separate time of the first, second, third, etc., trials. Such a method of presentation makes comparison with the work of others impossible. Likewise, the paper presents all *times* in seconds instead of in minutes and in decimals thereof. It is exceedingly difficult to get any immediate meaning out of 670 seconds, 810 seconds, etc. The decimal and metric systems were long ago adopted for all scientific purposes, and in the reviewer's opinion, it is wise to adhere to them in researches on animal behavior.

J. B. W.

The Mental Life of the Domestic Pigeon. JOHN E. ROUSE.

Harvard Psychological Studies. Vol. II., 1906, 581-613.

This paper reports an 'investigation of certain emotional and associative processes of the domestic pigeon.' The writer's work on the emotional processes appeared in the *Jour. Comp. Neurol. and Psychol.*, 1906, III., 161-162. This notice will, on that account, deal only with the associative processes of the pigeon discussed in the paper.

After a brief review of the literature of the subject, the writer, in characteristically ambiguous and involved phraseology states his purpose 'to determine the sense-data which the process involves, its method of formation (with due regard to social conditions), its rapidity, permanence, and modifiability, and also its probable degree of complexity. Material contributing to the subject was secured by observing the behavior of the animal when seeking to obtain food by overcoming such obstacles as labyrinths with wire passages, and latches, when the food was left in view or by finding it when out of sight." Tests upon the formation of sound associations were made, and also upon the possibility of learning by imitation. Considerable attention was paid to tests as to the influence of position, color and form, and the possibility of the formation of associations by employing such means.

In general, the investigator states that pigeons form associations only by the trial and error method, the learning curve being similar in contour to those reported of other animals. "Visual, acoustical, probably tactual, and certainly organic data, are the principal sensory factors of such associations." These are fairly permanent but easily modified.

"While these birds seem mentally inferior to English sparrows and to various mammals which have been tested in a similar manner, they are capable of numerous ready adjustments. They discover circuitous labyrinth passages, they learn to manipulate latch apparatus when adapted to their natural habits and conveniently placed, and they

easily reach their food by depending upon the position, color, or form of the box containing it." There is nowhere evidence of learning by imitation.

The paper is valuable as pioneer experimental work upon pigeons, but the reviewer feels that many of the tests were not well enough controlled to justify the conclusions drawn from their results.

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The Imitative Tendency of White Rats. CHARLES SCOTT BERRY.
Jour. Comp. Neur. and Psychol., XVI., 1906, 333-361.

The purpose of this study is to determine to what extent rats learn by imitating one another.

Ten rats, four of which were black and white, the remainder albino, were used in the series of experiments with problem boxes requiring more or less manipulation. In each case, the solution of the problem consisted in obtaining freedom from the box in order to reach food outside. Seven such boxes were employed, though the conclusions seem to have been mainly drawn from a consideration of results with one box, which involved the pulling of a bent wire with the teeth and forepaws.

An untrained rat was put into the box and if he failed to get out within a certain length of time, a rat trained to the solution of the problem was also put in. The trained rat left the box at once, and the untrained rat, by 'seeing' the act performed 'learned' to accomplish the result. The writer states that the untutored rat 'watched' the other, and that 'when one followed another, it was with a knowledge of the end to be gained by that following.'

While the untrained rats undoubtedly learned to leave the box, the experimenter has not shown that the learning process was one of voluntary imitation. Furthermore, he has not shown the rat to be capable of such acuity of vision as he assumes. In view of the experiments of Small and of Watson which render it highly problematical whether the white rat uses vision for accurate orientation, definite proof of this point is indispensable. The contention for the presence of the function of voluntary imitation in these animals needs to be supported by a much more varied series of facts than is offered by Berry before it can be accepted by the majority of psychologists.

Owing to a lack of careful summarization and to too much condensation of the experimental material, such facts as are offered are inadequately put forth.

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