

REVIEWS

- (a) *Chromosome Botany*. C. D. Darlington. Pp. viii + 186, 36 text figures. Allen and Unwin, Ltd., London, 1956. 16s.
- (b) *Chromosome Atlas of Flowering Plants*. C. D. Darlington and A. P. Wylie. Pp. xix + 519. Allen and Unwin, Ltd., London, 1955; 60s.

The two books under review are the successors of the *Chromosome Atlas of Cultivated Plants*, by Prof. Darlington and Dr. Janaki Ammal, which appeared in 1945. In its new form, the work consists of a Chromosome Atlas, which is in effect a list of chromosome numbers, now extended to cover all the Gymnosperms and Angiosperms which have been investigated, and a short book on Chromosome Botany, which is a development of the introductory essay of the earlier work. The new books are much superior in format and appearance to the old, though the separation of the essay from the list is not entirely an advantage.

The arrangement of the atlas is based on that of Hutchinson with some minor modifications. 241 out of 332 families are represented, and over 15,000 species in 2,500 genera are included. To save space, many of the larger genera, with the greatest constancy of numbers, such as *Quercus* and *Aquilegia*, have been abbreviated, but the necessary references are given. The larger families and genera are appropriately divided into tribes or sections. Each entry has its scientific name, popular name, chromosome number, and reference, the use of the plant is indicated, and its geographical distribution is summarised. There is a full bibliography and a good index.

It is clear that the work of compiling the *Atlas* has been done carefully and critically. Its value to the taxonomist and horticulturalist is obvious, but it is of no less value to the student of evolution. It is unfortunate that it should be so expensive, as this will limit its usefulness. For a work of this type, which is bound to become out of date in a relatively few years, there is much to be said for a low-priced edition even if this means paper and binding of inferior quality.

In the second book under review, the book on Chromosome Botany, Prof. Darlington, in effect, views the material of the *Atlas* in the light of genetic principles and draws conclusions about evolution. He points out that the flowering plants are better understood than any other large group of plants or animals with regard to their ecology and geographical distribution, their breeding behaviour and genetics and the evolution of their chromosomes. In particular, the crop plants, which man has developed and which have in recent years been so extensively studied by genetical methods, provide unique material for the student of evolution.

The first chapter deals with the chromosomes themselves, and the variation in their form and behaviour which can be observed. The second is concerned with the bearing of chromosome studies on the problem of systematic groups, and emphasises the dynamic view of the species to which this leads. The third chapter gives examples of the valuable results that can come from combined cytological and ecogeographical investigation of groups of related plants, as for example in *Rhododendron* and *Oenothera*; and the fourth chapter shows how knowledge of the chromosomes can throw light on the way in which evolution has occurred, on phylogeny, and on rates and modes of evolution. The two concluding chapters, on cultivated and ornamental plants, are of perhaps the most general interest, not only from the evolutionary point of view, but also because these plants are part of our historical and cultural background and tell us a good deal about how and where human civilisation has developed. The brief biographies of the garden flowers, such as hyacinth and daffodil, are well done.

In attempting to summarise, in all its bearings, the subject of Chromosome Botany, the author has undoubtedly succeeded remarkably well. But many of his arguments would be more convincing if they were less condensed. To anyone not so familiar as the author with the original literature, the line of thought is often difficult to follow; and the text has always to be read critically, as there has generally been no space for detailed discussion of individual problems or alternative interpretations. The practice of omitting specific references from the text, though allowing a smoother flow in reading, makes it more difficult to pin down specific points. The result is a book which will be difficult for the amateur who does not already know a good deal about the subject. For the more experienced reader, the book should be most stimulating. It illuminates in an original way the whole story of the evolution of the flowering plants, and it abounds with suggestions and clues which point the way to further investigation and exploration.

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Bau und Leben der Blumen. Emil Werth. Pp. 204, 46 figures. Ferdinand Enke Verlag, Stuttgart, 1956; DM. 20 (cloth-bound), DM. 18 (stitched).

Professor Werth in this book attempts a solution of that old but still formidable problem, with which such notable names as Delpino, H. Müller and P. Knuth are associated, of how the protean and almost endless variety of flower-forms can be classified on a biological basis. Professor Werth claims to have found the basic principles that enable this to be done, and describes and illustrates sixteen classes in accordance with his views.

Even to summarise his system would here demand too much space; the book itself is a succinct distillation of a dauntingly large body of facts and observations. He considers that the primary, primitive flowers are Napfblumen, "basin-flowers," open, with freely exposed nectar, such as are commonly found in the Ranales. From these, various specialised forms have arisen, involving either contraction of the area occupied by the stamens and styles, often also involving a companulate or tubular shape of the flower; or else elongation and prominence of the stamens and styles in relation to the perianth; or else zygomorphy in various ways. These forms lead on to further specialisation involving temporary trapping of the pollinating visitor, and to reductions through aggregation of the individual flowers and diminution in size, and through loss of nectar to wind and water pollination.

There is a detailed discussion of bird-pollination, with a list (surely very incomplete) of genera and species so pollinated, showing the remarkable preponderance of red or vivid orange in their flowers; and an inevitably speculative account of the evolution of the various flower-forms described by Professor Werth.

This is a stimulating book, based on long experience and much personal observation both in the tropics and temperate regions. It is probable that intermediate forms exist connecting most of his classes, but that they are not thereby necessarily invalidated. It is certain that this book will help to clarify our ideas of flower-forms.

If this book is reprinted the scientific names should be re-checked and the too numerous misprints corrected.

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