

A QUANTUM THEORY OF MIND

A Thesis

Presented to

the Faculty of Graduate Studies and Research

University of Manitoba

In Partial Fulfilment of

The Requirements for the Degree of

Master of Arts

by

Derek E. L. Best

September 1970



ABSTRACT

The purpose of this thesis is to show that any form of dualism is untenable, and to defend a form of identity theory which is compatible with the quantum theory of physics. Briefly, quanta are all that there is in the universe; it follows that a mental state is a quantum state of the brain apt for bringing about a certain sort of behavior.

In Chapter I the various mind-body theories are briefly presented and the failure of each noted. Herbert Feigl's discussion of the basic ambiguity of the terms "mental" and "physical" (as presented in The "Mental" and the "Physical") is summarized, with his criteria for a solution of the mind-body problem.

Various forms and interpretations of the statement of identity are explored in Chapter II. Statements are classified according to whether their truth results from logical necessity, linguistic necessity, causal necessity, or whether they are adventitious, or accidental. It is concluded that the present form of the identity theory states that the class of entities modified by the adjectival use of "mind" is entirely included in the class of entities modified by the adjectival use of the word "brain"; and that this is necessarily so as a result of the manner in which brains in fact operate, given the laws of nature as they are (regardless of whether they are known).

Chapter III contains a summary of quantum theory as it is currently held by most physicists, and descriptions of the laser phenomenon and holography are presented (a) as examples of the confirming evidence for quantum theory and (b) as relevant to a possible model of the brain and its functions.

An attempt is made to clarify the Heisenberg uncertainty principle and show its relevance to the problem.

The quantum theory of mind is presented and explained in Chapter IV, and an attempt is made to analyse various types of sensation statements in the light of mental events' being interpreted as quantum effects. The findings in parapsychology of L. L. Vasiliev of the University of Leningrad, and of Dr. Helmut Schmidt of the J. B. Rhine Institute are investigated as possible candidates for confirming or non-confirming evidence of the truth of the quantum theory of mind. The problem of intentionality is reviewed and a tentative solution presented. It is shown that most of the traditional mind-brain puzzles result from either (a) a faulty concept of mind, (b) an inadequate concept of matter, or (c) failure to pose questions unambiguously.

In the concluding chapter, a return to Herbert Feigl's postscript to The "Mental" and the "Physical" investigates in the light of the proposed theory the four "true but irreconcilable" propositions which Feigl quotes from the doctoral dissertation of Mrs. Judith Economos. It is concluded that none of the statements is, as stated, entirely true, and that if they are corrected or the questionable elements eliminated, they are no longer irreconcilable. Finally, the theory is subjected to Feigl's criteria for an acceptable solution to the mind-body problem. It is found that although there is insufficient evidence to state that the theory satisfies the criteria, there is no respect in which it clearly fails.

ACKNOWLEDGEMENT

I wish to acknowledge with thanks the encouragement and assistance given to me by all the members of the Philosophy Department, and especially by my adviser, Professor Martin Gerwin.

TABLE OF CONTENTS

	PAGE
INTRODUCTION	vi
CHAPTER	
I A Summary of Unacceptable Solutions	1
II The Status of Identity Statements	25
III On The Stuff of the Universe	51
IV What Is Mind?	72
V Can a Quantum Theory of Mind Solve any of the Traditional Puzzles?	96
BIBLIOGRAPHY	123

INTRODUCTION

It is probably misleading to refer to the mind-body problem; rather there is a number of related, but separate problems which may be classified as: (a) linguistic, (b) logical, (c) problems related to dualist theories, (d) problems related to materialist theories. While solutions to (a) and (b) must be sought, it seems that the way will be more clear when we have a clearer idea of the domain within which we are working.

Philosophical writing tends to become mired in discussions of "category mistakes" and "conceptual confusions" so that the main issues of mental and physical are lost. The dualist fails because of the inadequacy of some form of action or interaction theory, or else from the prima facie improbability of some form of parallelism. The materialist fails when faced with intentionality, volition, and the apparent efficacy of consciousness.

It is usually presupposed that the concept "physical" is unequivocal and clearly understood, and that "mental" refers to something which is necessarily non-physical. What has not, so far as I can tell, been directly suggested, is that our concept of matter has been so inadequate as to be clearly erroneous--i.e., that the quantum theory of current physics is basically correct and adequate to explain all the phenomena of the universe including consciousness.

When a physicist writes:

In experiment, in theory, and even in philosophical implications, the study of particles seems to have blurred the dividing lines between matter and

interactions, between actor and actions,¹

then it is time for the philosopher to reassess some of his basic assumptions. Thus the purpose of this thesis is to show that any form of dualism must be untenable and to suggest a form of monism which one might call a "quantum theory of mind". I would avoid the term "materialism" on the ground that classical concepts of matter are bound to be misleading. It is an identity theory of the type Richard Rorty calls a "disappearance" theory. I am not claiming to have solved the mind-brain problem, but to have shown that there is no longer any good reason to doubt that a full and adequate explanation of what kind of referents lie behind such locutions as "I", "I think", "I sense" etc. will be found within the domain of quantum theory as it may reasonably be expected to be modified by empirical research.

¹Clifford E. Swartz, "Resource Letter on Subatomic Particles,"
American Journal of Physics Vol. 34, No. 12, December 1966

CHAPTER I

A SUMMARY OF UNACCEPTABLE SOLUTIONS

Everyone knows that 'mind' is what an idealist thinks there is nothing else but, and matter is what the materialist thinks the same about. The reader also knows, I hope, that idealists are virtuous and materialists are wicked.

-- Bertrand Russell, History of Western Philosophy

There is, unfortunately, a good deal more to be said on the subject than this; much of it having already been said, and most even less enlightening. However for present purposes I shall divide the mind-body theories into the classifications of monism and dualism. Monistic theories, which can include both materialism and idealism, can be subdivided into identity theories, of which there are numerous statements, and double aspect theories--not currently held in very high repute, and perhaps unjustly so held. The class of dualist theories may be subdivided into: interactionism, epiphenomenalism, parallelism, and the less likely occasionalism and preestablished harmony. I shall not discuss the latter theories on the ground that (a) they are empirically unverifiable, and (b) they are intuitively unsatisfactory.

Before proceeding any further in detail I should like to distinguish between, and for the purpose of this discussion define, the terms 'brain state', 'brain event', 'brain process' with their parallels in the mental realm. 'Brain event' I shall treat as primitive, referring to those electromagnetic phenomena which can be recorded by an electroencephalograph, at least some of which can be correlated with awareness, or

mental events; a brain process, then, will be a sequence of brain events which may or may not be connected causally but are temporally sequential; a brain 'state' is a unit which may involve one or more brain events and/or processes, and which may be correlated with states or units of awareness of the kind that the common man would describe as 'anger', 'pain', 'satiety', 'seeing a red spot', or 'believing that Bowser is at the door'. Thus there may be a number of mental events and/or processes making up the mental state we call pain.

Of the dualist positions only interactionism seems to have an immediate appeal. Parallelism, like interactionism, accepts that there are brain processes and mental processes, that for every mental process there is a corresponding brain process, and for a certain class of brain process there is always a corresponding mental process; but unlike interactionism, parallelism denies that there is a causal connection between them. However the parallelist is denying that constant conjunction is a necessary and sufficient condition for the cause-effect relationship since he accepts the constant conjunction, yet denies the causation. Parallelism proposes that physical events can cause physical events in sufficiently complex trains that the entire stimulus-response behavior of the human can be explained without reference to or necessity for a theory involving non-physical effects of physical causes, or physical effects of non-physical causes. This theory can be refuted on empirical grounds as pointed out by Michael Scriven.¹ The human brain can be stimulated by electric probe or by drugs (these external stimuli will cause brain events),

¹Michael Scriven, "The Limitations of the Identity Theory", Mind, Matter & Method, Feyerabend & Maxwell, ed., (University of Minnesota, 1966), p. 191

and certain mental events will invariably occur simultaneously. If we apply a certain alleged cause, A, at random within a determinable set of background conditions, $(c, c_1, \dots c_n)$, we inevitably get the alleged result, R. Since of the set of conditions, A, C, $C_1, \dots C_n$, which is jointly sufficient for R, A is the non-redundant member and also random, there can be no other factor, A', which is the actual cause of R and happens to be simultaneous with A.

This consideration, then, proving parallelism to be false, leaves open the possibility of epiphenomenalism. This position allows that mental phenomena are caused by physical (brain) phenomena, but denies that the train is reversible. On the surface this seems to be implausible simply on the ground that if the physical can cause what is assumed to be non-physical, there seems to be no obvious reason why the reverse should not be equally possible. For the epiphenomenalist the position of the mind with respect to the body - the position of mental events with respect to brain events - is analogous to that of a shadow to the body of which it is a shadow. The movement of the body causes the shadow to move, but the movement of the shadow has no causal efficacy with respect to the body. The difficulty of this sort of argument from analogy is that while it is undoubtedly absurd to suppose that a shadow could move its object, having said this we have said nothing at all about the mind-body relationship.

Among the considerations which give epiphenomenalism some initial plausibility are things like sleepwalking and any unconscious behavior that passes under this name. For if mind is characterised by consciousness or awareness, then anything that the body does during sleep, and of which we are not even semi-aware, can be considered as purely non-mental. Now practically every human activity which is normally carried out consciously

has also been done by people during their sleep, including the solving of complicated mathematical equations. The epiphenomenalist could say that such occurrences show the overdetermining nature of consciousness in volition. The argument from hypnotic states is less clear since one hesitates to say whether or not an individual is conscious in the normally accepted meaning of the word when he is in an hypnotic trance. There are so many kinds of trance and so many ways in which the operator can determine whether the subject will "remember" what he has been through, that it is difficult to decide what credence we will give to the replies of the subject to questions about his "experience".

It seems that the only way we can refute epiphenomenalism per se (as distinct from the degree to which it gets flushed away along the interactionism, or must be taken to be false if monism is proven to be true), is to show that there is at least one physical event, which was caused by a non-physical event, and this is as unlikely of proof as the reverse. Yet it does seem that it is a mental state (my pain), and not a set of electro-chemical reactions simpliciter, that sends me to the dentist when I have a toothache.

Interactionism assumes that minds belong to the class of entities that are non-physical, that minds are causally responsible for certain physical states of the brain, and that these and subsequent physical states are causally responsible for states of the mind. The problem of interactionism is not so much that of how non-physical events can cause physical events and vice versa, since there is nothing in the concept of cause and effect preventing anything from causing anything else, but rather the problem of providing a plausible explanation of the causal process.

The whole problem of what we mean by "mental" as opposed to "physical", with our reluctance to accept into our ontology things which cannot be given neat, spatio-temporal co-ordinates and yet are efficacious, render the dualistic approach to the mind-body problem repugnant to those with a highly developed respect for the empirical as opposed to the mystical. Unfortunately the sea of monism is not much smoother.

At least two theories pass under the title of identity theories, both of which would assent to the statement, "brain states (events/processes) are identical to mental states (events/processes)." The difference between the theories lies in whether the statement is to be considered as analytic or synthetic. The first interpretation is to be rejected because it says nothing about the world, but about language. We shall turn our attention to the philosophically interesting position which regards the statement of identity as synthetic. That is, it is a contingent matter of fact that the statements describing brain states describe the same states of affairs as those describing mental states, in the same way as statements describing the Morning Star have the same referent as those describing the Evening Star.

Hospers,¹ following C. D. Broad, objects to any kind of identity thesis on the ground that "how can your thought about Paris and a certain complicated brain state inside your head be literally the same thing, since the one has characteristics that the other has not?" In actual fact, of course, both Hospers and Broad are arguing only against the uninteresting identity thesis with this form of attack. The same argument might

¹John Hospers, An Introduction to Philosophical Analysis, (Englewood Cliffs, N.J., 1953, Prentice Hall Inc.) p. 321

well have been used by the ancients to prove mistaken the first person to state that the Morning Star and the Evening Star were the same thing. After all, they might have said, the Morning Star is seen only in the morning and in the eastern sky, whereas the Evening Star is seen in the evening and in the western sky--obviously they have different characteristics, therefore they cannot be the same. It will be argued that 'when' and 'where' are not the kind of characteristics we are speaking of when we say that one has characteristics that the other has not; they are characteristics of the observer or of his situation, or of the situation in which the phenomenon is observed. This aspect can be separated in consideration of a phenomenon like the planet Venus; but what of the situation we are concerned with in which the phenomenon we want to observe is that with which we observe it?

Let us take another example in which this objection cannot be made. Consider the 36th president of the United States and the owner of the LBJ ranch. It is not a characteristic of the 36th president of the U.S.A. per se that he be a cattle owner or a tall Texan or many other things that are characteristic of the owner of the LBJ ranch. It will be argued that insofar as Lyndon B. Johnson was as a matter of empirical fact the 36th president of the U.S.A. and he is a Texan, etc., then these are in fact characteristics of the 36th president of the United States. This, however, is known only after the contingent fact is known that L.B. Johnson was the 36th president of the U.S.A. Similarly the opponent of the identity thesis would have to make the same move if it were (or could be) shown that as a matter of empirical fact brain states are identical to mental states. And it is just this that the supporter of identity must hold: that the identity is logically contingent and the statement of identity a synthetic statement.

But it is more than merely empirical identity that we are concerned with; if the identity thesis is true, knowledge of it demands certain conceptual shifts not required by the LBJ example. Knowledge of "pure" empirical identity adds to or modifies accepted concepts, but does not require changes in the concepts themselves. Knowledge of mind-body identity, if it is true demands that we form a new concept of what is referred to by the terms, "mind" and "body" in the same way that knowing that lightning is nothing more than an electrical discharge requires a new concept of lightning.¹ Evidence that such conceptual shifts may be required is seen in the findings of experimental work in particle physics such that such statements as the following have been made:

In experiment, in theory, and even in philosophical implications, the study of particles seems to have blurred the dividing lines between matter and interactions, between actor and actions.²

It was this statement, containing as it does a concept of the physical so foreign to the classical concept, that has led to the following attempt to find a solution to the mind-body problem within the confines of Quantum Theory. Such a solution must, of course, be monistic, although I would hesitate to call it materialistic since it rejects classical materialism. It is an identity thesis, but it demands more than mere empirical identity.

Against identity, C.D. Broad argues that it is palpable nonsense to try to reduce statements of the form "There is something which has the

¹cf. Michael Scriven, op. cit., pp. 191-192

²Clifford E. Swartz, "Resource Letter on Subatomic Particles" American Journal of Physics, Vol 34, No. 12, Dec. 1966.

characteristic of being my awareness of a red patch" to statements of the form "There is something which has the characteristic of being a molecular movement",¹ and that such a reduction would be necessary if the identity thesis were true. He argues that it would make perfectly good sense to ask of a molecular movement if it is swift or slow, straight or curved etc., but that such questions about the awareness of a red patch are nonsensical. But about this approach I would ask first: is "to know what it is to be aware of a red patch" the same as to know "what an awareness of red patch" is? I would suggest not, since although I know perfectly well what it is to be aware of X, I do not know what an awareness of X is, (in the same way that while I know what it is to be in love, please don't ask me what love is--I don't know). Yet the criticism of identity which is being advanced depends on the two statements having the same meaning and on our apprehension of the meaning of the first giving significance to the second which, I suggest, may be meaningless (at least within our current conceptual scheme). Secondly, if our current concepts are faulty, it may be perfectly good sense to ask of 'an awareness' (whatever that may be), "Is it swift or slow?" etc.

There are two monistic theories which travel under the name of double aspect theories but which are in reality quite different in their basic propositions. The first we might call the semantic double aspect theory, and the second the third substance theory. I shall discuss the two separately.

1. Semantic Double Aspect Theory: Such a thesis suggests that "brain state" talk and "mental state" talk are simply two different

¹C. D. Broad, The Mind and its Place in Nature, (Littlefield Adams & Co.) 1925, p. 622

linguistic conventions for describing the same set of phenomena. In essence such a theory presupposes identity of a materialistic sort such that our physiological conventions are reasonably adequate modes of description, but that psychological conventions, while undoubtedly useful, may be misleading insofar as they take for granted mental states that are basically different from physical states. The position states that the mind-body controversy is similar to the situation which exists in the linguistic conventions used to refer to ordinary physical objects such that the physicist describes a table in terms of the subatomic particles and their relations to one another, the atoms and the manner in which they are combined to form molecules, and the motions and characteristics of all of these so that considered together they reflect light, exhibit stability and offer resistance in the ways characteristic of tables. The common man has a different set of linguistic conventions to describe the same table, and an artist, designer, or cabinet-maker might have yet others--all dependent, of course, upon the conventions of the common man. It is the apparent disparity between the two conventions that originally made atomic theory difficult for the common man to contemplate since it required important conceptual shifts such as, for example, the shift in the concept of solidity. That there is no longer any doubt that when the physicist speaks of the microstructure of matter he is speaking of the same "stuff" as we are speaking of when we talk about tables is the nub of the semantic double aspect thesis; the requirement is that common parlance must simply come to grips with the empirical findings. In short, this theory is a restatement of the 'interesting' identity thesis with the added proviso that the 'problems' of mind-body are linguistic.

2. Third Substance Double Aspect Theory: This position, whose historical bases are well known, states that mind and body, or the mental and the physical, are the two knowable aspects of a third basic substance (i) as yet unknown or (ii) perhaps unknowable. The standard objection to (ii) is that in its attempt to solve the mind-body problem it creates a greater problem in that although we can talk about the head of the coin or the tail of the coin, it seems that we cannot talk of the coin itself; the self, which is the object of our search in the mind-body debate, is not only unknown but unknowable. What the proponent of this theory is willing to accept, the critic highlights as its weakness--that nothing can meaningfully be said about the central issue of the mind-body problem, the self. The critic sees that the only way out of this weakness is for the double aspect theorist to admit that we have two different linguistic conventions, physiological and psychological, and that these two conventions describe not only different characteristics but also different types of characteristics. Then, charges the critic, there is no justification for the belief that the two conventions describe the same thing. The force of this criticism would be reduced if and when a one-one correspondence is found between mental states and brain states, between psychological conventions and physiological conventions; while such a correspondence seems more and more likely with increases in the knowledge given to us by the empirical sciences, such findings only reduce, not nullify the force of the criticism.

What remains is that if this version of the double aspect theory maintains that the "third substance" is unknowable and/or ineffable, then the theory does not attempt a genuine solution to the mind-body problem. It does suggest a theory of linguistic or conceptual conventions, but we

are no closer to knowing what the 'self' is, or what the relation is between one aspect and the other. It is just this relationship which any adequate theory must elucidate.

A third substance theory is not fruitless, however, if it can make some significant statements about the third substance. The common man has a set of linguistic conventions whereby he speaks of trees, lamp-standards and puddles in the road; classical physics has a set of linguistic conventions concerning indivisible atoms and molecules in rapid motion which, it is claimed, describe the same entities we normally refer to as trees, lamp standards and puddles in the road; since 1920 the quantum physicist has told us that the real world can be adequately described only with a whole new set of conventions having to do with quanta--entities that do not behave as do trees, lamp standards and puddles in the road, but whose behavior accounts for that of the familiar objects of our environment. Quantum theory, then, is a third substance theory (not, ostensibly, in the mind-body domain), which reconciles the conventions of the common man and of classical physics without introducing any entities which are in principle unknowable or ineffable. It is, therefore, the chief purpose of this thesis to suggest that an adequate mind-body theory, which satisfactorily accounts for the relationship between the various conventions (psychological, physiological, etc.,) will be found within the domain of quantum physics.

In The "Mental" and the "Physical", Herbert Feigl¹ sets out what he conceives to be the "requirements and desiderata for an adequate

¹Herbert Feigl, The "Mental" and the "Physical", (University of Minnesota Press, Minneapolis, 1958/67)

solution to the mind-body problem" which I shall attempt to summarize here as a guide not only to the systematic criticism of solutions already suggested, but also to the embryonic solution I wish to propose. These are:

1. Linguistic analysis: an adequate analysis of the terms "mental" and "physical" must be attempted such that we can be clear about what is meant as well as what is not meant by each.
2. Empirical Unity: an adequate solution must account for the unity indicated by current trends and experimental data of empirical research, including those of parapsychology.
3. Efficacy: we must at the same time be able to account for the efficacy (apparent or otherwise) of mental states which, although we may very well be deceived, gives every evidence of being more than just apparent. This will have to include an account of free will in whatever sense this can be made to conform to what is scientifically defensible.
4. Logic: The logical requirement concerns the necessity to recognize as synthetic or empirical the statements correlating brain states with mental states.
5. Epistemology: the epistemological requirements are threefold, and I quote from Professor Feigl:
 - (a) the need for a criterion of scientific meaningfulness based on intersubjective confirmability,
 - (b) the recognition that epistemology, in order to provide an adequate reconstruction of the confirmation of knowledge claims must employ the notion of immediate experience as a confirmation basis;... 'Acquaintance' and 'Knowledge by acquaintance', however, require careful scrutiny;
 - (c) the indispensability of a realistic, as contrasted to operationalistic or phenomenistic, interpretation of empirical knowledge in general, and of scientific theories in particular.
6. Reconciliation: the reconciliation of scientific and philosophical analysis--i.e. how shall we distinguish between:

MENTAL	and	PHYSICAL
Subjective		objective
nonspatial		spatial
qualitative		quantitative
purposive		mechanical
mnemic		non-mnemic
holistic		atomistic
emergent		compositional
intentional		"blind"; nonintentional

Two things will be evident at this stage; first that the solution toward which I am aiming lies within the framework of monism, and second, that a complete and exhaustive study of the problem within the framework suggested by Feigl would be beyond the scope of this essay, and that therefore I shall have to be content to sketch the lines along which I suspect the solution will be found, and to indicate the manner in which it might satisfy the criteria set out above.

A. It is generally conceded that what is 'mental' is subjective, and that the 'physical' is objective; but saying this really solves nothing since by 'subjective' we generally mean that which is mediated by psychological or 'internal' factors, whereas 'objective' refers to what is directly perceived, or directly known--what is "out there", independent. But surely this very statement contains a contradiction! We are directly aware of, we know (in the hard-boiled sense) only our own mental states. I do not seem to be able to be mistaken about my thoughts and emotions; I may be mistakenly angry, but I cannot be mistaken about the fact that I am angry; I may be mistakenly aware of a pool of water in the road ahead, (i.e. it may be a mirage), but I cannot be mistaken about being aware of the pool-like sensation. If there is anything "out there" existing independently of my mind, I cannot apprehend it as directly as I can my own mental states. Psychological literature is full of "objective" observations which one very strongly suspects have been mediated by the

mental states of the observer. In fact recent experiments in neurophysiology (which will be reported later) indicate that all observations are mediated by the totality of previous experience.

In short, the whole project of sorting out what is mental and what is physical on the basis of subjective and objective is fraught with confusion so long as the latter terms are understood in relation to what is directly accessible as opposed to what is indirectly accessible.¹ How else shall we distinguish between subjective and objective? If the purpose of the enterprise is to illuminate 'mental', consideration of mind-dependent or mind-independent will lead to circularity in assuming prior to the investigation that we know what 'mind' is.

We are inclined to fall back on some conception of subjective as private, and of objective as public. In this way, although there may be public manifestations of private events, for example the screams and writhings of someone experiencing a pain which is itself private, the pain itself must remain private in the sense that no one else can experience that particular sensation. Nor can another person's sensation, given the numerically identical stimulus (loud noise, falling timber), under the same circumstances (the timber strikes both A and B with the quantitatively same force on the same area of the body at the same time), be the numerically same pain. Furthermore there is no way of anyone's knowing whether A's pain is even qualitatively identical to B's pain, even when all the publicly knowable factors are known to be similar, and there is every

¹Wolfgang Köhler, "A Task for Philosophers", Mind, Matter and Method, Feyerabend & Maxwell, ed., (Minneapolis, University of Minnesota Press), 1966.