

Behaviorism

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I. What is Behaviorism?

THE OLD AND NEW PSYCHOLOGY CONTRASTED

Two opposed points of view are still dominant in American psychological thinking—introspective or subjective psychology, and behaviorism or objective psychology.¹ Until the advent of behaviorism in 1912, introspective psychology completely dominated American university psychological life.

The conspicuous leaders of introspective psychology in the first decade of the twentieth century were E. B. Titchener of Cornell and William James of Harvard. The death of James in 1910 and the death of Titchener in 1927 left introspective psychology without emotional leadership. Although Titchener's psychology differed in many points from that of William James, their fundamental assumptions were the same. In the first place, both were of German

¹ In the last few decades there have been two other more or less prominent but temporary points of view—the so-called functional psychology of Dewey, Angell and Judd and the Gestalt Psychologie of Wertheimer, Koffka and Köhler. In my opinion both of these points of view are, as it were, illegitimate children of introspective psychology. Functional psychology, which one rarely hears of now, owed its vogue to considerable patter about the physiologically adaptive functions of the mind. The mind with them is a kind of adjusting "guardian angel." The philosophy behind it smacks very much of the good old Christian philosophy of Berkeley (interaction or control of the body by the deity).

Gestalt psychology makes its patter about "configurational response (really inborn!)." As a psychological theory it cannot gain very much headway. It is as obscure as Kant's treatment of imagination, which it resembles quite a little. The kernel of truth behind it has been very much better and more clearly expressed by William James in his *Principles* in the chapters on Sensation and Perception. Those chapters could be read with profit by the sponsors of Gestalt. Gestalt is still a part of introspective psychology. Incidentally a bit of collateral reading for any student who works on Gestalt is Hobhouse's *Mind in Evolution*.

origin. In the second place, and of more importance, both claimed that *consciousness is the subject matter of psychology*.

Behaviorism, on the contrary, holds that the *subject matter of human psychology is the behavior of the human being*. Behaviorism claims that consciousness is neither a definite nor a usable concept. The behaviorist, who has been trained always as an experimentalist, holds, further, that belief in the existence of consciousness goes back to the ancient days of superstition and magic.

The great mass of the people even today has not yet progressed very far away from savagery—it wants to believe in magic. The savage believes that incantations can bring rain, good crops, good hunting, that an unfriendly voodoo doctor can bring disaster to a person or to a whole tribe; that an enemy who has obtained a nail paring or a lock of your hair can cast a harmful spell over you and control your actions. There is always interest and news in magic. Almost every era has its new magic, black or white, and its new magician. Moses had his magic: he smote the rock and water gushed out. Christ had his magic: he turned water into wine and raised the dead to life. Coué had his magic word formula. Mrs. Eddy had a similar one.

Magic lives forever. As time goes on, all of these critically undigested, innumerable told tales get woven into the folk lore of the people. Folk lore in turn gets organized into religions. Religions get caught up into the political and economic network of the country. Then they are used as tools. The public is forced to accept all of the old wives' tales, and it passes them on as gospel to its children's children.

The extent to which most of us are shot through with a savage background is almost unbelievable. Few of us escape it. Not even a college education seems to correct it. If anything, it seems to strengthen it, since the colleges themselves are filled with instructors who have the same background. Some of our greatest biologists, physicists, and chemists, when outside of their laboratories, fall back upon folk lore which has become crystallized into re-

ligious concepts. These concepts—these heritages of a timid savage past—have made the emergence and growth of scientific psychology extremely difficult.

AN EXAMPLE OF SUCH CONCEPTS

One example of such a religious concept is that every individual has a *soul* which is separate and distinct from the *body*. This soul is really a part of a supreme being. This ancient view led to the philosophical platform called "dualism." This dogma has been present in human psychology from earliest antiquity. No one has ever touched a soul, or seen one in a test tube, or has in any way come into relationship with it as he has with the other objects of his daily experience. Nevertheless, to doubt its existence is to become a heretic and once might possibly even have led to the loss of one's head. Even today the man holding a public position dare not question it.

With the development of the physical sciences which came with the renaissance, a certain release from this stifling soul cloud was obtained. A man could think of astronomy, of the celestial bodies and their motions, of gravitation and the like, without involving soul. Although the early scientists were as a rule devout Christians, nevertheless they began to leave soul out of their test tubes.

Psychology and philosophy, however, in dealing as they thought with non-material objects, found it difficult to escape the language of the church, and hence the concept of mind or soul as distinct from the body came down almost unchanged in essence to the latter part of the nineteenth century.

Wundt, the real father of experimental psychology, unquestionably wanted in 1879 a scientific psychology. He grew up in the midst of a dualistic philosophy of the most pronounced type. He could not see his way clear to a solution of the mind-body problem. His psychology, which has reigned supreme to the present day, is necessarily a compromise. He substituted the term *con-*

sciousness for the term *soul*. Consciousness is not quite so unobservable as *soul*. We observe it by peeking in suddenly and catching it unawares as it were (*introspection*).

Wundt had an immense following. Just as now it is fashionable to go to Vienna to study psycho-analysis under Freud, just so was it fashionable some 40 years ago to study at Leipzig with Wundt. The men who returned founded the laboratories at Johns Hopkins University, the University of Pennsylvania, Columbia, Clark and Cornell. All were equipped to do battle with the elusive (almost soul-like) thing called *consciousness*.

To show how unscientific is the main concept behind this great German-American school of psychology, look for a moment at William James' definition of psychology. "Psychology is the description and explanation of states of *consciousness* as such." Starting with a definition which *assumes* what he starts out to prove, he escapes his difficulty by an *argumentum ad hominem*. *Consciousness*—Oh, yes, everybody must know what this "consciousness" is. When we have a sensation of red, a perception, a thought, when we *will* to do something, or when we *purpose* to do something, or when we desire to do something, we are being *conscious*.

All other introspectionists are equally illogical. In other words, they do not tell us what *consciousness* is, but merely begin to put things into it by assumption; and then when they come to analyze *consciousness*, naturally they find in it just what they put into it. Consequently, in the analyses of *consciousness* made by certain of the psychologists you find such elements as *sensations* and their ghosts, the *images*. With others you find not only sensations, but so-called *affective elements*; in still others you find such elements as *will*—the so-called *conative element* in *consciousness*. With some psychologists you find many hundreds of sensations of a certain type; others maintain that only a few of that type exist. And so it goes. Literally hundreds of thousands of printed pages have been published on the minute analysis of this intangible some-

thing called "*consciousness*." And how do we begin work upon it? Not by analyzing it as we would a chemical compound, or the way a plant grows. No, those things are material things. This thing we call *consciousness* can be analyzed only by *introspection*—a looking in on what takes place inside of us.

As a result of this major assumption that there is such a thing as *consciousness* and that we can analyze it by *introspection*, we find as many analyses as there are individual psychologists. There is no way of experimentally attacking and solving psychological problems and standardizing methods.

THE ADVENT OF THE BEHAVIORISTS

In 1912 the objective psychologists or behaviorists reached the conclusion that they could no longer be content to work with Wundt's formulations. They felt that the 30 odd barren years since the establishment of Wundt's laboratory had proved conclusively that the so-called introspective psychology of Germany was founded upon wrong hypotheses—that no psychology which included the religious mind-body problem could ever arrive at verifiable conclusions. They decided either to give up psychology or else to make it a natural science. They saw their brother-scientists making progress in medicine, in chemistry, in physics. Every new discovery in those fields was of prime importance; every new element isolated in one laboratory could be isolated in some other laboratory; each new element was immediately taken up in the warp and woof of science as a whole. One need only mention wireless, radium, insulin, thyroxin, to verify this. Elements so isolated and methods so formulated immediately began to function in human achievement.

In his first efforts to get uniformity in subject matter and in methods the behaviorist began his own formulation of the problem of psychology by sweeping aside all mediaeval conceptions. He

dropped from his scientific vocabulary all subjective terms such as sensation, perception, image, desire, purpose, and even thinking and emotion as they were subjectively defined.

THE BEHAVIORIST'S PLATFORM

The behaviorist asks: Why don't we make what we can *observe* the real field of psychology? Let us limit ourselves to things that can be observed, and formulate laws concerning only those things. Now what can we observe? We can observe *behavior—what the organism does or says*. And let us point out at once: that *saying* is doing—that is, *behaving*. Speaking overtly or to ourselves (thinking) is just as objective a type of behavior as baseball.

The rule, or measuring rod, which the behaviorist puts in front of him always is: Can I describe this bit of behavior I see in terms of "stimulus and response"? By stimulus we mean any object in the general environment or any change in the tissues themselves due to the physiological condition of the animal, such as the change we get when we keep an animal from sex activity, when we keep it from feeding, when we keep it from building a nest. By response we mean anything the animal does—such as turning toward or away from a light, jumping at a sound, and more highly organized activities such as building a skyscraper, drawing plans, having babies, writing books, and the like.

SOME SPECIFIC PROBLEMS OF THE BEHAVIORISTS

You will find, then, the behaviorist working like any other scientist. His sole object is to gather facts about behavior—verify his data—subject them both to logic and to mathematics (the tools of every scientist). He brings the new-born individual *into his experimental nursery* and begins to set problems: What is the baby doing now? What is the stimulus that makes him behave *this way*? He finds that the stimulus of tickling the cheek brings the response of turning the mouth to the side stimulated. The stimulus

of the nipple brings out the sucking response. The stimulus of a rod placed on the palm of the hand brings closure of the hand and the suspension of the whole body by that hand and arm if the rod is raised. Stimulating the infant with a rapidly moving shadow across the eye will not produce blinking until the individual is sixty-five days of age. Stimulating the infant with an apple or stick of candy or any other object will not call out attempts at reaching until the baby is around 120 days of age. Stimulating a properly brought up infant at any age with snakes, fish, darkness, burning paper, birds, cats, dogs, monkeys, will not bring out that type of response which we call "fear" (which to be objective we might call reaction "X") which is a catching of the breath, a stiffening of the whole body, a turning away of the body from the source of stimulation, a running or crawling away from it. (See page 152.)

On the other hand, there are just two things which will call out a fear response, namely, a loud sound, and loss of support.

Now the behaviorist finds from observing children brought up *outside of his nursery* that hundreds of these objects will call out fear responses. Consequently, the scientific question arises: If at birth only two stimuli will call out fear, how do all these other things ever finally come to call it out? Please note that the question is not a speculative one. It can be answered by experiments, and the experiments can be reproduced and the same findings can be had in every other laboratory if the original observation is sound. Convince yourself of this by making a simple test.

If you will take a snake, mouse or dog and show it to a baby who has never seen these objects or been frightened in other ways, he begins to manipulate it, poking at this, that or the other part. Do this for ten days until you are logically certain that the child will always go toward the dog and never run away from it (positive reaction) and that it does not call out a fear response at any time. In contrast to this, pick up a steel bar and strike upon it loudly behind the infant's head. Immediately the fear response is called

forth. Now try this: At the instant you show him the animal and just as he begins to reach for it, strike the steel bar behind his head. Repeat the experiment three or four times. A new and important change is apparent. The animal now calls out the same response as the steel bar, namely a fear response. We call this, in behavioristic psychology, the *conditioned emotional response*—a form of *conditioned reflex*.

Our studies of conditioned reflexes make it easy for us to account for the child's fear of the dog on a thoroughly natural science basis without lugging in consciousness or any other so-called mental process. A dog comes toward the child rapidly, jumps upon him, pushes him down and at the same time barks loudly. Oftentimes one such combined stimulation is all that is necessary to make the baby run away from the dog the moment it comes within his range of vision.

There are many other types of conditioned emotional responses, such as those connected with *love*, where the mother by petting the child, rocking it, stimulating its sex organs in bathing, and the like, calls out the embrace, gurgling and crowing as an unlearned original response. Soon this response becomes conditioned. The mere sight of the mother calls out the same kind of response as actual bodily contacts. In *rage* we get a similar set of facts. The stimulus of holding the infant's moving members brings out the original unlearned response we call rage. Soon the mere sight of a nurse who handles a child badly throws the child into a fit. Thus we see how relatively simple our emotional responses are in the beginning and how terribly complicated home life soon makes them.

The behaviorist has his problems with the adult as well. What methods shall we use systematically to condition the adult? For example, to teach him business habits, scientific habits? Both manual habits (technique and skill) and laryngeal habits (habits of speech and thought) must be formed and tied together before the task of learning is complete. After these work habits are formed, what system of changing stimuli shall we surround him with in

order to keep his level of efficiency high and constantly rising?

In addition to vocational habits, there comes the problem of his emotional life. How much of it is carried over from childhood? What part of it interferes with his present adjustment? How can we make him lose this part of it; that is, uncondition him where unconditioning is necessary, and condition him where conditioning is necessary? Indeed we know all too little about the amount and kind of emotional or, better, visceral habits (by this term we mean that our stomach, intestines, breathing, and circulation become conditioned—form habits) that should be formed. We do know that they are formed in large numbers and that they are important.

Probably more adults in this universe of ours suffer vicissitudes in family life and in business activities because of poor and insufficient visceral habits than through the lack of technique and skill in manual and verbal accomplishments. One of the large problems in big organizations today is that of personality adjustments. The young men and young women entering business organizations have plenty of skill to do their work but they fail because they do not know how to get along with other people.

DOES THIS BEHAVIORISTIC APPROACH LEAVE ANYTHING OUT OF PSYCHOLOGY?

After so brief a survey of the behavioristic approach to the problems of psychology, one is inclined to say: "Why, yes, it is worth while to study human behavior in this way, but the study of behavior is not the whole of psychology. It leaves out too much. Don't I have sensations, perceptions, conceptions? Do I not forget things and remember things, imagine things, have visual images and auditory images of things I once have seen and heard? Can I not see and hear things that I have never seen or heard in nature? Can I not be attentive or inattentive? Can I not will to do a thing or will not to do it, as the case may be? Do not certain things arouse pleas-

ure in me, and others displeasure? Behaviorism is trying to rob us of everything we have believed in since earliest childhood."

Having been brought up on introspective psychology, as most of us have, you naturally ask these questions and you will find it hard to put away the old terminology and begin to formulate your psychological life in terms of behaviorism. Behaviorism is new wine and it will not go into old bottles. It is advisable for the time being to allay your natural antagonism and accept the behavioristic platform at least until you get more deeply into it. Later you will find that you have progressed so far with behaviorism that the questions you now raise will answer themselves in a perfectly satisfactory natural science way. Let me hasten to add that if the behaviorist were to ask you what you mean by the subjective terms you have been in the habit of using he could soon make you tongue-tied with contradictions. He could even convince you that you do not know what you mean by them. You have been using them uncritically as a part of your social and literary tradition.

TO UNDERSTAND BEHAVIORISM BEGIN TO OBSERVE PEOPLE

This is the fundamental starting point of behaviorism. You will soon find that instead of self-observation being the easiest and most natural way of studying psychology, it is an impossible one; you can observe in yourselves only the most elementary forms of response. You will find, on the other hand, that when you begin to study what your neighbor is doing, you will rapidly become proficient in giving a reason for his behavior and in setting situations (presenting stimuli) that will make him behave in a predictable manner.

DEFINITION OF BEHAVIORISM

Definitions are not as popular today as they once were. The definition of any one science, physics, for example, would necessarily include the definition of all other sciences. And the same is true

of behaviorism. About all that we can do in the way of defining a science at the present time is to mark a ring around that part of the whole of natural science that we claim particularly as our own.

Behaviorism, as you have already grasped from our preliminary discussion, is, then, a natural science that takes the whole field of human adjustments as its own. Its closest scientific companion is physiology. Indeed you may wonder, as we proceed, whether behaviorism can be differentiated from that science. It is different from physiology only in the grouping of its problems, not in fundamentals or in central viewpoint. Physiology is particularly interested in the functioning of parts of the animal—for example, its digestive system, the circulatory system, the nervous system, the excretory systems, the mechanics of neural and muscular response. Behaviorism, on the other hand, while it is intensely interested in all of the functioning of these parts, is intrinsically interested in what the whole animal will do from morning to night and from night to morning.

The interest of the behaviorist in man's doings is more than the interest of the spectator—he wants to control man's reactions as physical scientists want to control and manipulate other natural phenomena. It is the business of behavioristic psychology to be able to predict and to control human activity. To do this it must gather scientific data by experimental methods. Only then can the trained behaviorist predict, given the stimulus, what reaction will take place; or, given the reaction, state what the situation or stimulus is that has caused the reaction.

Let us look for a moment more closely at the two terms—stimulus and response.

WHAT IS A STIMULUS?

If I suddenly flash a strong light in your eye, your pupil will contract rapidly. If I were suddenly to shut off all light in the room in which you are sitting, the pupil would begin to widen. If a pistol

shot were suddenly fired behind you you would jump and possibly turn your head around. If hydrogen sulphide were suddenly released in your sitting room you would begin to hold your nose and possibly even seek to leave the room. If I suddenly made the room very warm, you would begin to unbutton your coat and perspire. If I suddenly made it cold, another response would take place.

Again, on the inside of us we have an equally large realm in which stimuli can exert their effect. For example, just before dinner the muscles of your stomach begin to contract and expand rhythmically because of the absence of food. As soon as food is eaten those contractions cease. By swallowing a small balloon and attaching it to a recording instrument we can easily register the response of the stomach to lack of food and note the lack of response when food is present. In the male, at any rate, the pressure of certain fluids (semen) may lead to sex activity. In the case of the female possibly the presence of certain chemical bodies can lead in a similar way to overt sex behavior. The muscles of our arms and legs and trunk are not only subject to stimuli coming from the blood; they are also stimulated by their own responses—that is, the muscle is under constant tension; any increase in that tension, as when a movement is made, gives rise to a stimulus which leads to another response in that same muscle or in one in some distant part of the body; any decrease in that tension, as when the muscle is relaxed, similarly gives rise to a stimulus.

So we see that the organism is constantly assailed by stimuli—which come through the eye, the ear, the nose and the mouth—the so-called objects of our environment; at the same time the inside of our body is likewise assailed at every movement by stimuli arising from changes in the tissues themselves. Don't get the idea, please, that the inside of your body is different from or any more mysterious than the outside of your body.

Through the process of evolution human beings have put on sense organs—specialized areas where special types of stimuli are

most effective—such as the eye, the ear, the nose, the tongue, the skin and semi-circular canals.¹ To these must be added the whole muscular system, both the striped muscles (for example, the large red muscles of arms, legs and trunks) and the unstriped muscles (those, for example, which make up the hollow tube-like structures of the stomach and intestines and blood vessels). The muscles are thus not only organs of response—they are sense organs as well. You will see as we proceed that the last two systems play a tremendous rôle in the behavior of the human being. Many of our most intimate and personal reactions are due to stimuli set up by tissue changes in our striped muscles and in our viscera.

HOW TRAINING ENLARGES THE RANGE OF STIMULI

One of the problems of behaviorism is what might be called the ever-increasing range of stimuli to which an individual responds. Indeed so marked is this that you might be tempted at first sight to doubt the formulation we gave above, namely, that response can be predicted. If you will watch the growth and development of behavior in the human being, you will find that while a great many stimuli will produce a response in the new-born, many other stimuli will not. At any rate they do not call out the same response they later call out. For example, you don't get very far by showing a new-born infant a crayon, a piece of paper, or the printed score of a Beethoven symphony. In other words, habit formation has to come in before certain stimuli can become effective. Later we shall take up the procedure by means of which we can get stimuli which do not ordinarily call out responses to call them out. The general term we use to describe this is "conditioning." Conditioned responses will be more fully gone into in chapter II.

It is conditioning from earliest childhood on that makes the problem of the behaviorist in predicting what a given response will

¹ In chapter III we shall see how sense organs are made up and what their general relation is to the rest of the body.

be so difficult. The sight of a horse does not ordinarily produce the fear response, and yet among almost every group of thirty to forty people there is one person who will walk a block to avoid coming near a horse. While the study of behaviorism will never enable its students to look at you and predict that such a state of affairs exists, nevertheless if the behaviorist sees that reaction taking place, it is very easy for him to state approximately what the situation was in the early experience of such a one that brought about this unusual type of adult response. In spite of the difficulty of predicting responses in detail we live in general upon the theory that we can predict what our neighbor will do. There is no other basis upon which we can live with our fellow men.

WHAT THE BEHAVIORIST MEANS BY RESPONSE

We have already brought out the fact that from birth to death the organism is being assailed by stimuli on the outside of the body and by stimuli arising in the body itself. Now the organism does something when it is assailed by stimuli. It responds. It moves. The response may be so slight that it can be observed only by the use of instruments. The response may confine itself merely to a change in respiration, or to an increase or decrease in blood pressure. It may call out merely a movement of the eye. The more commonly observed responses, however, are movements of the whole body, movements of the arm, leg, trunk, or combinations of all the moving parts.

Usually the response that the organism makes to a stimulus brings about an adjustment, though not always. By an adjustment we mean merely that the organism by moving so alters its physiological state that the stimulus no longer arouses reaction. This may sound a bit complicated, but examples will clear it up. If I am hungry, stomach contractions begin to drive me ceaselessly to and fro. If, in these restless seeking movements, I spy apples on a tree, I immediately climb the tree and pluck the apples and begin

to eat. When surfeited, the stomach contractions cease. Although there are apples still hanging round about me, I no longer pluck and eat them. Again, the cold air stimulates me. I move around about until I am out of the wind. In the open I may even dig a hole. Having escaped the wind, it no longer stimulates me to further action. Under sex excitement the male may go to any length to capture a willing female. Once sex activity has been completed the restless seeking movements disappear. The female no longer stimulates the male to sex activity.

The behaviorist has often been criticized for this emphasis upon response. Some psychologists seem to have the notion that the behaviorist is interested only in the recording of minute muscular responses. Nothing could be further from the truth. Let me emphasize again that the behaviorist is primarily interested in the behavior of the whole man. From morning to night he watches him perform his daily round of duties. If it is brick-laying, he would like to measure the number of bricks he can lay under different conditions, how long he can go without dropping from fatigue, how long it takes him to learn his trade, whether we can improve his efficiency or get him to do the same amount of work in a less period of time. In other words, the response the behaviorist is interested in is the commonsense answer to the question "what is he doing and why is he doing it?" Surely with this as a general statement, no one can distort the behaviorist's platform to such an extent that it can be claimed that the behaviorist is merely a muscle physiologist.

The behaviorist claims that there is a response to every effective stimulus and that the response is immediate. By effective stimulus we mean that it must be strong enough to overcome the normal resistance to the passage of the sensory impulse from sense organs to muscles. Don't get confused at this point by what the psychologist and the psycho-analyst sometimes tell you. If you read their statements, you are likely to believe that the stimulus can be applied today and produce its effect maybe the next day, maybe

within the next few months, or years. The behaviorist doesn't believe in any such mythological conception. It is true that I can give the verbal stimulus to you "Meet me at the Ritz tomorrow for lunch at one o'clock." Your immediate response is "All right, I'll be there." Now what happens after that? We will not cross this difficult bridge now, but may I point out that we have in our verbal habits a mechanism by means of which the stimulus is reapplied from moment to moment until the final reaction occurs, namely going to the Ritz at one o'clock the next day.

GENERAL CLASSIFICATION OF RESPONSE

The two commonsense classifications of response are "external" and "internal"—or possibly the terms "overt" (explicit) and "implicit" are better. By external or overt responses we mean the ordinary doings of the human being: he stoops to pick up a tennis ball, he writes a letter, he enters an automobile and starts driving, he digs a hole in the ground, he sits down to write a lecture, or dances, or flirts with a woman, or makes love to his wife. We do not need instruments to make these observations. On the other hand, responses may be wholly confined to the muscular and glandular systems inside the body. A child or hungry adult may be standing stock still in front of a window filled with pastry. Your first exclamation may be "He isn't doing anything" or "He is just looking at the pastry." An instrument would show that his salivary glands are pouring out secretions, that his stomach is rhythmically contracting and expanding, and that marked changes in blood pressure are taking place—that the endocrine glands are pouring substances into the blood. The internal or implicit responses are difficult to observe, not because they are inherently different from the external or overt responses, but merely because they are hidden from the eye.

Another general classification is that of *learned* and *unlearned* responses. I brought out the fact above that the range of stimuli

to which we react is ever increasing. The behaviorist has found by his study that most of the things we see the adult doing are really learned. We used to think that a lot of them were instinctive, that is, "unlearned." But we are now almost at the point of throwing away the word "instinct." Still there are a lot of things we do that we do not have to learn—to perspire, to breathe, to have our heart beat, to have digestion take place, to have our eyes turn toward a source of light, to have our pupils contract, to show a fear response when a loud sound is given. Let us keep as our second classification then "learned responses," and make it include all of our complicated habits and all of our conditioned responses; and "unlearned" responses, and mean by that all of the things that we do in earliest infancy before the processes of conditioning and habit formation get the upper hand.

Another purely logical way to classify responses is to designate them by the sense organ which initiates them. We could thus have a *visual unlearned response*—for example, the turning of the eye of the youngster at birth toward a source of light. Contrast this with a *visual learned response*, the response, for example, to a printed score of music or a word. Again, we could have a *kinaesthetic¹ unlearned response* when the infant reacts by crying to a long-sustained twisted position of the arm. We could have a *kinaesthetic learned response* when we manipulate a delicate object in the dark or, for example, tread a tortuous maze. Again, we can have a *visceral unlearned response* as, for example, when stomach contractions due to the absence of food in the 3 day old infant will produce crying. Contrast this with the learned or visceral *conditioned* response where the sight of pastry in a baker's window will cause the mouth of the hungry schoolboy to water.

This discussion of stimulus and response shows what material we have to work with in behavioristic psychology and why be-

¹ By kinaesthetic we mean the muscle sense. Our muscles are supplied with sensory nerve endings. When we move the muscles these sensory nerve endings are stimulated. Thus, the stimulus to the kinaesthetic or muscle sense is a *movement of the muscle itself*.

havioristic psychology has as its goal *to be able, given the stimulus, to predict the response—or, seeing the reaction take place to state what the stimulus is that has called out the reaction.*

IS BEHAVIORISM MERELY A METHODOLOGICAL APPROACH TO THE STUDY OF PSYCHOLOGICAL PROBLEMS, OR IS IT AN ACTUAL SYSTEM OF PSYCHOLOGY?

If psychology can do without the terms "mind" and "consciousness," indeed if it can find no objective evidence for their existence, what is going to become of philosophy and the so-called social sciences which today are built around the concept of mind and consciousness? Almost every day the behaviorist is asked this question, sometimes in a friendly inquiring way, and sometimes not so kindly. While behaviorism was fighting for its existence it was afraid to answer this question. Its contentions were too new; its field too unworked for it to allow itself even to think that some day it might be able to stand up and to tell philosophy and the social sciences that they, too, must scrutinize anew their own premises. Hence the behaviorist's one answer when approached in this way was to say, "I can't let myself worry about such questions now. Behaviorism is at present a satisfactory way of going at the solution of psychological problems—it is really a methodological approach to psychological problems." Today behaviorism is strongly entrenched. It finds its way of going at the study of psychological problems and its formulation of its results growing more and more adequate.

It may never make a pretense of being a *system*. Indeed systems in every scientific field are out of date. We collect our facts from observation. Now and then we select a group of facts and draw certain general conclusions about them. In a few years as new experimental data are gathered by better methods, even these tentative general conclusions have to be modified. Every scientific field, zoölogy, physiology, chemistry and physics, is more or less in a

state of flux. Experimental technique, the accumulation of facts by that technique, occasional tentative consolidation of these facts into a theory or an hypothesis describe our procedure in science. Judged upon this basis, behaviorism is a true natural science.