though we may need such methods to analyze motivations of the Bengalese finch? As the Waterhouses say in their review, the future lies in comparison of measures, between cultures, age groups, or even species, so measures should perhaps be made with future observations, not just future statistical techniques, in mind.

Blurton-Jones and Konner do just such a study, comparing sex differences in London and !Kung Bushman children. Among other observations, they find that the Bushman girls are rougher-and-tumbler than London middle-class girls, which might support the contention that our culture inhibits females. More impressive, perhaps, are the similarities in sex roles which underline the importance of the innate component. Brindley, Clarke, Hutt, Robinson, and Wethli also emphasize innate components of nursery school sex differences—adding the nice point that most instances of girls' cooperation occur when older girls help younger children, whereas among boys it is the younger ones who seek to tag along in older boys' games.

Kendon and Ferber's paper on human greetings falls at an earlier level of analysis—the description and quantification of individual gestures. It again is strained by the self-discipline of "objectivity" in all-too-familiar situations. Here the authors save themselves by, first, an introduction stressing the comparative approach; second, seeing a surprising number of gestures of which we are usually only half-conscious (for example, the "body-cross" when a greeter places an arm across the midline during the last stages of approach, which may well be a substitute means of preserving individual distance); and finally, conveying the feeling that they themselves can't quite keep a straight face, especially as the hostess whose greeting behavior they were studying had the sense to wear magnificently flowered beach pajamas.

Finally, Simpson's paper on grooming in Gombe stream chimpanzees and Hess's description of sex among captive gorillas perfectly illustrate the quandary of whether quantitative observation illuminates or obscures social behavior. Simpson counts grooming bouts up, down, and sideways among his 11 male chimpanzees. He ends with a part-paper, a fragment which will take on meaning (or even comprehensibility) only when compared with other grooming studies, or when synthesized with other aspects of these same males' behavior, to recreate, in detail, the kind of character sketches of individuals which Simpson couldn't resist telling in his oral presentation of the same work. Hess, in contrast, in a qualitative, "preliminary" account, shows that the Basle Zoo gorillas have eager, individual, and complex patterns of sexual behavior, from the mother's first genital inspections of a newborn to the urgent invitations of the estral female. Hess succeeds in conveying, as clearly as any author in the book, that higher primates are inventive creatures and find many ways of enjoying themselves.

This book will be bought by the captive audience of libraries and by those individuals who are pursuing adjacent parts of the same puzzles, but by few of the wider public, particularly at $34 a copy.

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Sea Spiders

Pycnogonids. P. E. KING. St. Martin's, New York, 1974. 144 pp., illus. $8.95.

This compact volume brings together a surprising amount of information about these enigmatic marine arthropods. As might be expected from the author's interest in the histology and feeding habits of pycnogonids, physiological and structural information is most adequately reviewed. In addition to his own contributions, King has stimulated several students to undertake studies of the reproductive and nutritional biology of pycnogonids; he has set up a sort of school of pcynogonid studies at Swansea. This book has grown out of this activity, and is intended as an introduction to stand alongside the growing number of inexpensive paperbacks about various groups of invertebrates that have appeared in recent years. It is my understanding, however, that this book is to be available only in this expensive hard cover, senior professor edition.

The literature on pycnogonids is not easy to summarize because so much of it is systematic, dealing with descriptions of species, revisions of older descriptions, and geographical distributions. Ecology and behavior are still for the most part unknown, and often tidbits of information are tucked away in unlikely places. Obviously the author lacks command of this systematic literature, for he often uses obsolete and current generic names on the same page, and overlooks information in papers he has consulted in other contexts. The chapter on affinities and evolution is based on a less than careful reading of the available information. The chapters on morphology and anatomy are reasonable summaries, but unfortunately all illustrations have been redrawn in a muddy, heavy line and stipple style that obscures details when they are not distorted. Nowhere in the book is there a good drawing of an entire pycnogonid, and there are no photographs except for the very good one on the dust jacket. Thus it will be difficult for many who consult this volume to get a good idea of what one of these animals looks like.

While the book will have its use as an introduction for students, as intended, it could have been a much better book. Many of the mistakes are obviously due to haste at the expense of reflective reconsideration. The prose style appears to be taken directly from clusters of sentences on filing cards. I wish King had taken the time to reread and rewrite before committing the book to a publisher.

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The Thysanoptera

Thrips. Their Biology, Ecology and Economic Importance. TREVOR LEWIS. Academic Press, New York, 1973. xvi, 350 pp., illus., + plates. $22.

This book on a minor insect order covers the group completely, except for its systematics. It is a timely compilation, to be welcomed by the general entomologist, the teacher, and younger workers in the order. The references, appendices, and index, in which a high degree of accuracy is evident, will be of great help to the nonspecialist.

Anatomy, reproduction, feeding mechanism, and life cycles are covered in the manner of most major texts on entomology but in more detail. The chapters on migration and dispersal and factors affecting field populations are particularly well done. While many predatory species of thrips depress insect pest populations, there is little evidence that members of this order control major infestations. Likewise,

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