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PSYCHOLOGY WITHOUT CONSCIOUSNESS.

Behavior: An Introduction to Comparative Psychology. By Prof. J. B. Watson. Pp. xii+439. (New York: H. Holt and Co., 1914.) Price 1.75 dollars.

BY the nature of its subject-matter, psychology has been more handicapped than any other science as regards both methods and aims. This is a truism which may qualify the following statement of Prof. Watson: "Psychology has failed signally during the fifty odd years of its existence as an experimental discipline to make its place in the world as an undisputed natural science." He is quite justified in saying that psychology "as it is generally thought of, has something esoteric in its methods. If you fail to reproduce my findings, it is not due to some fault in your apparatus or the control of your stimuli, but it is due to the fact that your introspection is untrained. . . . If you can't observe 3—9 states of clearness in attention, your introspection is poor. If, on the other hand, a feeling seems reasonably clear to you, your introspection is again faulty. You are experiencing too much." This kind of psychological method has been particularly exploited by the Germans. Again, the science has almost evaporated "in speculative questions concerning the elements of mind, the nature of conscious content (*e.g.*, imageless thought, attitudes and *Bewusstseinslage*, etc.)"; a practical result is that the concept of sensation is "unusable, either for the purpose of analysis or that of synthesis." Generally, the axiom that psychology is a study of the phenomena of consciousness has been thoroughly mischievous; no data have been accorded any importance except in so far as they throw light upon conscious states. Compromises have been attempted; a line has been tentatively drawn where "associative memory" in animals begins; consciousness has been assumed to commence where "reflex and instinctive activities fail properly to conserve the organism," or "whenever we find the presence of diffuse activity which results in habit-formation, we are justified in assuming consciousness." Not the least result of such pre-suppositions is the divorce of the study from practical human interests.

The new school of what Prof. Watson terms "behaviorism" has, as his volume well shows, thrown overboard much conceptual lumber of the sort sketched above, and comparative psychology is able to act untrammelled. "It is possible to write a psychology (as the 'science of behavior') and never go back upon the definition; never to use the terms consciousness, mental states, mind, content, will, imagery, and the like. . . . It can be done in terms of stimulus and response, in terms of habit formation, habit integration, and the like." The starting-point is the observable fact that "organisms, man and animal alike, do adjust themselves to their environment by means of hereditary and habit equipments; . . . . certain stimuli lead the organisms to make the responses." Thus, with the elimination of investigational reference to consciousness, mental state, or imagery (as previously such reference to soul and mind (its successor) had been discredited), the barrier between psychology and objective sciences is removed; "the findings of psychology become the functional correlates of structure and lend themselves to explanation in physico-chemical terms." "The behavior of man and the behavior of animals must be considered on the same plane."

This latest reforming of the comparative psychological front may be considered strategically sound, and should lead to advances along all the line. Little has been accomplished yet, but the resulting clearness of objective is already promising. For instance, Prof. Watson's discussion of the differences between man and animal; convolution of brain surface probably means nothing *per se*. Wundt assumed that the apperception centres resided in the frontal lobe; for this view there is no probability, but since the frontal lobe "was the last brain tissue put on in evolution, and is to be found chiefly in man, we have hastened to assign to its care all those functions in which man is thought chiefly to excel the brute." The break between man and brute is "the lack of well-developed speech mechanisms in animals and the consequent lack of *language habits*. . . . The lack of language habits forever differentiates brute from man."

The general reader and the beginner in comparative psychology will find this impartial and well-reasoned volume invaluable. Some of the best matter is the result of the author's own experiments, *e.g.*, with terns, monkeys, and rodents.

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WATER, SEWAGE, AND FOOD.

(1) *The Chemical Examination of Water, Sewage, Foods, and other Substances.* By J. E. Purvis and T. R. Hodgson. Pp. 228. (Cambridge: At the University Press, 1914.) Price 9*s.* net.

(2) *Water Supplies: their Purification, Filtration, and Sterilisation. A Handbook for the Use of*