

surroundings, etc.), and secondly, those variations which arise *indirectly* from habit and practice, from accustoming themselves to definite conditions of life, and from the use and non-use of organs. The latter influences have been set forth especially by Lamarck as important causes of the change of organic forms, while the former have for a very long time been recognized as such more generally.

The sharp distinction usually made between these two groups of cumulative adaptation, and which even Darwin maintained, disappears as soon as we reflect more accurately and deeply upon the real nature and causal foundation of these two, apparently very different, series of adaptations. We then arrive at the conviction that in both cases there are always two different active causes to be dealt with: on the one hand, the *external influence* or *action* of adaptative conditions of life, and on the other hand, the *internal reaction of the organism* which subjects and adapts itself to that condition of life. If cumulative adaptation is considered from the first point of view alone, and the transforming influences of the permanent external conditions of life are traced to those conditions solely, then the principal stress is laid unduly upon the external factor, and the necessary internal reaction of the organism is not taken into proper consideration. If, on the other hand, cumulative adaptation is regarded solely in relation to its second factor, and the transforming action of the organism itself, its reaction against the external influences, its change by practice, habit, use, or non-use of organs, is put into the foreground, then we forget that this reaction is first called into play by the action of external conditions of existence. Hence it seems that the distinction made between these two