

origin to instincts. The main drawback to this Lamarckian theory is the absence of evidence that acquired characters may be inherited, but this difficulty was usually slurred over until Weismann's essays made this easy-going procedure impossible.

Darwin recognized a twofold origin of instincts. On the one hand, he admitted the possibility of the Lamarckian interpretation:—Habits are established; cerebral changes ensue; it may be that the inheritance of these is the explanation of some instincts. But it cannot be the explanation of all, he said, for every one knows that the non-reproductive worker-bees and worker-ants have instincts which are quite foreign to their parents—the males and queens. Thus, there must be another explanation of instincts, and this Darwin found in the action of natural selection on *congenital* variations.

One of the most prominent names in the history of animal psychology is that of George John Romanes (1848–1894), for, although there is legitimate difference of opinion as to the cogency of some of his conclusions, he did more perhaps than any other to raise the subject into dignity, and to place it on a secure biological basis. He approached the study from two sides, as a physiologist and as an evolutionist, for his earlier work was concerned, on the one hand, with the nervous and locomotor activities of medusæ, star-fishes, and sea-urchins; and on the other hand, with a critical study of Darwinism. In his first published work dealing with animal psychology (*Animal Intelligence*, 1881) he set forth the reliable data, partly from his own observation, largely from those of others, and sifted the precise from the anecdotal. In his *Mental Evolution in Animals* (1883) he developed his theory of instinct, distinguishing *primary* instincts, which arise, apart from intelligence, in the course of natural selection, and *secondary* instincts, which arise by the habituation and inheritance of activities originally intelligent. In the same volume he began the comparison of the mental life of man and animals, which he further developed in a third work on *Mental Evolution in Man* (1888).

Darwin's
Position.

The Work of
Romanes.