

THE BEHAVIORISTIC INTERPRETATION OF CONSCIOUSNESS

K. S. Lashley (1923)

Classics in the History of Psychology

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Part I.

I. Present Forms and Limitations of Behaviorism

Behaviorism, beginning as a laboratory technique and a critique of method in concrete experiment, has advanced rapidly to a place as an accredited system of psychology, stressing the importance of objective methods and of physiological interpretations. The history of the movement is still reflected in the tendency of its exponents to stress experimental method rather than interpretation, in the lack of any systematic formulation of the relations of the science to the [p. 238] specific problems of the older subjective psychology, and in a certain shifting of ground in behavioristic discussions which indicates that the behaviorists themselves are not yet quite certain of the philosophic implications of their system. Too often a statement of an extreme position is followed by a partial retraction or qualification which leaves the reader in doubt as to the degree of heterodoxy expressed. This hesitation before the plunge is not discreditable to the behaviorist: so great a departure from tradition in psychology demands caution. Moreover, the behaviorist is primarily an experimentalist and believes that many of the supposed problems of philosophy will, with increasing knowledge, resolve themselves into concrete laboratory problems. Why then dispute fruitlessly and at length about them before data are at hand for their solution?[1]

Nevertheless, preoccupation with experimental problems will not excuse behaviorism for certain apparent inconsistencies in its doctrines. In various discussions of the scope of behaviorism three distinct and incompatible formulations are discernible. All involve the conviction that a complete description and explanation of behavior can be given in terms of the physicochemistry of bodily activity. They differ, however, in the place assigned to 'mind' in the system. The formulations are as follow.

1. Facts of conscious experience exist and are capable of treatment, as distinct from behavior. The behaviorist is not interested in them, since they are irrelevant to his problems, and leaves them to the tender mercies of the introspective psychologists or philosophers. This is merely psychophysical parallelism with emphasis on the physical. It is the view of Bechterew (2) and other early objectivists.

2. Facts of conscious experience exist but are unsuited to any form of scientific treatment. This is the most common formulation of the behaviorist's position. It seems to have been Watson's view in his earlier writings (31), as is shown by the following statement:

[p. 239] "Will there be left over in psychology a world of pure psychics, to use Yerkes' term? I confess I do not know. The plans which I most favor for psychology lead practically to the ignoring of consciousness in the sense that that term is used by psychologists today. I have virtually denied that this realm of psychics is open to experimental investigation. I don't wish to go further into the problem at present because it leads inevitably over into metaphysics. If you will grant the behaviorist the right to use consciousness in the same way that other natural scientists employ it -- that is, without making consciousness a special object of observation -- you have granted all that my thesis requires."

Watson seems now to have abandoned this position for the more extreme one outlined below (3). Weiss (33) still holds to the view when he says, "The structuralist point of view can, of

course, be consistently maintained. There is justification for inferring the existence of a conscious correlate for at least some of our actions, but the heuristic value of this assumption seems doubtful when it is shown that behaviorism is not less discriminative or descriptive than structural psychology. . . ." And again, "Perhaps the distinguishing difference between the functionalist and the behaviorist lies in the fact that the behaviorist disregards the entity which the functionalist calls consciousness" (34).

This we may call a methodological behaviorism. Experimentally it promises much, for it avoids the confusion of terms and issues inherent in systems which try to treat of both 'mental' and 'physical' data indiscriminantly. It limits the problems definitely to interpretation upon one set of premises and avoids the common error of much older psychology in mistaking a psychological name for a physiological explanation. But it puts the behaviorist in the position of the dog in the manger. It omits a whole universe of phenomena, which have been supposed to constitute the chief realm of psychology. Simply because he can make nothing of the facts of consciousness (which he admits are facts) in his system of physical causation, the methodological behaviorist refuses to believe that any other system can be [p. 240] devised which will permit the development of a science of pure psychics. And so long as he admits the existence of a universe of consciousness he lays open to attack his major premise, that behaviorism can account for all human activities. For the psychological dualist is constantly finding mental facts which he holds to be inexplicable in any mechanistic terms and by refusing to discuss such data the behaviorist prohibits himself from answering arguments based upon them. Moreover, so long as he admits the existence of entities in human existence which behaviorism disregards, he can not deny to others the right to try to study those entities and reduce them to a science by any means whatever.

3. The supposedly unique facts of consciousness do not exist. An account of the behavior of the physiological organism leaves no residue of pure psychics. Mind is behavior and nothing else. This view is implied in much of Watson's writing, although it is not stated in so many words. For the most part he expresses a methodological behaviorism, but such statements as the following leave little doubt of his fundamental denial of the fact of consciousness, as described by the subjectivist. "It is a serious misunderstanding of the behavioristic position to say, as Mr. Thompson does -- 'And of course a behaviorist does not deny that mental states exist. He merely prefers to ignore them.' He 'ignores' them in the same sense that chemistry ignores alchemy, astronomy horoscopy, and psychology telepathy and psychic manifestations. The behaviorist does not concern himself with them because as the stream of his science broadens and deepens such older concepts are sucked under, never to reappear."

This is the extreme behavioristic view. It makes no concessions to dualistic psychology and affirms the continuity in data and method of the physical, biological, and psychological sciences. "Consciousness is behavior." "Consciousness is the particular laryngeal gesture we have come to use to stand for the rest." I shall speak of this doctrine as strict behaviorism, or for brevity simply as behaviorism, since methodological behaviorism is only a form of epiphenomenal- [p. 241] ism. Such a behaviorism has been called a materialism by several recent critics.[2] Perhaps it is such, to the extent that modern physics and physiology are materialistic, but the word materialism implies a metaphysical theory of reality, whereas these sciences are, at least in their systematic treatment, altogether phenomenological. Psychophysical dualism and epiphenomenalism do imply theories of the ultimate nature of mind and matter, but behaviorism claims to avoid this and to attempt nothing more than a logical and mathematical description of experience such as is presented by the physical sciences. To stigmatize this as materialism is to appeal against behaviorism to the prejudices aroused by a crude metaphysic which is nowhere implied in its doctrines.

When we examine the evidence upon which strict behaviorism is based, a weakness in its current formulations seems evident. The behaviorist denies sensations, images, and all other phenomena which the subjectivist claims to find by introspection or by some form of direct knowledge. This disagreement as to matters of fact is not necessarily fatal to behaviorism, although it is the most frequent ground for rejection of the system. But when we examine the evidence adduced in support of the denial of consciousness, the behaviorist seems to have

failed to strike at the root of the dualistic systems. The arguments employed -- they can scarcely be called evidence -- fall into four chief classes.

(a) Appeals to the principle of parsimony to exclude consciousness because it is unnecessary for the explanation of behavior (32, 34). The inadequacy of this argument is evident. The gravitational effects of Jupiter are irrelevant to a physiology of digestion, yet they are none the less a fact. The behaviorist must show further that his system is adequate to explain the supposed phenomena of consciousness as well as of behavior, before the argument becomes relevant. At best the argument in its present form can support only a methodological behaviorism.

(b) Reviews of the history of evolution or of superstition to show how the belief in the self may have arisen (35). [p. 242] This argument is beside the point. It may force the subjectivist to deny the universality of evolution or of historical sequence, but this he has already done in claiming the existence of a universe of non-material things as the subject of his study, and in refusing to admit their derivation from the physical phenomena of evolution.

(c) Redefining of mind in objective terms as when Bawden (1) states that ". . . mentality or mind is a name for the fact of the control of the environment in the interest of the organism through the interaction of inherited capacities and acquired abilities." Such arguments likewise avoid the issue. They ignore the subjectivist's claim that he knows a unique mode of existence not definable in objective terms. At best from the standpoint of the subjectivist they constitute only a study of the physiological correlates of conscious processes.

(d) Attacks on the method of introspection. These are the behaviorist's big guns. In general, they take one of two forms. Introspection is inaccurate, unverifiable; the stuff revealed by it is variable and inconsistent. It is indeed so unreliable that we are justified in throwing out everything which it claims to establish. But much the same argument has recently been urged against the objective methods of mental testing. It may be a strong plea but it is not logically convincing. A method may be defective and yet reveal fundamentally important facts, as Loewenhoeck's observations on infusoria.

The other form involves a theory of introspection. When one examines his own mental states he is really reacting to stimulation of his proprioceptors. Introspection is a physiological process and as such can reveal only other physiological processes. Even if mental states exist, they cannot be discovered by introspection. But the introspectionist may reply, "Your doctrine of introspection is only an hypothesis. You have not produced convincing proof of the homeodetic theory of introspection. My claim that mental states form a unique mode of existence is based on the nature of the material which introspection reveals. If it does reveal such phenomena, it must be more than a physiological process. It is [p. 243] only by showing that mental states do not exist that you can prove that you have given an adequate account of the introspective process."

Thus it appears that the current formulations of behaviorism have not made good their claim to exclusive possession of the field of psychology. Methodological behaviorism has all the faults of psychophysical parallelism plus that of intolerance. It admits the existence of certain phenomena called conscious, admits that it can not fit them into its system, and denies to others the right to study those phenomena and to seek to formulate them into a science. Or, it reverts to the early objectivism of Bechterew and admits the possibility of a subjective psychology, merely asserting that this psychology is irrelevant to behavioristic explanation. It thus paves the way for the development of two cognate sciences, such as Fernberger (8) has recently advocated.

Strict behaviorism is advanced as a theory, but the insistence upon methodological behaviorism at all costs has prevented the consideration of any supposedly subjective data and has left the theory undeveloped. Yet if behaviorism is to become a complete science, if it is to avoid becoming merely a coordinate system with subjectivism, it must subordinate questions of method, of objectivity, to the application of mechanistic or physiological principles to the whole

of psychology. This point is emphasized by Dewey (5) to whom the facts of consciousness appear as an experimental behavioristic problem. "To recognize that the behavioristic principle can make a place for them (the facts of consciousness) is important. For science is, after all carried on by men, and a seeming denial that such facts do exist and do come under the behavioristic principle is sure to keep alive in the minds of some a futile introspectionist method, by setting to one side a realm of facts to which (so it is thought) it *must* be applied since the behavioristic method confessedly does not apply."

Let me cast off the lion's skin. My quarrel with behaviorism is not that it has gone too far, but that it has hesitated, that it has been diverted by details of experimental method, [p. 244] when more fundamental issues are at stake; that it has failed to develop its premises to their logical conclusion. To me the essence of behaviorism is the belief that the study of man will reveal nothing except what is adequately describable in the concepts of mechanics and chemistry, and this far outweighs the question of the method by which the study is conducted. I believe that it is possible to construct a physiological psychology which will meet the dualist on his own ground, will accept the data which he advances and show that those data can be embodied in a mechanistic system. A behaviorism will thus develop which will be an adequate substitute for the older psychology. Its physiological account of behavior will also be a complete and adequate account of all the phenomena of consciousness. It will be methodological only in insisting that the concepts of the physical sciences are the only ones which can serve as the basis for a science, and in demanding that all psychological data, however obtained, shall be objected to physical or physiological interpretation.

Such a program demands that we face the issue squarely. We must accept tentatively the supposed data of introspection and test the validity of our system by its ability to deal with such data. We shall find but three alternatives: the data may be of such a character that we can not hope to embody them in any mechanistic system; they may even now fall into such a system; or we may be able to define the problem of consciousness as an experimental problem, unanswerable on the basis of existing data, but offering possibility of solution with the development of objective science. Indirect arguments and denials of facts which others consider verifiable will not suffice. The dualist advances specific data with certain definable attributes as evidence for the validity of his system. Perhaps we can not verify his findings objectively, but we can examine his claims and determine if and in what respects they are incompatible with the postulates of the natural sciences. The key to the development of behaviorism lies here. When the behaviorist denies that consciousness exists, he denies, not the existence of the [p. 245] phenomena upon which the conception is based, but only the inference that these data constitute a unique mode of existence or that they are not amenable to analysis and description of the same sort as are 'physical' data. Unfortunately, the psychological terminology current today involves not only an enumeration of phenomena but also a definite theory of reality. It is this theory which behaviorism repudiates.

In the following pages I shall first seek to discover on the basis of introspective evidence the 'data of consciousness,' stripped of metaphysical theory. I shall then attempt to show that these data are adequately describable in the concepts of the physical sciences and that the addition of a dualistic interpretation adds nothing to our understanding of them.

II. The Evidence for a Mind-Body Problem

Before we can begin a constructive program we must define clearly the sort of data with which the behaviorist and the dualist claim to deal and must have in mind the presuppositions underlying the system of each. I am not concerned here with the development of an epistemological theory, but only with the empirical basis of the distinction between behaviorism and psychophysical dualism. A system of psychology can not be developed without some implied theory of knowledge, but, on the other hand, every theory of knowledge presupposes a theory of psychology and by changing the rules of the game innumerable self-consistent systems can be developed. Escape from this dilemma, in so far as it concerns the points of difference between dualistic and behavioristic psychology, is offered by the faith which both express in the validity of physical science. Both behaviorism and psychophysical dualism

accept the formulations of physics, chemistry, and biology as adequate descriptions of the interrelations between certain data of knowledge, and hence both accept a theory of knowledge which must justify the methods and conclusions of physical science. Any theory of knowledge which does this must also permit an attempt to extend the methods of physical science to other aspects [p. 246] or elements of experience and can not arbitrarily limit the field of physical investigation. The dualistic systems of psychology admit this and seek to justify their dualism upon empirical rather than epistemological grounds. They point to certain data of experience -- qualitative diversity, transcendence of time and space, independence of 'physical law,' and the like -- and assert that the concepts of the physical and biological sciences are inadequate to describe the relations and characteristics of these data. On this ground they justify the division of experience into two aspects or modes of existence and the formulation of additional postulates concerning the nature of 'mental existents.' The behaviorist, on the contrary, claims that the concepts of the physical and biological sciences are adequate to describe and account for the whole of experience and that there is not adequate empirical evidence for the distinction of mental and physical modes of existence or aspects of experience. "Grant me," he says, "the postulates of the physical sciences, and I can show you how the phenomena of mind may arise within a system which has no other attributes than those which the physicist ascribes to his phenomenological world."

The mind-body problem is thus a problem of the applicability of certain postulates and descriptive methods (those of the physical sciences) to certain specific data of knowledge (the so-called attributes or elements of consciousness). The controversy between behaviorism and dualism is not a question for philosophy but one to be answered strictly in the light of empirical evidence provided by psychological study.

We must first consider the character of the postulates and methods of physical sciences. These sciences are as yet incomplete and no one can predict what form they will finally take. Their simplest formulations at present involve postulates of the relation of discrete entities in time and space and the attempt at characterization of experience in terms of the mathematical relations of these entities. They seek to keep their postulates as few and simple as possible; to avoid ascribing to the entities other attributes than those implied in a time-space-number system; to avoid additional concep- [p. 247] tions of energy, substance, and the like.[3] Complete success has not attended their efforts at simplification, but the physical and biological sciences have found it possible to develop with but few additions to the above named postulates. In general they have tended to quantitative formulations, with their implications of individual discreteness and qualitative identity of elements. I shall not attempt here to characterize their methods further than this, since the later attempt to deal with the phenomena of consciousness in physiological terms will give additional definition to the method.

The conception of mind has undergone a long course of evolution and many of its supposed attributes are only vestiges of the superstition, religious dogma, and false psychologizing which at various times have influenced its progress. Of these, many do not fit into the physical system, but we shall find that they are the illusions of a metaphysical legerdemain and not the discoveries of introspective psychology. Before we can attempt a behavioristic account of consciousness we must scrutinize these attributes and discard such as do not seem to be revealed by psychological investigation. Then we may begin the application of the methods and postulates of the physical sciences to the residual data.

The Distinguishing Features of Consciousness

There are almost as many analyses of conscious phenomena as there are writers on the subject and from the mass of frequently vague and conflicting discussion it is difficult to distinguish just what characteristics are held to differentiate conscious phenomena from the subject matter of the inorganic sciences. The following, however, seem to be the most frequently stressed and the ones upon which most general agreement may be obtained.[4]

[p. 248] 1. *Awareness.* -- The conscious organism has a knowledge of itself, of things other than itself, or of both which the inorganic mechanism, however complicated, lacks. Awareness

may or may not presuppose a knower; it presupposes something known. It does not imply any particular pattern or organization of the known. It may or may not presuppose the doctrine of transcendence discussed below.

2. *Content*. -- This is a universe of things known, of sensations, images, affects, etc., which stand in the relation of objects of awareness and which have certain attributes not definable in spatial, temporal, quantitative, or other 'material' terms.

Various writers have stressed these categories in different ways. For one, the knowing is the important thing and content is merely attribute of knowing. For another, content alone exists and when its characteristics are described, nothing need be said of any process of knowing. Content is sometimes physical reality distorted by the process of knowing, sometimes distinct from physical reality, a parallel mode of existence. That is, red may be ether vibration as known, or the psychical correspondent of ether vibration. But whether we are confronted with a pink awareness or an awareness of pink, the attributes of process or content which distinguish it from the physical world seem to be very much the same. For brevity of discussion I shall ascribe them to content and later discuss conditions where they seem rather ascribable to awareness.

Things known, then, have certain attributes which are held to mark them off as unique from a physical reality. The more important of these are:

(a) *Qualitative Diversity*. -- Sensations, images, affects, have certain attributes -- duration, intensity, extensity, quality, clearness, and the like. Of these duration, intensity, extensity have their parallel in the physical world and are not peculiar [p. 249] to consciousness, but quality and clearness (which is often reduced to a different kind of quality), form a unique existence. Differences of quality are not implicit in physical postulates and are not describable in mathematical terms.

(b) *Self-transcendence*. -- The content of consciousness (or the conscious process) transcends time, space, and objective discreteness. The material in content unites past, present, and future, relates spatially separated objects in a unique unity, includes not only the explicitly known but also implicit meanings. This is sometimes stated as a function of awareness sometimes as an attribute of content, sometimes as the very essence of consciousness.

Sometimes content is held to transcend physical reality, as when an image refers to the past. Sometimes awareness is said to transcend the elements of content, as when two images are known together and compared. The problem of transcendence seems to be essentially the same in either case. It is the basis of the claim for psychological uniqueness in memory, recognition, meaning, purpose, and the unity of consciousness. Even the problem of qualitative differences has recently been reduced to a peculiar union of discrete neural impulses.

3. *The Organization of Consciousness*. -- In addition to the processes or elements making up awareness and content, we may distinguish certain characteristics which may be ascribed to the organization of things known into the complex system of human consciousness. They are:

(a) *The Limitations of Content*. -- In the field of consciousness certain elements are included, other excluded. This selective action is sometimes cited as having no parallel in the material world.

(b) *The Unity of Consciousness*. -- This is perhaps implied in the doctrine of self-transcendence. The elements of content are said to be fused into a unique whole which is something more than mere coexistence. Knowledge of the elements transcends the elements. The 'centrality' of consciousness is unique form the physical world.

(c) *Consciousness of Self*. -- Through the warp of conscious- [p. 250] ness there runs a thread of self-knowledge. This is not necessarily a knowledge of the knower, but is a feeling of

personal identity which is a part of content and is distinct from other parts.

(d) *Self-arrangement*. -- Under this heading I mean to include the various capacities of logical necessity, self analysis, intelligent action, and the like. These may be generalized as the capacity of the elements of consciousness to fall into ordered patterns, or as the ability of consciousness to define order within itself. Here we are treading upon dangerous ground, for to question the basis of logical analysis is to become involved in a scepticism which throws doubt even upon its own doubting. Nevertheless some of these capacities are held to distinguish the organization of consciousness from physical order and hence be considered in a discussion of the behaviorist's problem. In the light of its premises, behaviorism must study the logician and discover how his logic arises from the interaction of propagated disturbances in his nervous system; it must study the scientist and show the material basis of human progress; it must study the moralist and discover the mechanism of his ethics.

This classification is not complete, but I believe that the more important arguments for the uniqueness of consciousness will fall into one or another of the categories listed. There is little unity or similarity among the affirmed elements and attributes of consciousness save the supposed impossibility of describing them adequately in terms of the concepts of physical science. If we can include those above in our behavioristic system, there will be little left upon which the subjectivist may base his claim to a distinct system of knowledge.

I shall now take up the questions raised by the dualist in greater detail, examine the subjective or introspective evidence which is supposed to prove that the various attributes of consciousness are different from the phenomena of the physical world, and try to show that the subjective evidence does not justify the demand for any other postulates than those made by the inorganic sciences.^[5]

[p. 251] *The Subjective Definition of Awareness*

Of introspective description of the process or state of knowing there is none, although many pseudodescriptions have been advanced. The neo-realists have given us a statement of the case for awareness which none of the other schools has been able to refute. I shall follow them, with some obvious deviations, in the subsequent discussion.

There is no direct experience of a knower. There is no direct knowledge of the process of awareness. All that can be discovered by the most careful introspection is the existence and attributes of the objects of knowledge, of the content of consciousness, and this content does not include the knower or awareness itself. Knower and knowing are implicit in the known, but are not directly experienced. That something produces the limits and attributes of content is a logical conclusion, but no description of that thing from experience is possible. All that can be said is that some process, relation, or what not, gives rise to the phenomena of content, and determines the character of the field of consciousness. Subjective experience does not justify any further statement concerning awareness than this.^[6]

It follows that any process or relation will account for the selection of the elements of content and for the attributes of those elements (other than being known), whether that process or relation be in a universe of physical things or [p. 252] in a realm of pure psychics, will fulfill all the subjectively discoverable requirements for a complete account of awareness. The subjectivist can not deny that any process whatever which will give rise to the characteristics of the known is the process of knowing. It is unnecessary, therefore, for the behaviorist to deal specifically with awareness. If he can give an account of the attributes of content, his task is accomplished.

The Problem of the Attributes of the Elements of Content

The two characteristics of the elements of content which are held to differentiate them from the data of physics are their peculiar quality or qualities and their self-transcendence. The psychological account of quality, as of awareness, is almost wholly negative. Quality is

something unique, indescribable, except in terms of itself. Red is red, green is green. Neither is, by any stretch of imagination, a form of ether vibration or chemical change in the brain. This, or course, is crude subjectivism. Modern philosophy is more subtle. Quality is a fusion of discrete elements into a unique whole: it is the process of fusion, not the result (26). But the fact of qualitative diversity remains the basis for the argument. The fusion is deduced from the uniqueness of quality, not from any direct knowledge of the process. The concept of transcendence has been here introduced upon no other grounds than the existence of quality.

Let us examine the situation more closely. What has the subjectivist to say in description of quality? Qualities are diverse; some are less unlike than others; not all seem simple but those which are compound are compounded of simpler qualities, and when by analysis the simplest qualities are reached, nothing more may be said of them save that they are in different, undefinable degrees diverse.[7] They have no describable characters inherent in themselves; they are not analyzable into anything else. They exist by virtue of their [p. 253] undescribable differences and by virtue of nothing else discoverable by introspection.

For the subjectivist that is not the crux of the matter. He holds that quality is something apart from unanalyzable diversity, a thing-in-itself; red would always be recognizably red, though there were no other quality from which it differed. My point, however, is that the subjectivist can tell nothing of the process by which he knows quality-in-itself. He can neither affirm nor deny on introspective grounds that mere unanalyzable diversity *is* the source of this appearance of quality-in-itself. Therefore, the behaviorist is fully justified in assuming unanalyzable quantitative diversity as the sole condition of quality, provided that he can thereby show how the appearance of quality may arise and that he violate no requirement for description of other attributes of content.

On the basis of his own evidence the psychophysical dualist is compelled to define quality as a diversity which is not analyzable by the process of awareness or introspection. He can not, on introspective grounds, define the process of introspection. He can not otherwise define quality. It is merely something which is refractory to subdivision (analysis) by something else. But this is nothing unique from the physical world. If the behaviorist can show any system which is unitary in its relation to any other system in the behavior of the organism, which is therefore unanalyzable by that system, he will have met all the subjective requirements for an explanation of qualitative diversity and 'quality-in-itself.'

The doctrine of the image has occupied a rather large place in discussions of behaviorism. The existence of 'centrally aroused sensations' has seemed to offer considerable difficulty for a methodological behaviorism, since such sensations are presumably not open to objective study. For a behaviorism which is chiefly interested in physiological explanation, the difficulty is less serious, since it makes little difference in physiological principle whether a neural pattern is aroused peripherally or centrally. Nevertheless, on empirical grounds I am inclined to agree with Watson's reduction of the [p. 254] image to terms of reaction. The sharp issue on matter of fact which that interpretation has induced seems, however, to call for some modification of the original formulation. The majority of psychologists claim to find peripheral sensory elements in their images. In my own, I find the condition to be as follows. The visual image is made up largely of the feel of movement, with a core of true visual quality. This, on closer examination, turns out to be an actual entoptic stimulus-retinal light or after-image -- which is interpreted in terms of the motor activity. Thus an entoptic light, aroused by pressure, was successively interpreted as a human face, a wolf's head, and the wing of a flying bird, in accord with changes of the motor set.

Recent developments of the 'Gestalt' or integration theory suggest that the attributes of sensation are likewise dependent upon the reactions of the observer.[8] Sensory quality, intensity, movement, and extensity vary with the condition of the observer. All sensations are hence regarded as perceptions and 'pure sensation' becomes a meaningless abstraction. This conception, with the above view of the image, would make a continuous series of sensation, perception, after-images, memory images, illusions of day-dreaming, hypnogogic images, dream images, and hallucinations; the quality, vividness, and seeming reality of the experience

varying with the character and degree of dominance of the interpretative set. Such part of the introspective literature on the image as does not obviously suffer from the stimulus error seems to bear out this view. Images are fleeting things and where the seeming peripheral sensory elements are actually described they have more the character of entoptic lights than of detailed pictures.

Whether or not this account of the image is correct, the image seems to present practically the same problem for behavioristic interpretation as does sensation. It contains qualitative elements which are not describable. In addition it is supposed to contain reference to the past, future, or to some spatially distant object, and hence to transcend itself or space or time.

[p. 255] This doctrine of transcendence is today by far the more fashionable argument for the uniqueness of consciousness. This is true, partly because the subjectivists themselves have no nearly discredited subjective quality. Perhaps it is true, also, because there has been so little careful psychological study of this supposed characteristic. Whatever the cause, it is apparent that the doctrine of self-transcendence of mind is today dominant in discussions of psychological theory. It takes form in discussions of recognition, memory, purpose, spatial reference, and meaning. I quote statements here which represent extreme views of the psychic transcendence of time and space.

"Suppose we remember a visit to the Azores 20 years ago. That original visit, we are told, left paths in the nervous system, along which resistance is diminished, and the nervous discharge tends to follow those paths. But this physical account misses the essence of memory. The neural event is a present fact, similar to one that happened in the nervous system before, but not in any sense that past event; while in memory the past event is present. There is here a direct incompatibility between memory and the laws of material existence. Materially the past event is quite non-existent; mentally it is not, for it is present (with all its pastness too) as a part of our conscious experience. No matter whether it is directly present as if in a sort of perception, or present only as something not seen but meant or inferred. In either case it is an object touched by present consciousness; for inferring is a conscious act. Nor does it matter whether we say that the past event is relived in the present, or the mind leaps back into the past. In either way the gulf of time is bridged. But physically this sort of thing cannot happen, for a present physical event can not be or contain or touch an event that happened 20 years ago" (26).

"The organism is separated by space from the object to which it responds; mind with infinite speed passes from one to the other" (26).

"Thought constantly deals with the distant in space and with the remote in time; but the movements of the 'language- [p. 256] mechanisms' in which the thought of a given moment is supposed to consist are strictly intracorporeal and are limited to that moment" (18).

There is not space to review the arguments for transcendence in detail. The statements usually take one of the following forms:

1. Content transcends physical time and space

- (a) By reproducing or invading the past or the spatially distant and bringing it, representative or real, into the present.
- (b) By making physical diversity into unity, as in sensation.
- (c) By referring or pointing to past or future, without actually bringing them into content.

2. Content transcends itself

- (a) By identifying present content with past or future content.
- (b) By uniting its own elements into a whole whose parts may be compared, yet form a unique unity. (This is also expressed in the doctrine that awareness transcends the elements of

content.)

The first doctrine holds to an objective reality which is transcended by the non-objective. But this demands an explanation of falsification of memory, and the like, which has not been provided. I may imagine a remotely past object which once existed (*a*); I may imagine a past object which never had physical existence (*b*). How do these images differ? Both have past 'reference,' both 'point back.' I can determine that one refers to a physical past only by the correspondence of present physical evidence with present content. I conclude that (*a*) refers to a real event because of 'historical proof.' I deny it in the case of (*b*) because of lack of similar proof.

The same is true for events within my own memory. I remember that I locked my door. I later find that I did not. Only by correspondence of present physical evidence with content of memory can I establish that an objectively past event is or is not present in consciousness. The same may [p. 257] be said of reference to a spatially remote object or of realization of purpose. The actual reference to a physical object can be established only by other physical evidence of that object. In this respect, a photograph is as much a slice of the past as is my memory. The reference is independent of the physical existence of the object. It is either a purely subjective feeling of pastness, or it is an inference drawn from the correspondence of present content with present physical evidence of former or distant events.

If we adopt a purely subjective view, the same argument applies. I remember that I remembered the incident of locking the door. Does this refer to an actual past content of consciousness, or is it but another falsification of 'memory'? 'Introspectively,' I can not determine, but I find above, evidence on the written page that I did so remember. A present content having 'sensory reference' corresponds to another content having 'past reference.'

The past state of consciousness is not recalled into consciousness, but another appears, containing the feeling of 'pastness.' The identification of this content with the past content, implied by the doctrine of transcendence, is the result of a false inference from some objective evidence or from some correspondence of 'memory content' with 'sensory' content. Thus we see that the supposed pointing of content is nothing more than a subjective feeling of pastness, remoteness, or futurity, which is unrelated to the real existence of the past, remote, or future event or object.

What is the nature of these feelings of pointing or reference? The introspective literature deals extensively with them. The introspectionists who seek to describe the objects of consciousness fall into two chief classes, the structuralists and the exponents of imageless-thought. The latter include in the objects of knowledge sensory content and process. In many cases the processes are, in the words of the observers themselves, merely inferences from the sequences of content. 'Judgments -- problems and solutions -- must be conceived as something more than successions of images. The latter will not account for the results attained. The results are evidence [p. 258] for the existence of something more than the images.' But in other cases direct experience of process is claimed. I confess that I find these discussions almost unintelligible. The processes are awareness of meanings, fringes of content, irradiations, placid convictions, directions of thought, indescribable qualities of familiarity, Bewusstseinslagen. They seemingly have no other attributes than that of pointing, or implying.

As one reads the descriptions it seems as though the authors were trying to describe vague feelings: their words, as Titchener (27) says, have an 'emotive ring.' As we have seen, they are independent of real existents. They point to nothing present in consciousness, they point to nothing outside of consciousness. They are directions with nothing at either end. But is not such pointing from nothing to nothing sheer nonsense?

At this moment comes a call to lunch. I am reluctant to go. I have the feeling of swelling potentiality, of unexpressed volumes ready to pour from my pen, a magnificent Bewusstseinslage! But it is nothing more than a tenseness, shallow breathing, muscle tonus, enteric stagnancy, which remains unmoved by the suggestion of food. It points to nothing. It

does not tell me what I shall accomplish. It is indistinguishable subjectively from the enthusiasm aroused by a progressing experiment. If I stop to introspect, it leads to the verbal expressions of 'swelling potentiality, etc.' -- to this discussion. If I do not introspect, it merely keeps me at work, without other meaning until it is succeeded by another content. It means nothing in itself. Only as it leads to verbal expression or to accomplishment does it acquire meaning.

As a behaviorist I am disqualified for introspection. But there is authoritative introspective evidence in support of my contention. Titchener (27) has dealt at length with meanings and our transcendentalist friends will profit by re-reading him.

"I hold that, from the psychological or existential point of view, meaning -- so far as it finds representation in consciousness at all -- is always context. An idea means another idea, [p. 259] is psychologically the meaning of that other idea, if it is that idea's context. And I understand by context simply the mental process or complex of mental processes which accrues to the original idea through the situation in which the organism finds itself -- primitively the natural situation; later, either the natural or the mental. In another connection I have argued that the earliest form of attention is a definitely determined reaction, sensory and motor both, upon some dominant stimulus; and that as mind developed, and image presently supervened upon sensation, this gross total response was differentiated into three typical attitudes; the receptive, the elaborative, and the executive, which we may illustrate by sensible discrimination, reflective thought, and voluntary action. Now it seems to me that meaning, context, has extended in the same way. Meaning is, originally, kinaesthesia; the organism faces the situation by some bodily attitude and the characteristic sensations which the attitude involves give meaning to the process that stands at the conscious focus, are psychologically the meaning of that process. Afterwards, when differentiation has taken place, context may be mainly a matter of sensations of the special senses, or of images, or of kinaesthetic and other organic sensations, as the situation demands. The particular form that meaning assumes is then a question to be answered by descriptive psychology."

In other words, the only way in which an element of content may have meaning is by coexisting with or by leading to another element of content, which is then the meaning of the first. Here is no mystic transcendence of time or space, no pointing from naught to naught, no fullness of meaning of nothing.

The fact is that meaning, on subjective analysis, reduces to a succession of images accompanied by vague affects, and to ascribe transcendence to it is to mistake logical inference for introspective analysis.[9] The behaviorist need only account [p. 260] for the determination of the succession and for the quality of the affect.

There remain, of the transcendence hypotheses, the transcendence of physical discreteness in sensory quality and of the discreteness of the elements of content by consciousness. How do successions of ether vibrations or neural impulses become unitary in sensory quality? How may two elements of content be known together and compared in consciousness? The answer to the two problems is the same. On the one hand there is a system of elements which are by definition disparate. On the other, a union of these elements in the relation of being known as one. Introspection can tell nothing of the process by which this unity is brought about. The process can be defined only in terms of its products, quality and the 'conscious manipulation' of content. The keys are united by the ring. This union differs from subjective unity solely in that the keys do not thereby acquire quality or the capacity for self-ordering. Subjective unity in itself presents no problem.

I have devoted so much space to the doctrine of transcendence because its rejection seems to me essential to the progress of psychological science. Its acceptance disregards the empirical findings of both the introspectionists and behaviorists, leads to the mystic's substitution of emotional for rational conceptions, and abandons the use of scientific method in this field of psychological analysis. The behaviorist is justified in rejecting it as an inference from inadequate evidence, and can cite good introspective authority in support of his view.[10]

[p. 261] Certain problems of 'reference' remain, but they are experimental, not philosophical problems. "The particular form that meaning assumes is then a question to be answered by descriptive psychology" says Titchener (27). "It [the problem of meaning] becomes like others in psychology a problem for systematic observation and experimentation," says Watson (32). The behaviorist must describe the particular patterns of proprioceptive reactions which lead to the statement, 'That occurred long ago,' he must define the conditions of response which constitute recognition, and the like, but he need not seek a mystical self-transcendence in the physical world when none exists in the so-called psychic.

The Problem of the Organization of Consciousness

I have thus far dealt with the elements of conscious content, which, occurring in various combinations, make up the complex organization which we call consciousness. The tendency among writers of the subjectivist schools is to consider these as capable, at least theoretically, of independent existence, as though there might be awareness of a simple sensation, without other concomitant elements of content, or as though there might be awareness for one moment without preceding or succeeding moments. I believe that the greatest difficulties of the mind-body problem have arisen as a result of the fallacy which is involved in such an analysis. A single element is never experienced in isolation; it is an analytical convenience, nothing more. On subjective evidence one can not assert that a single element can ever be known alone. Indeed one must say that a single element never *is* known except in combination with others. The essence of consciousness is a field of many elements, organized after the plan of human experience. In the discussion of the elements of content I have sought to show that their 'peculiarly psychic' attributes of quality and reference are not intrinsic to them as self-existent elements, but can be defined only in terms of their relationship within the complex organization of which they are independent variables. We must now examine this organization in greater detail to discover in how far it con- [p. 262] forms with the types of organization discovered by the physical and biological sciences within their realms of investigation.

At any moment the 'pattern' of consciousness consists of a number of elements coexisting in the relation of being known together. The pattern is in a constant flux, new elements appearing and others dropping out with a certain regularity and consistency which provide the basis for the conceptions of logical necessity and physical continuity.

Various dualistic systems have emphasized different characteristics of this organization as evidence for the mind-body problem. The chief arguments from organization are based upon (1) the unity of consciousness, (2) the limitation of consciousness to a part of existence, (3) the persistence of the elements of self-consciousness, (4) the capacity for self-ordering or analysis, (5) the creative activity of mind.

The problem of the unity of consciousness and of the limits of consciousness is essentially that which I have discussed as the self-transcendence of the elements of content. Every system of dualistic psychology has postulated the existence of entities not present in content (indeed, the concept of the unity of consciousness implies the existence of other entities excluded from that unity) with, in brief, the attributes of physical existence. Within this physical system unity is defined as organization in a system whose parts are more closely or complexly related to each other in behavior than to the elements of other systems (for example, a solar system or a physiological organism). This is also a definition of the unity of consciousness. Conscious unity differs from physical unity only in that the elements of the physical system are mathematical entities, the elements of the conscious system are qualitative elements. The argument from unity therefore reduces to the argument from qualitative diversity.

The behaviorist has been strictured for his inability to determine objectively whether a process is or is not conscious, although he admits that some processes are and others are not conscious (19). What determines the content of consciousness at any given moment? A pure subjectivism, involving psychic determinism, may assert that preceding sensations [p. 263] or images determine subsequent ones and hence the elements of content. But it is unable to explain for example how a momentary redness can determine the subsequent crashing noise.

The postulate of a physical world tides over the gap (7). Every system of psychology which has sought to be more than purely descriptive has been forced to fall back upon the postulate of physiological processes to account for the inclusion of specific elements of content. One hears a noise because the ear is stimulated, thinks of the past because he sees something that reminds him of it. There is no subjective evidence as to what determines the content included at a given moment. Introspection may show perhaps that one complex of physiological processes involves consciousness, another does not. If the behaviorist can show a constant difference between these physiological processes he will have fulfilled the subjective requirements for an explanation of the limits of consciousness. Further, as I hope to show when I take up the constructive program of this paper, he need not appeal to introspection to determine whether or not he is dealing with a 'conscious' complex. The 'conscious' will be given in the organization of the complex itself. The limits of consciousness are the limits of an undefinable togetherness. Any togetherness which fulfills the other criteria of consciousness will satisfy the subjectively definable criteria of limitation of content.

The field is sometimes held to be united or given its character of 'centrality' by the consciousness of self, which runs through it. I need only refer to James' (14) description of the self to show that it presents no other problems than those of persistence of sensory elements and recognition. On introspection, the self resolves into a group of sensations, largely somæsthetic, which recur from time to time and, if they are dominant, lead to some internal or explicit expression such as "This is I," which becomes their meaning of self. Associated with this there may be a constant emotional tone, but subjectively, nothing more is discoverable than a constant affective and sensory element associated with ideas of self, which in turn resolve into verbal or imaginal expressions of, "This is I or mine."

[p. 264] The momentary aspects of content can not be separated from the temporal aspects, for the flux of content is continuous, although isolated elements may seemingly persist unchanged while others change. Here the field presents sequences which are classified roughly in accord with the regularity of their recurrence. Certain sequences are so regular as to be taken for granted as though they required no postulated relations to link up their elements. These constitute logical and mathematical necessity. Psychologically they reduce to unvarying sequences of ideas which, in turn, resolve into sequences of sensory or imaginal elements, subject to the same analysis and demanding the same sort of explanation as other sequences of elements of content, but since they also furnish the basis of that analysis and explanation, they seem to lead to a logical impasse. On analysis, the physical world is made up of mathematical and logical orders. But to argue, therefore, that the mind must be physical is to start a vicious circle which is completed by Bergson's (3) argument that the physical world has these characters only because of the structure of intelligence. They are in mind because they are in the physical world, because they are in mind, *ad infinitum*. In truth this order forms an argument for neither side. If the hypothesis of mathematical and logical organization of the physical world will account for the other attributes of consciousness, then it follows that mathematical and logical order must also rule consciousness, that logic is limited by the nature of material; as does the inverted argument of Bergson. The character of logical order therefore does not present evidence for the distinction of mind and body. If physical postulates fail to cover both logical and sensory sequences, they must fail for each as for the other.

Certain other relationships within the organization of consciousness seem to be less clearly implied in the postulates of the physical sciences. Elements known together may be compared, and yet retain their individual discreteness. This involves processes which are not obvious among physical events. But descriptive psychology finds in these processes only successions in content. Comparison, analysis, and the [p. 265] like are but names for the fact that succeeding elements are determined by the sum of preceding elements. Introspection discovers unvarying sequence (determination) but the manner of this determination is undefined. Each of several elements may be followed by a specific sequence constituting introspection of, or thought about that element; or the elements in combination, under different conditions sometimes undefinable subjectively, may be followed by different sequences. This is all that is subjectively discoverable concerning the process of comparison.[11] A number of elements may be integrated in the final outcome, but the dynamics of integration is not open to introspective study. Explanation of the process demands postulation of mechanisms or

processes underlying the successions of experience. The problem is as to whether physical mechanisms are adequate to account for all sequences which appear in consciousness.

Continuity of activity and sequence of events are included in the postulate of a physical world. To justify the setting apart of a psychic world it is necessary to show that the sequences of mental states differ either in the character of succession or in the results accomplished, from any sequences of the physical world.

The sequences and functions of thought are complex and difficult to state briefly, since they involve all the elaborations from day-dreaming to creative intelligence. For discussion we may divide them roughly into three overlapping classes.

1. The relatively unordered drift of reverie. Here elements follow each other by rather superficial associations (habitual connections which lack complexity of organization), or through common association with some emotional background, though the elements themselves may seem otherwise unrelated.

2. The reproduction of habitual sequences, as in the flow of memorized material or making of habitual judgments. Subsequent elements are rather simply conditioned by pre- [p. 266] ceding ones, the whole dominated by an as yet undefined close organization of the system, represented by the 'set' for reproduction.

3. Creative thinking involving a problem set and a solution reached.

This is essentially the classification given by Watson (32), except that habitual sequences seem to me to involve a closer and more complex organization than do the sequences of reverie. The first two classes present no new problems beyond those discussed under the attributes of content, save the determination of sequences. Subjective evidence gives no explanation of this determinism, but is forced to fall back upon the hypothesis of physical continuity. 'Aufgabe' and the like describe no causes whose mode of action can be understood, and in many cases the introspectionists confess that the determining tendency is wholly unconscious. There is determination, but no particular kind of determination and there is not subjective evidence to show that the determining tendencies may not be wholly physical.

The third class presents the supposedly creative work of consciousness. Subjectively, the problem seems to present three phases; determination of sequences, conflict of elements of content, and resolution of the conflict. I can make these points clearer by a concrete example.

I am confronted by a mass of stimuli -- notes of experiments, histological specimens, charts, etc. My scientific training results in the habitual reaction to such masses in the setting of my laboratory by the question, 'What is it all about?' and by a feeling of dissatisfaction until an answer is given. The data are neurological.

Destruction of the frontal lobes -- loss of habit.

Habit relearned after destruction.

Incomplete destruction of frontal lobes -- habit retained.

Destruction may involve any half -- habit retained.

These data are given, partly in verbal terms, but largely in kinæsthesia. There is, in addition, a feeling of tension, of movements, which, if completed, lead to gestural description of the data, but which for the most part seem in conflict with [p. 267] other gestures. This is all that is subjectively present of a 'purpose' to solve the 'problem.'

Associations come: frontal lobes -- attention -- Pillsbury -- attention necessary for learning -- learning impossible in absence of attention center -- possible in absence of frontal lobes, increased feeling of dissatisfaction and dropping of this line of association.

This presents the problem of logical conflict, a mutual incompatibility of ideas.

I start again, parts capable of doing what the whole does. (This appears as a somæsthesis of wabbling in three dimensions and during the problem solving it has no other meaning. When I return to it and introspect, it is followed by memories of my solution of Driesch's inconceivable machine, as a lazy-tongs reduplicated in three dimensions.) Driesch -- violent emotional reaction with vague memories of discussions of vitalism -- sensations of shrugging and raising upper-lip, abandonment of this line of association.

This presents failure of solution through emotional conflict.

I start again, lazy-tongs -- multiplication of identical parts -- identical parts in central nervous system -- feeling of hands raised with spreading fingers -- fibers to cortex -- one hand down -- part destroyed, remainder functioning. Here follows a relief from the initial dissatisfaction which constituted the problem.

The problems presented here are those of tension or conflict and relief from the tension. Subjectively the tension is nothing more than feeling of muscular tension and emotion. I tend to interpret it as an interference of two incipient acts which are incompatible (*i.e.*, 'up' is incompatible with 'down' because the feeling of raising of the head which is 'up' is interfered with by the feeling of bending the head which is 'down'.) But the incipency is an interpretation from the fact that in subsequent introspection I find either or both of the two acts carried out independently. It is the old fallacy of inferred meanings.

Subjectively, the problem of creative reasoning reduces [p. 268] to feelings of tension, determined sequences broken off after more acute tensions, and final subsidence of the initial tension. This may not be recognizable as a description of the solution of a problem, but the further characteristics usually demanded of such a description are teleological interpretations and not elements of the experience of problem solving.^[12] The first tension we call 'set' because of its consequences. The sequences we call successful or unsuccessful trials, in view of the outcome. The correct solution differs from the incorrect only in its further consequences in behavior or mental content. In the process there are no attributes, save those of static content, other than the attributes of the physical world. The description of a rat opening a problem box is as complete an account of the *process* of thinking as can be given from introspective data.

In this analysis of the attributes of consciousness, I have attempted not to overstep the point of view of the subjectivists and to adhere to their terminology as far as possible. I have sought to discover, further, just what the unique features of consciousness are thought to be, to strip them of their mystical obscurity and put them in definitive form. On subjective evidence, nothing can be said as to how one idea leads to another, nothing as to why assent or dissent is given. The dynamics of thought is not an object of awareness. The goal in problem solving is no more evident in preceding contents than in the goal of evolution in the existing species of animals. Both can be known only when reached. If behaviorism can formulate any mechanistic account of accomplishment in problem solving, it will have fulfilled the subjectively definable requirements for conscious purpose and for the creative action of consciousness.

This brief analysis of the attributes of consciousness necessarily omits many considerations of importance for the complete development of the behavioristic argument, but I believe that it will indicate the direction which that argument [p. 269] may safely take. The physical sciences deal with postulated entities having certain attributes and relations. Granting the validity of their system, we seek to extend it, without fundamentally modifying its postulates, to include the phenomena upon which the concept of mind, as distinct from the physical universe, is based. Analysis of these phenomena shows that in so far as they are definable on introspective evidence they consist of varying, complicated organizations of elements within a limited system; the elements themselves being definable only in terms of their relationships within the system. The behaviorist's problem is to describe this system in terms of the conceptions of the physical sciences; to show that relationships such as are ascribed to consciousness exist also among

physical entities.

III. Vitalistic Arguments

I have thus far dealt with the view which maintains that there is evidence of a direct experience of a universe of psychic things which is fundamentally different from the universe of physical things. There remains another type of argument against behaviorism which holds that certain events in the physical world are inexplicable in terms of mechanism. This is the argument of vitalism, as distinct from the first or animistic argument. The vitalist cites particular phenomena -- morphogenesis, regeneration, habit-formation, complexities of speech, and the like -- and denies the possibility of a mechanistic account of them (6, 20). But he thereby commits what we might term the egoistic fallacy. On analysis his argument reduces every time to the form, "I am not able to devise a machine which will do these things; therefore no one will ever conceive of such a machine." This is the argument from inconceivability of Driesch and McDougall, put badly. To it we may answer, "You overvalue your own ingenuity." But the real answer is the constant restriction of field which science is imposing upon vitalism. A few years ago the impossibility of a physicochemical explanation of secretion against an osmotic gradient was a favorite vitalistic argument.

Recent work in physical chemistry has given an adequate [p. 270] explanation of the phenomena in terms of electrical energy produced by adsorption in membranes and has led to the construction of a machine which actually secretes against an osmotic gradient. Such is the answer of physical science to vitalism. Science has not yet explained the physical world, but the vitalist cannot, by taking thought, set limits to what it may explain.

A second anti-mechanistic argument is typified by Haldane's discussions (11). It is apparent also in certain attempts of some behaviorists to distinguish between their science and physiology (36). Haldane's argument is essentially the following. Physiological investigation reveals more problems than it solves. We can never hope to give a complete account of the organism in physical terms. All investigation, however, must be directed toward this end, and attempts at other explanation, as by introducing the concept of vital force, are futile. But since we can not hope for a full explanation of the behavior of the organism we must add to the mechanistic account the conception of the *organism* in physiology, and of the *personality* in psychology: wholes which are more than the sum of their parts.

I can not see in such discussions anything more than a warning against too great simplification of our explanations. Obviously the various physiological processes influence each other throughout the organism. But astronomy equally recognizes the influence of the farthest star upon the smallest atom in the earth and consequently admits the incompleteness of its account of the universe. Organization, in this sense, is no more a property of living things than of the non-living.

Of such objections to the formulations of behaviorism there can therefore be no criticism, so long as they remain simple warnings, but they seem inevitably to lead to an abandonment of the search for physiological explanation and to the substitution of empty names (the organism as a whole, regression of the stimulus, personality, and the like) for explanation. They seem to lead also to such statements as, "We must consider the social value of the stimulus in relation to the organism," as though social value had other existence [p. 271] than in the reactions of the organism. And because of this tendency to replace explanation by name and to read into the names mystical potentialities, I must object to any definition of behaviorism which would make it more than the science of the physiology of reaction to stimulation.

The discussion of a third anti-behavioristic doctrine, which emphasizes the humanistic values of subjective psychology, I shall leave to a later section of this paper.

Thus far in the discussion I have sought to state the distinguishing attributes of 'mind' as the subjectivist must define them on the basis of the empirical evidence of introspective analysis. Too often in discussions of the behavioristic doctrines the impossibility of an account of

consciousness in physical terms is asserted with no adequate analysis of the supposedly distinguishing features of 'mental' phenomena. To consider a specific instance: Lovejoy (18) says that the error of the behaviorist is easily demonstrated on his own premises, "For a behavioristic psychologist (*a*) is a human organism, (*b*) whose perceiving and thinking, if his own theory is correct, should be exhaustively describable in terms of of [sic] movements of his laryngeal and related muscles, but who (*c*) in fact thinks, or professes to think, of external objects and stimuli, that is, of entities outside of his body, (*d*) which thinking is obviously neither describable as, nor 'accounted for' by, movements of his laryngeal or other muscles inside his body." Now to the behaviorist his thinking is just as *obviously* so describable as it is indescribable to the subjectivist. The obviousness in either case arises from a background of metaphysical prepossessions, in this case the belief in transcendence of space. Such conclusions are not self-evident; the premises demand further analysis and citation of evidence. [13] If we accept the subjectivist's postulate that mind presents things-in-themselves which are, by definition, not describable in physical terms, or relations which are not of the physical world, then *obviously* they are not describable in physical terms.

But examination of the empirical evidence shows that [p. 272] many of the attributes ascribed to consciousness are not discoverable by introspection and that others, when cleared of the mysticism that has surrounded them and stated in terms of descriptive psychology instead of metaphysical interpretation, are not different from characteristics resulting from physical relationships. Our analysis has shown that 'mind' is definable in terms of certain kinds of relationships among elements which are not analyzable by introspection. In the following sections of this paper I shall try to show that these relationships are fully describable in terms of the attributes which the physicist and biologist ascribe to the physical world with which they deal. My thesis will be, primarily, that as complete an account of the attributes of consciousness can be given in behavioristic terms as can be given in subjective terms as a result of introspective study; that a description of behavior of the physiological organism shows just those relations and elements which are held to characterize consciousness. In other words, I shall try to show that the statement, 'I am conscious' does not mean anything more than the statement that 'such and such physiological processes are going on within me.'

(To be concluded)

[Classics Editor's Note: In the original text, Part II does not immediately follow Part I.. This is because Part I is in Vol. 30, number 4, and Part II is in Vol. 30, number 5. This accounts for the page-jump from p. 272 (above) to p. 329 (below).

Part II.

[p. 329] IV. The Behavioristic Solution

Restatement of the Problem

The problem which confronts the behaviorist is to find in the physical world deterministic relations between non-qualitative, discrete entities in time and space which fulfill certain conditions of relationship laid down by subjective evidence. I will restate these conditions briefly as the behavioristic problem.

1. Awareness, on subjective evidence, is merely a relation of something to something else, such that the attributes of content result. It presents no positive characteristics in itself and will be adequately accounted for by any physical process which will account for the attributes of content.

2. The unity of consciousness. This consists of a coexistence of things (elements of content) in an undefinable relationship which excludes other things. Any physical system which gives rise to other attributes of content will meet this condition.

3. Sensory quality. This was found to be definable only as the indivisibility of something (element of content) in relation to something else (introspection). Any physical complex which behaves as a unit in relation to another physical process meets this condition.
4. The self-transcendence of content. This was found to [p. 330] be only the fact that two elements can combine to condition the appearance of a third.
5. Determination of sequences. This reduced to the fact that one element follows another. The 'how' is not given to introspection.
6. Transcendence of time and space. This was shown to be a false deduction from the confusion of a postulated reality with the actual content of consciousness, which is a varying emotional quality. Behaviorism need only account for the origin of particular qualities, and the determination by these of particular sequences of content.
7. Self-consciousness. This turned out to be persistent sensory content capable, under certain conditions, of leading to behavior or ideational expressions of 'self,' 'I,' 'mine,' etc., with their behavior consequences.
8. Self-ordering of content. This order is as inherent in our conceptions of the material world as in consciousness, and irrelevant to the argument.
9. The creative action of consciousness. This resolved into processes whose manner of action is indefinable from introspection; processes which must be inferred in terms similar to those employed by the behaviorist in describing problem-solving; tension, trial and error, conflict, and resolution of tension.

We do not know enough of organic behavior to be able to say just how bodily mechanisms do bring about the details of behavior, but we are able to make rather probable guesses as to what is going on at any given time, and to outline roughly the kind of mechanisms that control activity.

The Conscious Machine

Let us assume that we have constructed a machine which can perform all the neuroglandular and muscular activities of a man; a machine constructed on reflex principles, whose parts are capable of summation, facilitation, and inhibition of activity, which can react to mechanical forces on its periphery and in its interior, so that it may respond both to external stimulation, and to its own activities. Let us be sure that [p. 331] we have not inadvertently introduced any atom of psychic stuff: that the machine is not, by definition, conscious. Will its activities meet the subjective definition of consciousness, or will it remain 'merely a machine'?

Suppose that we stimulate the machine with light of wave-length = 6800 Å. The 450 trillions of vibrations per second will be summated by the chemical mechanism of the retina, and result in neural impulses of a given frequency and intensity. These will summate in turn to produce muscular movements. The pupils will contract, the eyes will converge in relation to the direction of the light beam, visceral activities will follow and finally the vocal mechanism may be thrown into activity. The machine will say, 'I see a red light.' If next we stimulate it with wave-length = 5200 Å., a different series of reactions will occur, also involving summation, and the machine will say, 'I see a green light.' If now we ask the machine to describe the color, our request will reinforce its reactions to its own reactions and we will obtain a series of internally aroused movements. But these reactions will not be to the individual elements of the previous reaction, but only to their patterns, by the process of summation. The machine cannot respond to the contraction of its pupils alone, nor to the activity of a single gland or muscle. But all these reactions, by summation, modify and condition the next response. The reaction to 6800 Å. would in turn arouse one further series of reactions, that to 5200 Å. another series. The machine can not react to the individual elements of the stimulus, but only to the two complexes

of stimuli as unanalyzably different.

Now this situation fulfills all of the subjectively definable requirements for qualitative diversity (and for quality as a thing-in-itself.) Each stimulus, by summation, is unitary for subsequent reaction and therefore presents for that subsequent reaction an irreducible element. We have seen that the only possible subjective definition of quality is indescribable diversity from something else, (3, in list on page 329) and that quality as a thing-in-itself is indistinguishable from this. Our account of quality in the behavior of the machine [p. 332] therefore leaves over no unexplained residue of psychic stuff, no conscious attribute.

But this attribute of indivisibility by something else is likewise in the relation of the knife to the loaf. Something more is required for our account of consciousness. And this is an account of the structure of content. It is not alone the attributes of the elements of content but the particular variety and pattern of them that makes up the supposed uniqueness of human consciousness.

To return to our machine. Its reactions are organized at several levels of complexity; that is, some stimuli call out movements in only one or a few parts, others throw the whole machine into activity. Suppose we set the machine to reading a book and to giving us a verbal report of the contents. This activity will involve the visual, gestural, vocal, and a goodly part of the of the intraorganic mechanisms, resulting in a complex organization of interacting parts. If now we stimulate the case of the machine lightly with a brush, a limb may be thrown into activity and scratch the stimulated area. The stimulus is adequate to excite this movement but its effects do not spread to involve in any way the vocal, gestural, or visceral mechanisms. The reflex reaction remains outside of the dominant system.[14] If, now, we apply a more intense stimulus to the case of the machine -- if we pierce it with a pin, we arouse a more widespread reaction. The vocal mechanisms are involved, the machine says 'ouch!' the eyes are directed from the book and turned to the point of stimulation, the gestural mechanisms come into play, the reactions to the book are disturbed, and reactions to the pin now dominate the greater number and variety of parts of the machine. The content of the dominant system is now almost completely altered; the effects of the pin-prick have become a part of it. [p. 333] The subsequent activities of the mechanism included in this dominant integration are in part determined by this pattern. New mechanisms become involved in the pattern and others drop out. The total content of the system determines the speech and gestural reactions of succeeding moments, and these in turn modify the organization of the system. A continuous flow of interrelated activities is thus produced. Reinforcement of any mechanism within the system will lend to it a greater influence upon the subsequent activities of the whole and tend to bring in other reactions associated with it.

These complexities of organization meet the subjective definition of the limits of consciousness, as a system including some and excluding other existents (2). The subjective systems have already wrecked upon this rock, and we have such self-contradictory expressions as co-conscious, foreconscious, subconscious, and unconscious mind. These are assumed to have all the attributes of consciousness except that of being known. They involve, as do the atomistic theories, the self-contradictory conception of unconscious consciousness. For this, the behaviorist may substitute the conception of systems of varying degrees of complexity, from the isolated reflex, to the activation of the entire mechanism, thus meeting the subjective definition of the limitation of consciousness: a field of varying complexity, from which some existents are excluded.[15]

The machine is capable of reacting to its own reactions.[16] Suppose that we confront it with the neurological problem described above, and study the specific instances of the working out of the relation of the frontal lobes and attention.

The request for a solution induces a set which keeps the [p. 334] mechanism active, and reinforces the habit-traces of certain systems of response-habits formed to the words 'frontal lobes,' 'learning,' 'brain lesion,' etc. 'Frontal lobes' and 'learning' have common habit elements with 'attention,' formed by reading Pillsbury's book. Reinforcing each other, they combine to

arouse the verbal response, 'attention.'

This situation fulfills the subjective definition of self-transcendence of content (4), the conditioning of an element by two preceding. The determination of sequence is also met by the physiological determination.

The word 'attention' arouses the further word, 'Pillsbury,' with tension of the muscles of the arms and eyes. If we interrupt the machine's activity at this moment by asking the meaning of the last word, the reinforcement from the just preceding tensions of language mechanisms and arms, "I was thinking that off there (overt movements of hands corresponding to previous muscular tension) is the book." Here is meaning, and transcendence of time and space, in so far as they are subjectively discoverable (6).

Throughout all the reactions of the machine there persist certain common elements. Whatever the peripheral excitation to activities of the dominant system, certain constant elements of stimulation -- visual from the body itself, organic from the movements of the heart, enteron, reproductive tract, etc. -- will be present, modifying the dominant reaction. Further, at any time when they are reinforced so as to become effective for verbal-motor or gestural activity, they will lead to constant reactions, typified by the statement, 'This is I.' They will be unanalyzable by subsequent reaction into individual stimuli and will therefore have quality, will be the 'sensations of self' (7).

We have interrupted the machine in the midst of solving a problem. It had reached the word 'attention.' The machine has certain organizations of response which we may characterize, for brevity, as leaning forward or backward. With the first is associated the words 'yes,' 'present,' 'existent,' and the like (similarity of reaction to them constituting the likeness), making up a system of positive reaction. The second [p. 335] is associated with 'no,' 'absent,' etc., making up the complex of negative reaction. Since the machine cannot simultaneously perform both movements, the systems are incompatible. These systems determine the next step in the attack of the problem. 'Attention-learning,' with forward movement. 'No attention' -- backward movement -- 'no learning.' The remaining associations traced above follow by the same mechanisms until the traces of bodily reaction to 'no frontal lobes,' and 'learning present' bring about a simultaneous stimulus to conflicting movements, with a blocking of reactions.[17]

The machine has further a system of habits which tend, when aroused, to dominate its reactions. It pricks up its ears and relaxes its internal workings and gives the positive reaction at the word 'mechanism,' as it tenses and clinches its fists and straightens at the word 'vitalism,' or its associations. Further reactions, in the set of problem-solving, lead to a series of reactions which have many associations with 'mechanism.' The system presents, for a time, stimuli to no conflicting movements, and the relaxing effects of the associations with 'mechanism' gradually inhibit the tension of the set to problem solving. The solution of the problem has been reached. [18]

This is all highly speculative and by no means a true picture of the organic processes involved in human problem- [p. 336] solving, but it meets the subjectively definable requirements for determining tendency, comparison of elements of content, incompatibility of elements, blocking of the train of thought by conflict, and the final solution of the first tension (9).

We have seen that awareness is defined only by the attributes of content and the reactions of our machine have all of the subjectively definable attributes of content (1). The reactions are awareness.[19] The complexes of reaction meet the subjective description of the organization of consciousness, and leave over no undescribed psychic elements. We must conclude, therefore, that our machine is, by virtue of its organization, fully conscious. An adequate account of its behavior will constitute as complete a description of the content and processes of consciousness as can be given from introspective data. Nay, it is far more complete, for it not only describes the complexes which constitute the elements of content, but also describes the component parts of those complexes. Introspection can only describe the external form of the cloud; behaviorism may describe the constituent molecules of water vapor, their movements

and patterns. In so doing, it also defines the external form of the cloud, but this dwindles to minor importance; only one of many characters of the aggregation.

V. Non-experiential Arguments

Against every system of materialistic or objective psychology there has been urged the objection that it leaves over some elements or attributes of consciousness which are not adequately accounted for by its formulations. In the foregoing pages I have attempted to analyze such of these attributes as have been clearly expressed as data of experience in the subjective literature and to show that they do not necessitate an abandonment of the behavioristic point of view. But there remain certain other attributes and other points of view which are not so directly open to attack on the basis of experimental evidence.

[p. 337] *The 'Ineffable' Character of Consciousness*

It may be urged that analysis of the attributes of consciousness is based upon the verbally expressible characters and that it thereby misses the very essence of consciousness, which is its impossibility of verbal characterization; that consciousness is pure experience, has no analogies, and is incapable of analysis. The behavioristic account fails because it gives no suggestion of this esoteric quality.

It is clear that subjective psychology can give no reason for its inability to express such supposedly ineffable traits of consciousness. It cannot tell in what way they are different from material things and can only affirm the distinctness by an act of faith, based, perhaps, upon the claim to a direct knowledge of the difference. I am without the pale. I can find nothing in my own experience which seems omitted from my verbal characterization. Consciousness therefore either lacks these inexpressible elements or I am not conscious and present in real life the "paradox of the thinking behaviorist" to the confusion of Lovejoy's arguments (18). I will grant either conclusion and support my thesis. But it is more pertinent to point out that, if language cannot characterize the ineffable qualities of consciousness, then a subjective science or philosophy of consciousness is impossible and the behaviorist account is as adequate as any other which may be formulated.

The 'Two-aspect' Doctrine versus Behaviorism

The parallelist may say, "After all, you have but reexpressed the two-aspect doctrine. You have first described consciousness from within, then from without. Is it surprising that you have found a point-for-point correspondence? And does not the fact that you have given two such descriptions prove that there are two such distinct aspects?"

I am exceedingly astigmatic. To my uncorrected vision the moon appears as seven dim and overlapping moons. Now I might construct an account of the world in terms of my astigmatism. It would differ in many ways from an account written by a normal man. It would be true and real for me, but it would omit many details observed by the normal man [p. 338] and would add nothing to his account which he could not predict from the optical principles underlying astigmatism. To the normal man it would be of interest only as an account of the effects of astigmatism. And as soon as I obtain adequate correction, my former account becomes for me also only a pathology of the eye.

The parallel holds for introspection and behaviorism. The subjective view is a partial and distorted analysis. Behaviorism presents the possibility of a more nearly complete analysis of the same data. It presents, therefore, a more nearly adequate solution of the problem and relegates introspection (except as the method of verbal reaction) to a subordinate place as an example of the pathology of scientific method. The subjective and objective descriptions are not descriptions from two essentially different points of view, or descriptions of two different aspects, but simply descriptions of the same thing with different degrees of accuracy and detail.

The basis assumption of the two-aspect and parallelistic doctrines is that a descriptive and analytic account of the content of consciousness can be given without reference to a physical world and that such an account will have value in itself. If the behavioristic interpretation is correct, such an account must deal wholly with systems of a high order of complexity, which are incapable of analysis by introspection but which may be analyzed by objective methods. Moreover, the account must be confined to actual content and cannot include the phenomena of the so-called subconscious. The introspectionist is in the position of describing the form and pattern of clouds which are capable of analysis into aggregates of water particles by other methods. What function can such a study serve?

We have seen that it does not reveal any different kind of stuff from that with which behaviorism deals and that it can claim only to study the same material by a different and less analytical method. One might study the form of clouds for their artistic value, as does the painter. This is avowedly not the purpose of the introspective psychologist. One may describe clouds as a recreation, in day dreaming, but surely [p. 339] this is not the object of introspection. One may seek to correlate cloud forms with meteorological conditions; to explain or predict the weather by antecedent cloud pictures. This is a scientific procedure but we should have small respect for the meteorologist who confined his studies to this one aspect of his material, and excluded analysis of the structure of the cloud from the science of meteorology. Understanding or precipitation demands analysis of the cloud and a statement of the laws of condensation, of the interplay of temperature, water vapor, atmospheric dust, and air currents, elements which are not defined by cloud form. Behaviorism cannot object to such efforts at correlation, but it may point out the narrow limitations of the subjective method and its futility as an attempt to arrive at a complete understanding of the phenomena of consciousness. So long as human investigation was confined to the external form of the cloud, Jupiter Pluvius reigned in the heavens, as does the 'mind' in psychology.

VI. Lack of a Subjective Criterion of Consciousness

It is usually taken for granted in discussions of the nature of consciousness that one can at least determine the existence of consciousness by introspection or by some direct knowledge of the state and in the foregoing discussion I have admitted the assumption in order to deal with the claims for the uniqueness of consciousness. But a further examination of the evidence seems to throw doubt upon this fundamental assumption of the subjectivists. The criterion of knowing is the object known and there may be as many kinds of awareness as there are patterns of content. There is no subjective reason for holding that the process of knowing is ever twice the same. It is relatively easy to set limiting cases, to say that consciousness is typified by my condition during introspection and unconsciousness by dreamless sleep, but it is not possible to say that either of these is more like an hypnoidal state than the other. The question where consciousness appears during a gradual awakening is not less erudite than the question of when the soul enters the body of the fetus. [p. 340] There are borderline states which cannot be studied by introspection for the simple reason that the slightest effort necessary for subjective examination destroys them. And below them are even vaguer states, with amnesias, which so nearly border upon the unconscious as to seem to have no definite distinguishing features.

This difficulty of introspection is well emphasized by the current patten of abnormal psychology. The various doctrines of co-, fore-, pre-, sub-, etc.- conscious states show a complete abandonment of 'knowing' as the distinguishing feature of mind and a perfect willingness to accept the paradox of consciousness without knowledge, rather than to face the problem of a subjective criterion of consciousness. Nor does such a difficulty appear only in the writings of psychopathologists. It is evident in the many atomistic theories of consciousness. We find McDougall (20) rejecting awareness as the distinguishing feature of mind and substituting for it an unconscious soul as the subjective element in the mind-body problem.

All this seems to point to the conclusion that there is no reliable subjective criterion of consciousness. All that introspection can do is to describe contents of varying complexity and assert that consciousness ends somewhere near the place where content becomes so vague

and obscure that subsequent thought about it is impossible. Objective psychology provides an equally definite or *equally indefinite* criterion of consciousness. It describes systems of varying complexity, from the simple reflex, arousing no subsequent reactions, to the most complex chains of language and gestural activities. It can point out which of these systems is capable of arousing further activity, which is sufficiently well integrated to permit of verbal or gestural characterization, and in so doing it will have told as much as does the subjective statement that consciousness is or is not present.

For, after all, when I say that I am conscious of something, I say merely that there exist certain organizations of entities which are called by the introspectionists 'sensations, images, ideas' -- describable patterns, the elements of which are inde- [p. 341] scribable. The behaviorist says precisely the same thing when he describes the organization of behavior in terms of the interplay of reaction-systems which are unitary in their relations to subsequent activity. But for the purposes of science the arbitrary emphasis upon this particular kind of organization, the restriction of psychology to the study of 'conscious phenomena,' has no value and only hampers the development of physiological explanation. In modern psychology, with its hierarchies of the subconscious, the dividing line between conscious and unconscious has ceased to be of importance, relative to the dynamic features pervading both. And for behaviorism the distinction between activities which come to verbal characterization and other reactions is merely on a level with the distinction between spinal reflex and postural tonus.

VII. Consciousness as Physical Organization

The conception of consciousness here advanced is, then, that of a complex integration and succession of bodily activities which are closely related to or involve the verbal and gestural mechanisms and hence most frequently come to social expression. The elements of content are the processes of reaction to stimulation and do not differ in essential mechanism from the spinal reflex of the decapitated animal to the most complex adaptive activity of man. The objects of awareness are the physical stimuli, but in every case they act by a process of summation in such a way that the logically discrete physical elements (physicochemical processes) can not be reacted to separately and hence individually never become objects of awareness. The objects are always unanalyzable complexes specific for each reaction; hence the failure of introspection to reveal molecular vibrations etc. and the origin of sensory quality.

Such isolated reactions are not in themselves conscious or known. Consciousness consists of particular patterns and sequences of the reactions interacting among themselves and the attributes of consciousness are definable in terms of the relations and successions of the reactions. The patterns of [p. 342] reaction may exist in varying degrees of complexity and continuity. As the complexity and continuity of the processes increase from simple spinal coördination to complex cerebral integrations the sum of integrated activity takes on more and more of the 'conscious attributes' of the normal waking individual. In the series of increasing complexity there are no sharp breaks, as there is no clear distinction between the subjectivist's divisions of conscious and subconscious. The 'states of consciousness' are patterns of response and their character is defined by the statement of the specific integrations concerned.

Some processes may be physiologically isolated from the principal integrated system. If they lack complexity or some continuity, they lack the essential character of 'conscious states' and are classed as reflex or automatic actions. If they are complex, long continued, and capable of influencing some of the verbo-gestural mechanisms, they may present some or all of the characters of fully integrated reactions and appear as automatic writing, somnambulism, or the like. They may even reach such complexity of integration as to equal that of the dominant system and constitute a secondary 'consciousness.'

The relation of any integration to the speech and gestural mechanisms is of prime importance for its 'conscious aspects.' Not only is the single certain evidence of consciousness in another person the existence of consistent, rational expressive movements, but the introspective evidence that there was consciousness at a given moment consists in the occurrence of thoughts (verbal or gestural sequences) conditioned by the state at that moment. The core of

the 'conscious' integration is the verbo-gestural coördination.

The behaviorist has been content to limit his account of behavior to the simple reflex hypothesis. Neurological evidence however indicates that the complexity of integration may greatly exceed that permitted by simple reflex theory. I have elsewhere (16) sketched an hypothesis of an all-pervading substratum of postural tone upon which are superimposed reflex and voluntary movements. The evidence for [p. 343] such a substratum throws some light upon the problems of 'set,' 'attention,' 'drive,' and dynamic mechanisms in general, and suggests that what I have called the dominant organization may consist of such a postural pattern with the adaptive reactions facilitated by it.

Consciousness is a general term applied to a variety of such complex integrations as I have sketched above. It marks off no group of phenomena which can be sharply defined or which have any characters requiring special scientific treatment. The distinction is made wholly on the basis of an indefinite complexity, and psychology is finding such distinctions of questionable value (witness the recent attacks upon the concept of instinct). For the behaviorist the setting off of these particular integrations from others is unimportant. The physiological mechanisms seem to form a continuous series and their analysis is hampered, not facilitated, by such artificial distinctions. 'Conscious states' have outlived their usefulness to science and with Watson we may say that, "the behaviorist does not concern himself with them because as the stream of his science broadens and deepens such older concepts are sucked under, never to reappear."

VIII. Science and Sentimentalism in Psychology

The acceptance of the postulates of physical science, whether we regard them as the attributes of a real objective world or merely as explanatory hypotheses, brings with it an avalanche of consequences which has not always been foreseen or enjoyed by the unwary adventurer in science. Once they are accepted, we cannot arbitrarily set a limit to their application and reserve a favored corner of our experience for consideration in other ways. Only empirical evidence of such limits can justify the claim to their existence. I have attempted to show that the so-called phenomena of consciousness do not constitute such a limit. Physical postulates are as fully applicable to mind as to the material world and there are no subjectively definable attributes of mind which distinguish it from other physical processes. The acceptance of a physical world seems to me therefore to involve as a [p. 344] corollary a behavioristic psychology. The various forms of psychophysical dualism strive to set apart a fragment of knowledge and to apply to it a different set of postulates without adequate evidence for the distinction. They thereby violate the principle of parsimony, while accepting it within the limits of their respective systems.

The same criticism does not apply to other systems which definitely reject one or more of the postulates of physical science as applied to any phenomenon of experience. Solipsism rejects all, idealistic monism apparently the postulates of spatial relationship and individual discreteness of elements, creative evolution the doctrine of determinism, certain mysticisms the postulate of temporal relationship, and finalism rejects determinism and substitutes values. Since each consistently rejects the postulates of the others for all experience, they are each rationally unassailable from the postulates of the other. This leads to a consideration of the psychological factors involved in the construction and choice of a system.

The Psychology of Mechanistic and Teleological Systems

The psychology of philosophy is yet to be written, although it must be included in any psychological system. The finalist must show to what purpose his speculations, and the mechanist must explain how he is become as he is. Each must show the place of his system within his system.

In so far as one can analyze it at present, physical science seems to be the attempt to express all experience in terms of bodily activity. However abstract the notions of time or space, of

gravitational attraction, and the like, they are thought of in bodily movements or postures. Translation into other terms is precluded in the system and in particular all emotional elements are ruled out. The more nearly the expression can be reduced to pure movement and posture, without push or pull (kinæsthesia), the more nearly it approaches the mechanistic ideal. Advanced mathematics substitutes verbal symbols for manipulative patterns, but the symbols are first derived from the patterns, and their meaning is a reënactment of the patterns from which they [p. 345] were derived or for which are named. The apparent limitations of science and metaphysics seem to be determined by the manipulative capacities of the bodily mechanism. Scientific explanation might be called the manipulative interpretation of the universe.

In addition to manipulative activities, the organism is capable of emotional reactions and these seem to furnish the basis for the antagonistic doctrine of finalism. It stresses the emotional and utilizes the manipulative only where emotional interpretation fails to cover the phenomena of experience. This point of view is most clearly expressed in Bergson's intuitionism. Description and 'explanation' are of less importance than valuation, and the formulation of knowledge is to be made in terms of its emotional significance.

Perhaps other modes of interpreting experience may be devised, but thus far none has been. Other positive doctrines seem to exist largely by avoidance of clear statements of their postulates and by vacillation between these two methods of thought. A few writers see the antagonism of the two views, and, as Bergson, reject determinism with all its works, or with the behaviorist finalism and values, but the majority of psychologists are still precariously bestriding both steeds.[20] Adherence to mechanism or finalism seems to be wholly a matter of temperament; the choice is made upon an emotional and not a rational basis. Perhaps the psychoanalysts, specialists in human motives, can explain the choice of a system. Their account of my behaviorism would certainly run as follows:

A strong Oedipus complex; identification of the Heavenly Father with the father of the complex; transfer of the affect to all religious dogma; rejection of soul, mind, everything which suggests transcending or paternal authority. The history is clear. Coupled with this, a tendency to 'shut-in' temperament with its resultant *Schadenfreude*; organic inferiority with compensation through a derogatory view of others. "These superior men! They are only modified [p. 346] entera with gonadal appendages. Nothing but machines which can claim no credit for their achievements."

But if this is the solution of my behaviorism, are the advocates of other systems in any better case? We can imagine the psychoanalytic account. Finalism is but an attempt to magnify the ego in another way. "What! am I only an evolved enteron? By no means! I transcend mere matter. I am a free mind, a self-created and self-creating being." This, like materialism, is but another form of the "Myth of the Birth of the Hero" (25).

Valuation Versus Scientific Description

The two systems, mechanistic explanation and finalistic valuation, stand out as incompatible points of view, scientific versus humanistic. To the writer, the most serious defect of current psychology is the confusion of these points of view in the attempt to develop a science. There is an almost universal demand that psychology shall do more than explain mind in the sense in which other sciences explain their material. It must also subject itself to anthropocentric values; it must leave room for human ideals and aspirations; and it must present its material in such a way as to identify the explanatory principles with some qualitative elements within the reader's experience.

Other sciences have escaped from this thralldom. The astronomer and biologist no longer need to bow before man's egotism, and their conclusions are a frank denial of his preëminence. And equally they are freed from the necessity of arousing the 'experience of the thing described.' No one asks that the physicist's account of gravity shall make his hearer feel heavier, or that the biologist shall throw him again *in utero* by his statement of the recapitulation theory.

Yet many psychologists demand that the explanation of mind shall be, somehow or other, identical with mind. The final objection to behaviorism is that it just fails to express the vital, personal quality of experience. So far as I can analyze this objection, it is based upon the demand that the scientific description shall have the affective value of the [p. 347] thing described. This demand is quite evident in James' arguments concerning the 'automatic sweetheart.' It is scarcely less obvious in other cases. The objection to a physiological account of the awareness of red, for example, seems unquestionably to be based upon the feeling that the description is not red; does not give the peculiar sense of possession which is in *my* red; does not arouse the experience of red. And so for other more obscure psychological data of the sort which is supposed to involve transcendence. There is a persistent demand that the scientific description shall be capable of arousing the experience of the thing described. Such descriptions belong to art, not to science. If such is the function of psychology, then the painter, musician, and poet far excel the psychologist in the practice of his profession. And a slap in the face is a better description of anger than can be formulated in words.

Not only is there this demand for an esoteric quality in psychological studies, but there has also been a constant attempt to inject metaphysics into the science. The developments of physics are independent of any theory of the ultimate nature of matter, and it is a bold metaphysician who ventures to take the physicist to task for ignoring things-in-themselves. But psychology has ever been the playground of philosophers, ignorant of its empirical findings but confirmed in their belief in the unassailability of their introspections and determined that psychology must be made the stepping stone to a knowledge of reality and value. And psychologists have accepted these unscientific aims and attempted to make the science to conform to them. Yet things-in-themselves are, as Conger (4) has phrased it, "the limiting case of nothing" and to the scientist *qua* scientist simple nonsense, and one of the chief lessons of empirical psychology is that values are never rational but always based upon an affective reaction. It is only by divorcing itself from metaphysics and values and adopting the phenomenological method of science that psychology can escape the teleological and mystical obscurantism in which it is now involved.

[p. 348] IX. The Behaviorist Program

I pick up at random an elementary textbook of psychology (not written by a structuralist) which is presumably representative of current interests in psychology; the best that psychology can contribute to the culture of the student. It is made up as follows: Sensation, perception, affection 66 per cent., anatomy of the body, 10 per cent., learning, 9 per cent., thought (more than half a discussion of sensation and imagery), 9 per cent., self (metaphysical) 1 per cent. The remaining five per cent., by a stretch of the imagination may be interpreted as a discussion of human motives. Perhaps this book is not typical, but it is fairly representative of the kind of psychology that prepossession with the mind-body problem has produced. It practically ignores what to the behaviorist are the most important problems of psychology, and what to the average student are the most interesting and vital questions, the problems of human conduct. The behaviorist is interested to discover the wells of human action: how does the individual meet the complex situations in which he finds himself, how solve his problems, how acquire social conventions, whence come his interests, prejudices, ambitions, what is the source of his genius or commonplaceness? These are not the problems of the introspectionist, yet they are unquestionably psychological problems, and their importance is far from measured by the grudging five per cent. granted them in the text. Only a vision grown myopic by long introversion could behold sensory physiology as twelve times more important than all the problems of human personality combined.

It is by this demand for change of emphasis in psychology that behaviorism has broken most completely from the traditions of the older psychology, which is willing to leave the problems of every-day life to the 'applied sciences' of sociology, education, and psychiatry. The behaviorist holds that the greater part of introspective psychology is only a poorly devised physiology of the sense-organs and that its minor importance as such should be generally recognized. He would make of psychology a true science of human conduct.

[p. 349] By what means? From physiology we inherit reflexes, conditioned reflexes, and glands;

from animal psychology, habit, trial and error, and instinct; from psychiatry, emotional complexes and conflicts; from subjective psychology, a horrible example. With this meager equipment we must begin our task. The task is first to define more clearly the problems of reaction, of motivation and integration in behavior, to analyze the behavior components in specific human activities; second, to state these in terms of the physiological mechanisms involved. Without physiology behaviorism can make but little progress, for its explanatory principles are physiological and no sharp line can be drawn between the two sciences. For the present, if we are to deal with complex human activities, we must be content with the pseudo-explanations offered by such conceptions as 'set,' 'habit,' 'gestural reaction,' 'drive,' 'conflict,' 'dominant stimulus,' and the like, but our task is not completed until we can show something more definite than these as the foundation of the science.

At present, behaviorism is based largely upon the conceptions of subjective psychology. Its categories of behavior are derived from the categories of structural psychology and its 'explanations' are largely re-phrasings of subjective descriptions. This is due in part to language difficulty, in part to the early training of most behaviorists in subjective psychology, but chiefly to the backwardness of the science of physiology.

Our current psychological language is a weird composite of teleological and mechanistic terms; names for phenomena which, as experienced, reveal neither purpose nor cause. The result is that a scientific description of many phenomena may not be recognized by those who are less familiar with the phenomena than with the names and their interpretative implications. This has led to such objections to behaviorism as that recently advanced by Pratt (24) who has argued that to make himself intelligible the behaviorist must always fall back upon subjective terms, ". . . has to translate half a dozen behaviorist pages into two lines of introspective psychology, [p. 350] in order to clear up his meaning even to his introspectionist colleagues." Such objections have perhaps been justified by behavioristic discussions, perhaps even by this paper, but the fault lies rather with the lack of an extensive and generally understood behavioristic nomenclature than with behavioristic theory. I may say that I am hungry and purpose to have steak and onions for dinner. The subjectivist and the main-in-the-street gets the meaning clearly. Yet my words have only been accepted names for the facts that stomach contractions, salivary secretion, changes in visceral tonus, specific laryngeal and tongue movements, contractions of trunk musculature, and the like are occurring within my body. An introspective description of my *purpose* would not reveal an influence of the future on the present, nor does the behaviorist account. Yet such is the defect of language that to be intelligible to any one except the most highly specialized behaviorist, the description of the phenomenon must employ a word which implies this finalistic interpretation (the very word *implies* has connotations which the behaviorist cannot admit, yet to avoid it I must use half a page to describe the actual phenomenon of implication, as it appears to either behavioristic or introspective analysis). Only the gradual development of a widely understood behavioristic terminology can eliminate this difficulty.

To the man trained in the older psychology or philosophy the traditional problems must still seem important, even though he has thrown off most of the metaphysics of the school in which he was trained. Moreover, unless he has first-hand knowledge of a vast range of human activity he must take his facts from the subjective literature where they are arranged and selected with the subjectivist's bias as to their relative importance. Small wonder then that current behaviorism shows the taint of introspection. Where the behaviorist is engaged in experimental work and is not trying to construct a system, this difficulty is by no means so evident and the few behaviorist investigations which have appeared are certainly not open to Pratt's criticism that the problems are derived from subjective psychology.

[p. 351] The behaviorist's chief handicap is the lack of an adequate physiology upon which to base his science. The exaggerated emphasis upon conditioned reflexes, suprarenal glands, and 'sets' shows the paucity of the material at hand. But by turning physiologist the behaviorist may hope to enlarge the number of his explanatory mechanisms and by a wider direct contact with human problems to escape the subjective categories under which they are now classed.

In this respect we need some compromise between the positions recently advocated by Warren and by Weiss (28, 29, 36). Weiss would make of behaviorism a science based upon the "individual-social" aspect of reactions, utilizing physiological results only as a basis for social valuation. Warren emphasizes the neuro-physiological problems of behavior.

The social categories of Weiss are certainly open to further analysis and must always be questionable -- mere hypothecated processes or names for ill-defined groups of phenomena -- until their neurological mechanisms have been solved. On the other hand, if behaviorism is to treat of human conduct, it must for the present employ such vague categories. The insistence upon neurological interpretation can now only lead to the formulation of preposterous neurograms or to the restriction of behavioristic research for many years to the physiology of the simplest neural processes. The compromise must include a healthy scepticism toward the present behaviorist categories, an insistence that the problem of their physiological mechanism be kept always in mind, with a full recognition of their practical value for systematizing the problems of human conduct.

Behaviorism began as a criticism of introspection. Must it retain as fundamental to its tenets the objection to any form of verbal report from its subjects? Certainly such reports are not necessary for a recognition and study of central processes. The whole concept of neural integration and the detailed accounts of spinal mechanisms which are now possible have been derived without recourse to introspection. On the other hand, there can be no valid objection [p. 352] by the behaviorist to the introspective method so long as no claim is made that the method reveals something besides bodily activity. Behaviorism has a place for introspection, but it must be a vastly different form of introspection from that which now burdens the literature. Its avowed aim must be the discovery of cues to physiological problems and its final appeal for verification to the results of objective methods. Such introspection may make the preliminary survey, but it must be followed by the chain and transit of objective measurement.

The physiological analysis of human behavior presents a stupendous, perhaps insuperable task. It has not been my object here to develop specific physiological theories to formulate a system of behaviorism, or to prophesy the course which its development will take, but only to point out that the supposed problem of consciousness does not present insurmountable difficulties to behavioristic treatment. Subjective psychology has not revealed data which justify any type of psychophysical dualism. The attributes of mind, as definable on introspective evidence, are precisely the attributes of the complex physiological organization of the human body and a statement of the latter will constitute as complete and adequate an account of consciousness as seems possible from any type of introspective analysis. The behaviorist may go his way without fear that his final account will fail of including 'mind' and with the conviction that the inclusion of 'mind' will add nothing to scientific psychology.

Footnotes

[1] Watson (32) has emphasized this view in his discussion of the rôle of the observer in experimentation.

[2] Cf. Pratt, (23).

[3] This mode of attack is not fashionable in philosophy today. Realism believes that it has scotched solipsism. But a consistent behaviorism can not admit any accurate direct knowledge of reality, since, if reactions constitute knowledge, the reactions may be to a part only of the total situation and knowledge is, therefore, limited by the reaction capacities of the mechanism. The behaviorist is under no delusion as to the 'ultimate' truth of the physical system. For him it is only an explanatory hypothesis, accepted because it seems the most flexible and widely applicable of all which have been suggested.

[4] I believe that the chief difficulties of the mind-body problem arise from such analysis as this with the failure to appreciate the fact that the 'elements' are abstractions whose existence is conditioned by the intactness of the total organization of consciousness. We may speak of an element of consciousness but not of a conscious element. Confusion on this point has led to the various atomistic theories and to much meaningless discussion of consciousness in lower organisms. (See page 000.)

[5] Watson has repeatedly suggested that in the physical sciences the question of the observer is presupposed and disregarded and that behaviorism may follow the same method. I do not wish my position to be confused with this. It is only the postulated characteristics of physical reality in the absence of an observer that I consider here. The mechanism of the observer seems to me a real problem for the behaviorist, as it is not for the physicist. Nor does Watson altogether disregard the problem of the observer. The behaviorist may study a behaviorist in the act of studying a behaviorist, and is justified in concluding that his own processes of study resemble those of the other.

[6] Some writers have read other characteristics into awareness, as does Montague (22) when he defines consciousness as ". . . the potential or implicative presence of a thing at a space or time in which that thing is not actually present." But such statements are mere inferences from the nature of content. Because the thing known has certain attributes it is assumed that the knowing process has those attributes. This assumption is perhaps justifiable, but the point which I wish to emphasize is that, if the characteristics are not found in content, there is no other reason for ascribing them to awareness. If content does not transcend time and space, then neither does awareness. The only criterion of the process is the result.

[7] Holt (13) has advanced evidence to show that all qualities are subjectively analyzable, his implication being that if introspection could carry the analysis far enough quality would reduce to some neutral, non-qualitative substratum. This is also the thesis of my discussion, save that the neural mechanism of introspection later developed seems to preclude possibility of any such ultimate subjective analysis.

[8] Cf. Koffka (15).

[9] I can not agree with Sheldon (26) that such inference involves the problem of transcendence. For psychology it is only the generalization of certain types of experience. Pastness, for example, is a name for a class of experiences having certain characters (perhaps a specific affect and lack of tension or of demand for immediate reaction) and the inference of pastness is only the assignment of an experience to this category. The inference of *real* temporal relationship is, psychologically, the translation of succession into a spatial or numerical series which can be thought in postural terms.

[10] The new realists have met this problem by pointing out that our conceptions of the character of time and space are only postulates and that if mind seems to transcend time and space, the fault lies really in a false notion of the latter. In real time or space objects are related as they are in mind. Modern physics has done much to revise our ideas of space-time relations but has not added the postulates of self-transcendence. And the evidence from mind does not seem to me to justify the addition. In this respect neo-realism seems to me a form of animism.

[11] Such introspective accounts of comparison and generalization as that of Fisher (9) which attempt to give an exact description of content without metaphysical interpretation clearly bear out this contention that sequences alone are discoverable by subjective methods.

[12] In his recent criticism of behaviorism Pratt (24) has overlooked the fact that the introspective account of a purpose (for example) must be just as unintelligible to the philosopher as the behaviorist account unless it also is tagged with the name current in philosophy.

[13] Cf. Warren's criticism (29) of Lovejoy's discussion.

[14] By 'dominant system' I mean to imply nothing more than the organized system which at the moment is most closely integrated with the speech and gestural mechanisms. That two or perhaps more such systems may be activated simultaneously is suggested by the facts of automatic writing, and the like. The confusion of tongues which might result on the motor or laryngeal theory of consciousness from such simultaneous activity, is avoided by the postulation of central chains of neural activity which activate efferent neurones only when the latter are facilitated by tonic innervation.

[15] The various attempts to correlate the presence of consciousness with a particular degree of synaptic resistance (30), with meeting of new situations (1), with associative memory (17), with conflict in response, and similar specific types of behavior have met with rather dismal failure. I believe that this conception of consciousness as the complex sequence of reactions, with the dominance of the language mechanisms, comes nearer to meeting the subjective description, than does any of the other physiological theories.

[16] The weight of evidence seems definitely against the hypothesis which makes every reaction take motor expression at once and looks upon thought as a succession of complete reflexes. The evidence offers some difficulty to the extreme methodological behaviorism, but is of little significance to the theory presented here.

[17] This of course is an almost ludicrously simple analysis of the behavior summed up in the conceptions of positive and negative reaction. An understanding of the mutual inhibitions and facilitations of complex neural integrations will be necessary before an adequate statement of the nature of logical contradiction can be given. The above description however presents a conceivable mechanism for logical incongruity, which is all that is required for the present argument.

[18] The physiology of dynamic mechanisms in behavior is by no means worked out. In some cases, as in thirst, persistent peripheral stimulation is obviously the dominant factor in maintaining activity. In the majority of human activities the motivating mechanisms are more obscure. I have discussed the activities of the machine chiefly in terms of the reflex theory. Recent neurological evidence however indicates a much closer integration of reaction systems than is possible on the assumption of isolated reflexes. There may be special mechanisms for the maintenance of tonic integration (Lashley, '22) and it is not improbable that a common tonic innervation underlies the organization of mechanisms in the dominant system. In order that an overt reaction should occur, its mechanisms must first be primed by tonic innervation, and this may constitute the 'set' of the behaviorist.

[19] Cf. Frost (10).

[20] The most recent spectacle of this sort is presented by McDougall (21), who bounces back and forth between accurate scientific description and the exhortations of a soap-box evangelist.

Literature Cited

1. BAWDEN, H. H. 'The Presuppositions of a Behaviorist Psychology,' *PSYCHOL. REV.*, 1918, 25, 171-190.
2. BECHTEREW, W. V. 'La psychologie objective,' Paris, 1913.
3. BERGSON, H. 'Creative Evolution, N.Y., 1911.
4. CONGER, G. P. 'The Implicit Duality of Thinking,' *J. of Phil.*, 1922, 19, 225-237.
5. DEWEY, JOHN. 'Concerning Alleged Immediate Knowledge of Mind,' *J. of Phil.*, 1918, 15,

29-35.

6. DRIESCH, H. 'The Science and Philosophy of the Organism,' London, 1908.
7. DUNLAP, K. 'Dr. Yerkes' View of Psychic Causation,' *Psychol. Bull.*, 1911, 8, 400-403.
8. FERNBERGER, S. W. 'Behaviorism versus Introspective Psychology,' *PSYCHOL. REV.*, 1922, 29, 409-413.
9. FISHER, S. C. 'The Process of Generalizing Abstraction; and its Product, the General Concept,' *Psychol. Rev. Monog.*, 1916, 21, v + 213.
10. FROST, E. P. 'Cannot Psychology Dispense with Consciousness?' *PSYCHOL. REV.*, 1914, 21, 204-211.
11. HALDANE, J. S. 'Mechanism, Life, and Personality,' N.Y., 1914.
12. HOLT, E. B. 'The Concept of Consciousness,' N.Y., 1914.
13. HOLT, E. B. 'The New Realism,' N.Y., 1912.
14. JAMES, W. 'Principles of Psychology,' N.Y., 1890.
15. KOFFKA, KURT. 'Perception: an Introduction to the Gestalt-Theorie,' *Psychol. Bull.*, 1922, 19, 531-585.
16. LASHLEY, K. S. 'Studies of Cerebral Function in Learning. No. III. The Motor Areas,' *Brain*, 1921, 44, 255-286.
17. LOEB, J. 'Comparative Physiology of the Brain and Comparative Psychology,' N.Y., 1900.
18. LOVEJOY, A. O. 'The Paradox of the Thinking Behaviorist,' *Phil. Rev.*, 1922, 31, 135-147.
19. MARSHALL, H. R. 'Behavior,' *J. of Phil.*, 1918, 15, 258-261.
20. McDOUGALL, W. 'Body and Mind,' N.Y., 1913.
21. McDOUGALL, W. 'Prolegomena to Psychology,' *PSYCHOL. REV.*, 1922, 29, 1-43.
22. MONTAGUE, W. P. 'The New Realism,' N.Y., 1912.
23. PRATT, J. B. 'The New Materialism,' *J. of Phil.*, 1922, 19, 337-351.
24. PRATT, J. B. 'Behaviorism and Consciousness,' *J. of Phil.*, 1922, 19, 596-604.
25. RANK, O. 'The Myth of the Birth of the Hero,' N.Y., 1914.
26. SHELDON, W. H. 'The Soul and Matter,' *Phil. Rev.*, 1922, 31, 103-134.
27. TITCHENER, E. B. 'Experimental Psychology of the Thought Processes,' N.Y., 1909.
28. WARREN, H. C. 'Psychology and the Central Nervous System,' *PSYCHOL. REV.*, 1921, 28, 249-269.
29. WARREN, H. C. 'Awareness and Behaviorism,' *Phil. Rev.*, 1922, 31, 601-605.

30. WASHBURN, M. F. 'Movement and Mental Imagery,' Boston, 1916.
 31. WATSON, J. B. 'Psychology as the Behaviorist Views It,' PSYCHOL. REV., 1913, 20, 158-177.
 32. WATSON, J. B. 'Is Thinking Merely the Action of the Language Mechanisms?' *Brit. J. of Psychol.*, 1921, 11, 87-104.
 33. WEISS, A. P. 'Relation between Structural and Behavior Psychology,' PSYCHOL. REV., 1917, 24, 301-317.
 34. WEISS, A. P. 'Relation between Functional and Behavior Psychology,' PSYCHOL. REV., 1917, 24, 353-368.
 35. WEISS, A. P. 'The Mind and the Man Within,' PSYCHOL. REV., 1919, 26, 327-334.
 36. WEISS, A. P. 'Behavior and the Central Nervous System,' PSYCHOL. REV., 1922, 29, 329-343.
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