

prototypes, which latter arose out of inorganic matter by spontaneous generation. But none of them succeeded in placing this fundamental element of the doctrine of descent in relation with some cause, nor in satisfactorily explaining the transformation of organic species by the true demonstration of its mechanical antecedents. Charles Darwin was the first who solved this most difficult problem, and this forms the broad gulf which separates him from his predecessors.

The special merit of Charles Darwin is, in my opinion, twofold: in the first place, the doctrine of descent, the fundamental idea of which was already clearly expressed by Goethe and Lamarck, has been developed by him much more comprehensively, has been traced much more minutely in all directions, and carried out much more strictly and connectedly than by any of his predecessors; and secondly, he has established a new theory, which reveals to us the natural causes of organic development, the acting causes (*causæ efficientes*) of organic form-production, and of the changes and transformations of animal and vegetable species. This is the Theory of Natural Selection (*selectio naturalis*).

When we reflect that almost the whole science of Biology, before Darwin's time, was elaborated in accordance with the opposite views, and that almost all zoologists and botanists regarded the absolute independence of organic species as a self-evident inference from the results of all study of forms, we shall certainly not lightly value the twofold merit of Darwin. The false doctrine of the constancy and independent creation of individual species had gained such high authority, was so generally recognized, and was, moreover, so much favoured by delusive