though the insect and mite enemies of thrips pest species are numerous few seem to give timely and dependable control. A general evaluation of the extensive tabulations of miscellaneous records of these relationships would have been helpful to the reader seeking to place thrips in their proper perspective.

The omissions are few and minor. Some thrips do feed on roots as well as most other plant parts. With several hundreds of host plants known, it is not strange that such plants as cacti, succulents, hollyhock, pyracantha, and toyon should be omitted. References to many biological studies on agriculturally injurious species of thrips, as well as on species that attack nursery plants and flower seeds, that have been reported in trade journals and experiment station publications obviously had to be omitted. The dispersal of thrips has taken place by rafting as well as by wind currents. From the compilation of distributional records presented, it is difficult to visualize the numbers and diversity of thrips in relation to latitude or biogeographic zones.

This book does very well what the author set out to do—condense "many valuable snippets of published and unpublished information and combine them with major contributions before the task becomes too daunting." However, in traversing the neatly stacked rows of known facts concerning these tiny insects, one hopes for, but does not find, a general summary of their attributes and their place in the insect world.

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Aneuploidy in Plants

Cytogenetics of Aneuploids. GURDEV S. KHUSH. Academic Press, New York, 1973. xiv, 302 pp., illus. $17.50.

The cytogenetics of aneuploidy is a very specialized subject of both theoretical and practical importance. While the doubling of the entire chromosome complement of a plant usually has little effect on fertility, addition of a single chromosome can result in very drastic changes to the phenotype and lead to sterility. On the other hand it is possible to replace a chromosome of one species by that of another (a so-called substitution line) and obtain a modified but often viable phenotype. All these manipulations permit us to discover what effect chromosomes as cellular organelles have on the phenotype and to learn more about interactions among chromosomes and the genes they carry.

Because aneuploidy is a specialized aspect of cytogenetics usually treated cursorily in textbooks, Gurdev Khush undertook to write a textbook solely on aneuploids. It was his hope that the book would (i) supplement standard cytogenetics texts for use in advanced courses, (ii) serve as a reference source for research workers and teachers, and (iii) bridge the gap between plant and animal cytogenetics. The book attains the second objective adequately, the first poorly, and the third not at all.

The greatest value of the book lies in the exhaustive and comprehensive review of the literature of plant aneuploidy. Almost every conceivable aspect has been reviewed. There is a bibliographical list of 25 pages with over 600 references, from Blakeslee's first paper on *Datura* to the latest paper on protein electrophoresis of aneuploids. On the other hand the subject is presented in a highly descriptive fashion, with a possible overemphasis on the technical aspects. As a result the book is hard to read, and the reader has to be prepared to skip over a great deal of very technical and specialized material in order to get an overview of the field. For example, the first chapter after a very brief historical introduction presents a page and a half of definitions of terms followed by five pages of discussion on the most adequate terminology for aneuploids. This chapter is followed by a lengthy and interesting but very specialized discussion of how trisomics can be and have been obtained. It is only in the third chapter that the subject, namely, the cytogenetics of aneuploids, is introduced. If most of the first chapter had been relegated to an appendix or a technical journal and the second chapter had been combined with chapter 7 and put toward the end, the book would have gained much as a didactic tool. Finally, save for a final short chapter of seven pages on aneuploidy in animals and man, the book is devoted entirely to plant cytogenetics and will be of use only to people interested in plants.

In summary, this book is a very thorough, up-to-date and detailed review of the cytogenetics of plant aneuploids. It can be used as supplementary reading in advanced courses, but it has serious deficiencies as a textbook. Finally, the void between plant and animal cytogenetics (if indeed such exists) will not be bridged by this wholly botanical volume.

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Techniques and Their Uses

Plant Tissue and Cell Culture. H. E. STREET, Ed. University of California Press, Berkeley, 1973. viii, 504 pp., illus. $32.50. Botanical Monographs, vol. 11.

In the last decade or so, the cultivation of plant tissues, cells, and protoplasts on chemically defined media has changed from a laboratory curiosity to a useful tool for the probing of basic biological questions as well as for the investigation of important agricultural problems. This book is an authoritative and reasonably up-to-date compendium of basic methods used in plant cell culture. It offers as well some insight into the major questions addressed and in some instances solved by the use of those techniques.

For readers unfamiliar with the field (and in my experience this includes many zoologists and microbiologists who ought to know better) this book will reveal that many, if not most, plant tissues can be cultivated indefinitely on relatively simple, completely defined media. Cultures can be started from single cells, which grow into undifferentiated callus; from such callus, roots and shoots and even flowers can be regenerated, generally through hormonal provocation. Besides providing a useful technique for propagation and multiplication of desirable genomes, this proves the persistence of totipotency, even in differentiated cells. Even further, one can go to enzymatic removal of cell walls, to yield naked protoplasts in bulk. Such protoplasts can reform cell walls and go on to make entire plants; they can also be fused in vitro to make somatic hybrids; and they can pinocytotically engulf virus particles, chloroplasts, DNA strands, and other large objects. Anther cells can be made to grow into haploid cultures, which also differentiate normally. The field thus seems ready to explode into agricultural importance.

Street has received able collaboration