

interesting sentences which have a bearing on vegetable morphology, these were only guesses at truth, and must not be taken too seriously. Thus, to quote three examples given by Dr. Masters, Aristotle is reputed to have said, "As a general rule, a plant possesses potentially both root and stem in every part"; Theophrastus said, "Some organs exist only according to analogy, and others, though the same, yet exist in a different manner"; and Nicolas of Damascus ventured the hypothesis that "leaves are properly speaking fruits". But it would be absurd to see in the last sentence, for instance, any prevision of a modern theory, that the vegetative leaf is derived from a sporophyll. There was practically no vegetable morphology until we approach the time of Goethe, who was the first to use the word.

In this chapter we propose to consider two of the greatest modern morphological achievements in botany—the doctrine of metamorphosis, and the recognition of alternation of generations.

For many years morphological inquiry centred around the word metamorphosis, which Goethe defined (1790) as "the operation by which one and the same organ assumes various forms".

Metamorphosis in Flowering Plants.

Unfortunately, however, the word was not always used in the same sense; thus Linnæus used it quite loosely, sometimes in reference to the changes observed in normal development; sometimes in reference to the observable changes which are seen, for instance, when a wild flower becomes "double" under cultivation; and sometimes in other ways. But the ambiguity of most importance is this: (a) some used the word with definite *material* content to describe structural changes now observable, or supposed to have been observable in the course of the ages, *e.g.* the change of a vegetative leaf into a flowering leaf, or *vice versa*; (b) others used the word with a merely *idealistic* meaning, being content with convincing themselves that vegetative leaves and floral parts could be related *in thought* as metamorphoses of the idea which the supposed "archetypal" plant expressed.