Finally, we may mention another line of evidence which strongly supports the chromosome interpretation of heredity. We refer to non-dijunction, in which the abnormal behavior of the sex chromosomes in the maturation of the egg can be correlated with an identical abnormal distribution of all sex linked factors.

The points here cited are only a few of the many to be found in this book, but they will serve to illustrate the more important phases of Mendelian heredity which are now receiving the attention of geneticists. The student of Comparative Psychology must necessarily be interested in these problems, for sooner or later he will have to deal with them.

J. T. PATTERSON

UNIVERSITY OF TEXAS

The Investigation of Mind in Animals. E. M. SMITH. Cambridge: Cambridge University Press, 1915. Pp. ix+194.

This volume was written to present "a brief account of the modes of procedure employed by Animal Psychology, its aims, trend and the general nature of the results hitherto obtained."

The first chapter on protozoan behavior is concerned mostly with the reactions of paramecia. The tropistic and the trial and error interpretations are contrasted. Reversal of reaction by change in the physiological condition or by a mere variation in the intensity of the stimulus counts in favor of the trial and error theory, which alone admits of "plasticity."

Retentiveness, habit formation, associative memory and sensory discrimination are reviewed in the second and third chapters. Some of the familiar studies on learning the maze, and auditory and visual discrimination are outlined, and a reference is made to the work of Pawlow.

In chapter four the author emphasizes that in an instinct we have an impulse and the satisfaction of the impulse. The impulse constitutes the instinct, and, in the absence of a proper stimulus, it may seek satisfaction until a suitable object is encountered. An instinct is neither a simple reflex nor a mere chain of reflexes. The effects of practice and of structural maturity are considered.

The chapter on *Homing* treats mainly of the travels of ants, bees, and pigeons. After a review of several studies of *Imitation*, the conclusion is reached that "no case has, as yet, been recorded which cannot, in the last resort, be adequately analyzed on the 'stimulus and response' basis, the object or situation, either in itself or through

association, suggesting the appropriate reaction." The range of attention may be narrowed to the vital part of the apparatus. Neither learning from "putting through" nor imitative behavior can be a criterion of intelligence. With the possible exception of the method of delayed reactions, no test as yet applied demonstrates "that animal learning is anything more than a process of association, on the perceptuo-motor level. The one point that clearly emerges is the need for new methods of inquiry."

The book as a whole is a rather brief survey of the topics indicated with little that is original in its treatment. It should be added that this is just what it pretends to be. It would probably be of use in a short course, and the general reader will doubtless find it worth while.

JOHN F. SHEPARD

UNIVERSITY OF MICHIGAN

The Study of Human Behavior. R. M. YERKES. *Science*, 1914, 39, 625-633. *A Study of the Crow Corvus Americanus Aud. by the Multiple Choice Method.* C. A. COBURN & R. M. YERKES. *J. of Animal Behav.*, 1915, 5, 75-114. *A Study of the Behavior of the Pig Sus Scrofa by the Multiple Choice Method.* R. M. YERKES & C. A. COBURN. *J. of Animal Behav.*, 1915, 5, 185-225. *The Ideational Method of Studying the Behavior of Man and Other Animals.* R. M. YERKES. *Psychol. Bull.*, 1915, 12, 330-331. *Methods of Studying Ideational Behavior in Man and Other Animals.* R. M. YERKES. *Psychol. Bull.*, 1916, 13, 93-94. *The Mental Life of Monkeys and Apes: A Study of Ideational Behavior.* R. M. YERKES. *Behav. Mon.*, 1916, 3, no. 1, Pp. iv+145.

The above list includes all references to date on the Multiple Choice method of studying behavior. Inasmuch as this material lays down the essentials of purpose, method and interpretation as conceived by the authors, a comprehensive review and criticism cannot be amiss.

The Multiple Choice method presents the subject tested several series of simultaneous visual stimuli from which he is to select one stimulus. Success is rewarded and failure is punished. The experimenter so arranges the presentation of stimulus series from trial to trial that the stimulus to be selected bears (for the experimenter) a certain constant relationship to the whole. Thus, to be concrete, in the work here reviewed, 2 pigs, 2 crows and 3 primates