

A Guide to Plant Genetics

Recent Advances in Plant Genetics

By Dr. F. W. Sansome and Dr. J. Philp. Second edition, revised and rewritten by Dr. F. W. Sansome. Pp. xii + 412. (London: J. and A. Churchill, Ltd., 1939.) 18s.

WHEN this book first appeared, it filled a gap by providing a valuable summary of the more modern aspects of plant genetics. The new edition, which has been revised and partly rewritten by Dr. Sansome, preserves the main features of the previous one. There is an entirely new chapter on variegation and chimeras, and the first two chapters have been rearranged with considerable gain in coherence and clarity. Although not designed as a text-book, and in spite of the limitations imposed by the authors in their preface, it forms a very satisfactory introduction for the student of genetics. Through a logical sequence it succeeds in giving a proper perspective of the principles of modern genetics. The new edition should be even more useful than the first.

Within the limits set, the student of genetics and the general biologist have a very fair guide to inheritance in plants. But the field of study is enormously wide and varied and it is obviously impossible to give the substance of every recent addition to knowledge of it within the limits of one book. The student is aided by a bibliography containing about 1,500 titles and a "Key to Literature" in which the more important papers and review summaries are classified under subject headings. By means of the "Key" the uninitiated can rapidly trace the literature on, for example, twin seedlings, cotton genetics or chromatid segregation.

The predominant role in modern genetics of the cytological method is reflected in this book. Nuclear behaviour is described first, the results of pedigree breeding afterwards. This applies to each of the sections dealing with the broad mechanical aspects of heredity, namely segregation, linkage, polyploidy and structural change. The correlation achieved is rather better than that in the previous edition.

Attention is directed also towards physiological aspects of genetics. A consideration of factor interaction leads on to a useful discussion of the biochemical work on flower pigments. Later we are introduced to the balance theory of gene action and interaction.

The continued omission of any treatment of selection or of population mechanics is to be regretted. These form by far the best introduction to a study of evolution, only specialized aspects of which are covered in the present book. The evolutionary approach is principally through the results of interspecific hybridization and in relation to polyploidy and structural hybridity (especially as in *Oenothera*).

The chapter on the constitution of the gene now includes sections on the position effect, gene size estimations and the effects of X-rays. Somatic crossing-over and mosaicism in maize endosperms are also given a place here, but scarcely seem at home with the rest of the company. There is no mention of reverse mutation, and the account of the effects of X-rays is very defective and inaccurate. It is without a reference to the contributions of Timoféeff-Ressovsky, Zimmer and Delbruck on the mechanism of spontaneous and radiation-induced mutation. They have shown that a spontaneous mutation must be regarded as a chance chemical change which has a very low reaction rate and consequently a very high van t'Hoff coefficient.

A few errors have crept in. The most serious is a confusion (p. 18) between character and factor. The statement "that the immediate products of meiosis are qualitatively different in respect of one pair of alternative (allelomorphic) characters" is clearly unsound. Moreover, it contradicts the (correct) statement on p. 16 "that the chromosomes carry determiners . . . which control the transmission and behaviour of inherited characters". This tendency to a looseness of phraseology sometimes leads to an untrue statement. For example, that "Beaded wing in *Drosophila* is a dominant lethal" (pp. 69 and 275). Two of the constitutions for linkage in autotetraploids (p. 192) are wrong, namely those for asymmetrical coupling and for triplex coupling.

The final chapter evaluates the newer work on genetics. Further attack on the nature and action of the gene seems likely to lead more and more into physiological by-ways. No one can predict how advances will be made; but it is interesting to reflect that our present understanding of gene action has come from such varied experiments as the implanting of *Drosophila* eye-buds into larval abdomens, the crossing of radishes with cabbages and the regeneration of diploid moss-plants from injured capsules. D. G. CATCHESIDE.