phenomena by virtue of a strained analogy between electromagnetic radiation and memory processes.

3. PARAPSYCHOLOGY, QUANTUM LOGIC AND INFORMATION THEORY

C.T.K. Chari, Madras Christian College, Madras, India

(Professor Chari did not attend the conference. His paper was read by Harold Puthoff.)

SUMMARY:

In addition to three types of conventional biological information; 1.) genetic, 2.) environmentally conditioned, and 3.) symbolic and recorded communication; the author postulates a 4th type of information network, the psi-network. The logic of this network would be non-Boolean. Understanding the psi network may require use of recently proposed concepts in the quantum theory of measurement and in information theory.

CRITIQUE:

A paper written in the context of philosophy and formal logic without, however, a clear internal organization. It provides no theory clear enough for experimental verification or further development. The principal value of the paper is its numerous citations of recent work in the philosophy of quantum mechanics and in information theory. Indeed this paper reads like an over-abbreviated review article.

Since C.T.K. Chari did not attend the conference he read advanced drafts of some of the presented papers and submitted a written version of his reactions to them entitled:

An Indian Parapsychologist's Reactions to the Geneva Conference on
"Quantum Physics and Parapsychology"

4. QUANTUM PARADOXES AND ARISTOTLE'S TWOFOLD INFORMATION CONCEPT

O. Costa de Beauregard, Institut Henri Poincaré, Paris, France

SUMMARY:

The problems of relativity, time reversibility, and entropy increase lead to consideration of measurement processes in the context of information theory. A measurement process by which information is acquired produces an increase in entropy, since negative entropy must be supplied equal to or greater than the information acquired. Such a process is a learning or a perceptual process. An entropy increasing process is dissipative, and dissipation is a requirement of macroscopic causality in the normal sense of past determining the future or, equivalently, retarded waves.

The author proposes the reverse process (an ordering process) whereby pre-existing information is converted into order, a process which occurs whenever any conceptual scheme is actualized to produce macroscopic order. Ordering decreases entropy. An entropy decreasing process is the reverse of dissipative and implies macroscopic acausality (or finality) in the sense of the future situation determining the past, or advanced waves.

Both processes, which were foreshadowed in Aristotle's thinking, can be represented by the two chains of equivalence:

Measurement → Information	Information → Ordering
Entropy Increase	Entropy Decrease
Dissipation	Anti-Dissipation
Causality	Finality
Retarded Wave	Advanced Waves
Past to Future	Future to Past

Although de facto the first column predominates in natural macroscopic processes, the inverse process of the second column is a theoretical possibility and indeed must also occur. At the microscopic level of elementary quantum processes one might expect a symmetry between the two columns, similar to the other symmetries of microscopic physics (time reversal, charge conjugation, etc.). Since probability plays a central role in quantum theory, the two types of process depending respectively on increasing and decreasing order, have tight consequences. Some of these are PK by use of conscious information to control a quantum process, and telepathy by the linked outcome of quantum measuring processes. Basically these considerations are summarized in the statement that the wave function of quantum mechanics propagates probabilities. It is not a physical field which propagates, but rather an information field.

CRITIQUE:

Though scarcely providing an explicit theory, this paper hews closely to established physical understanding. It provides a theoretical framework which not only may connect observed ESP effects with quantum mechanics, but which also places ESP in the very general context of information theory. Whatever else it may be or may involve, ESP does deal with information. In addition the paper points up how information theory may underlie some very deep physical principles. This is a provocative paper, perhaps the most profound physical discussion at the conference. It may perhaps formulate a general foundation upon which could be built an intelligible physical theory of ESP.

5. LIFE AND QUANTUM PHYSICS

V.A. Firsoff, Royal Astronomical Society, London, England

SUMMARY:

This paper uses the ideas expressed by Monod (Jacques Monod, Chance and Necessity, 1972) as a framework for expounding the theme that mental processes have a fundamental role in nature which cannot be understood on the basis of classical mechanism, logic of the excluded middle, cybernetic models, or any other conventional ways of thinking. Numerous illustrative examples are cited to support this assertion. Life is too rare and strange a phenomenon to be explicable in terms of statistical probability. Its characteristics of genetic invariance coupled with dynamic evolution^{and} adaptability indicate a directive force of mental type. Visual perception may use only a few photons, and neural processes in the brain are sufficiently sensitive to respond to quantum effects. In turn PK experiments have demonstrated mental influence upon radioactive decay, a quantum process. Thus there is a deep, and not understood, connection between life, mental processes, and quantum physics.

CRITIQUE:

Not precisely an objective paper, but rather expressive of the author's sense of awe and wonderment at the mysteries of nature, citing examples of inexplicable processes, and weaving some possible general implications from them. Basically a philosophical essay, more lucid than many, but offering no testable hypotheses nor firm points of departure for subsequent analysis.

6. PHYSICS, ENTROPY AND PSYCHOKINESIS

Harold Puthoff and Russell Targ, SRI, Menlo Park, California

7. REMOTE VIEWING OF NATURAL TARGETS

Russell Targ and Harold Puthoff, SRI, Menlo Park, California

SUMMARY:

Both of these papers describe experimental tests with gifted paragnosts. The first describes PK experiments influencing sophisticated physical instruments, and the second describes extrasensory perception of remote targets in such detail as to imply high rates of data transmission. No detailed summary is necessary since the papers are experimental and the descriptions are clear.

Some general features of PK and speculations about its nature are given in the first paper, to wit:

1. PK phenomena are close to noise level and appear to derive their energy from mobilization of random thermal energy.
2. Results seem to appear as a result of coincidence rather than of specific cause.
3. PK-phenomena are intrinsically spontaneous and hard to produce on cue.
4. Close control and observation inhibit the phenomena.
5. Phenomena are known to occur on the microscopic quantum level which are similar to observed PK phenomena.

CRITIQUE:

Belief in the experimental results depends upon confidence in the integrity and skill of the experimenters. The results described, if valid, establish the existence of the phenomena and are a first step toward establishing its patterns.

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Some of the features observed are compatible with the general ideas expressed in the paper of Professor Beauregard.

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8. PARAPSYCHOLOGY AS AN ANALYTICAL-DEDUCTIVE SCIENCE

J.H.M. Whiteman, University of Cape Town, Cape Town, South Africa

SUMMARY:

I am utterly unable to understand this paper. It appears to outline a complete logical-mathematical system, which is also expressive of an entire philosophy or world view sufficiently rich in structure to permit parapsychology and much else besides.

CRITIQUE:

I am neither a philosopher nor a logician, but as a physicist I doubt whether such artificial constructs, however beautifully articulated, are fruitful unless narrowly constrained by experimental fact. Such is apparently not the case here.

9. A LOGICALLY CONSISTENT MODEL OF A WORLD WITH PSI INTERACTION

Helmut Schmidt, The Institute for Parapsychology, Durham, North Carolina

SUMMARY:

An empirical description of psi phenomena is proposed wherein a psi source strength is defined as a multiplicative factor applied to the ratio of a priori probabilities for random events. Thus psi can change relative probabilities of events. Different experiments can be conceived as chains of random events, and whether an event occurs in the chain or not can depend upon previous events in the chain.

Various experimental structures are proposed which could serve to test the consistency of this model. Psi sources could be superimposed to test the linear addition of weak psi effects, multiple stimulation of the psi source (an animate object) could be tested, and various logical connectivities can be constructed to test equivalence of PK, precognition, etc.

CRITIQUE:

This empirical approach to the quantification of psi effects is motivated by Dr. Schmidt's successful experiments in the psi control of random quantum events. The approach furnishes no deep mechanism or understanding, but can be very valuable for sorting the logical consistency of models. Whether these specific ideas prove consistent by surviving further experimental checks or not, the general approach of empirical quantification in the context of a simple logical structure seems quite appropriate and reasonable at the present stage of understanding of psi phenomena.

10. CONNECTIONS BETWEEN EVENTS IN THE CONTEXT OF THE CONSTITUTIONAL MODEL FOR A QUANTUM PROCESS

Ted Bastin, Cambridge Language Research Unit, Cambridge, England

SUMMARY:

This paper refers to, but does not describe in detail, a mathematical structure which is under development by the author. The mathematical model has as its object, nothing less than attainment of a fundamental theory underlying all objects and phenomena. It hopes to derive such things as elementary particles and their characteristics, as well as the very structure of space and time. Despite the occasional mention in the paper of more conventional physical ideas, the chain of speculative logic remains obscure. Little explicit mention is made of parapsychology.

CRITIQUE:

This paper is so confusing to the reader as to prevent any effective evaluation, other than to record the impression that such speculations are not only disorganized but very remote from conventional physical theory. Their relation to parapsychology is at present extremely tenuous, although the author's interest in parapsychology may provide part of the ultimate motivation for his thinking.

NOTE:

At the conference Dr. Bastin circulated a paper, without permitting copies of it to be made. This paper, authored by Hasted, Bohm, Bastin, and O'Regan and dated June 22, 1974, was a narrative description of experiments with Uri Geller. Geller's ability to modify counts of a Geiger counter (perhaps by control of electrical currents in the counter shell), to bend spoons, and to bend molybdenum disks is reported.

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PROGRAM

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