

deserts, to have a heavy coat of gray or white woolly hairs. In some cases it has been actually proven that the production of the woolly hairs is directly induced by the hot climate and that plants covered with dense hairs will drop these if transplanted into a climate of greater humidity.

The important influence upon the general configuration of plants exercised by the environmental conditions leads naturally to the practical question: "Is it possible to produce, by changing the climatic conditions, new types or new plant species?" If a species is defined as a unit, provided with certain constant characters, we must answer that, as far as our experience shows, it is not possible to produce new plant species by changing the outer conditions; no facts exist to support the opinion of Lamarck as to the hereditary quality of acquired characters in plants.

The aforesaid variations are all produced by the influence of different external factors upon individuals. When speaking of "variations" in ordinary parlance, however, we usually think of something quite different. We speak of the great variation in roses and apples, by which we mean that there occur a great number of types in apples and roses. The forms which generally are termed individual variations do not refer to the changing of a certain type or a certain individual, but simply to the existence of types possessing different characters. When speaking of "variation" people have been inclined to associate with the term the idea that something is changing. When speaking of individual variation within a species they ordinarily assume that a given individual can become permanently altered in character in one direction or another, that, in fact, a certain main type can produce a number of different, constant varieties. Such a conception, however, leads to confusion and to a misinterpretation of the phenomena connected with the species idea and the proper idea of variation.

When we speak of the apple species, for instance, we must remember that the word species is only an abstract which we use for all kinds of apples. And when we say that this species or that species is very variable, we simply mean that it consists of a number of distinct types.

The practical importance of "individual variation" in a plant species is now clear. It simply means that nature herself has provided for a great number of concrete types which, from a practical point of view, are of very different value. And, when we say that we use the individual variation of a species for practical purpose, we really mean that we use the life-types or bio-types of the species in question.