

The Structure of the Flower

Floral Morphology:

a New Outlook, with Special Reference to the Interpretation of the Gynæceum. By E. R. Saunders. Vol. 1. Pp. viii + 132. (Cambridge: W. Heffer and Sons, Ltd., 1937.) 3s. 6d. net.

THE history of plant morphology shows a number of more or less distinct phases. The earliest phase was one of description, including the recognition of morphological categories and the introduction of terms. Later the idealistic concepts of Goethe laid the foundation of much that is still orthodox. With the advent of Darwinism, there commenced a long period of explanation in terms of use and, on the whole somewhat later, attempts to trace the evolution of organs. At the present time, all these earlier phases seem to be revived in a new interest in plant structure, with the introduction of certain new methods and theories.

The vast majority of existing seed plants are characterized by possessing flowers clearly marked off from the vegetative parts of the plant body. The evolutionary history of the flower is still obscure and, even as a preliminary to research on this problem, there is an urgent need for clarification in our knowledge of the morphology of its component parts. Botanists are not all agreed as to whether it be a simple stem bearing modified leaves, a modified branch system, or essentially a structure *sui generis*. All parts have been subjected to detailed and comparative examination: perianth, androecium, and gynæcium (gynæceum). The composition of the latter has, however, been the subject of most recent research. The numerous papers of Miss E. R. Saunders have made botanists familiar with the theory of carpel polymorphism. None will deny the importance of her work in directing attention to the many peculiarities of arrangement, anatomy, and behaviour to be found in the ovaries and their associated parts in both monocotyledons and dicotyledons. In a first volume on floral morphology, Miss Saunders summarizes her views on the architecture of the flower, with special reference to the gynæcium, in an introduction, and outlines on this basis the flower structure of thirty-nine families. A student unacquainted with the new concepts would probably find the book somewhat difficult reading, partly because of the very few illustrative drawings. The size, founts, general format, and low price of the book are all excellent, and it is to be hoped it

will be widely read and used, especially as a guide to laboratory work by teachers and students. If it gives stimulus to the detailed dissecting of flowers and a study of their anatomy in academic institutions, it will have fulfilled a most important and urgent need.

The special theory of carpel polymorphism, which is the central theme of the book, is in accordance with the view that in true apocarpous the individual ovary is formed of a single carpel, which arises as a separate structure, but that in syncarpous and pseudo-apocarpous forms it is composed of two kinds of carpels, sterile and fertile". Two main types of carpels are distinguished: valve and consolidated. The former shows pinnate venation, marginal ovules (when fertile), and when present alone generally forms an apocarpous gynæcium. The consolidated carpel has a pair of strongly developed bundles close to the mid-line (with or without a median bundle). The ovules are usually borne on either side of the mid-line, and the consolidated carpel is, in syncarpous ovaries, generally fertile. It may be contracted (solid carpel) or expanded (pseudo-valve carpel).

Though based very largely on the number and relationship of the vascular strands in the flower, it is claimed that the principles outlined "dispose of many morphological fictions, including hypothetical splittings and unions, hypothetical suppressed whorls, 'commissural' stigmas, 'false' partitions, 'free central' placentation and epigyny, as traditionally interpreted, while 'parietal' and 'axile' placentation and 'septicidal' dehiscence now have an altered significance. They provide an explanation of obdiplostemony, various forms of fruit dehiscence, and many other hitherto unexplained features".

There is no doubt that, considering the evidence as a whole, Miss Saunders has presented a strong case. It is probable that not all her interpretations will be accepted by future investigators: but they will have to be examined from the point of view of the evidence she has provided, even if other viewpoints be also considered valid. The evidence is particularly strong in the *Rhacadales* (including the *Cruciferae*) and in the *Liliaceae*. Some of the families in which it is probably more difficult to provide an acceptable interpretation of the structure of the gynæcium on the basis of carpel polymorphism, such as the *Leguminosae*, are not included in this volume.

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