

development. This is clear, among other things, from the following passage: "The triumph of physiological metamorphosis manifests itself where the whole separates and transforms itself into families, the families into genera, the genera into species, and then again into other varieties down to the individual. This operation of Nature goes on *ad infinitum*; she cannot rest inactive, but neither can she keep and preserve all that she has produced. From seeds there are always developed varying plants, exhibiting the relations of their parts to one another in an altered manner."

Goethe had, in truth, discovered two great mechanical forces of nature, which are the active causes of organic formations, his two organic formative tendencies—on the one hand the conservative, centripetal, and internal formative tendency of Inheritance or specification; and on the other hand the progressive, centrifugal, and external formative tendency of Adaptation, or metamorphosis. This profound biological intuition could not but lead him naturally to the fundamental idea of the Doctrine of Filiation, that is, to the conception that the organic species resembling one another in form are actually related by blood, and that they are descended from a common original type. In regard to the most important of all animal groups, namely that of Vertebrate animals, Goethe (in 1796!) expresses this doctrine in the following passage: "Thus much, then, we have gained, that we may assert without hesitation that all the more perfect organic natures, such as fishes, amphibious animals, birds, mammals, and man at the head of the last, were all formed upon one original type, which varies only more or less in parts which are none the less permanent, and still daily changes and modifies its form by propagation."