

qualified person who is well able to organize and administer the extremely complex functions of a modern library intent on communication as well as conservation, who understands the needs of faculty and students, and who controls a management system which designs and evaluates his services. The architect is a professionally competent adviser, planner, designer, coordinator, cost estimator, arbitrator and supervisor. The two clearly respect each other's contribution. The library design favoured is a completely flexible modular plan, flexibility being carried to the point of specially designed handling equipment which can move a fully loaded bookstack.

There is nothing essentially new about library design in the book. The novelty exists in putting it all down on paper so concisely and usefully to produce a book which will take an immediate place as a standard text.

W. ASHWORTH

## Processing Pictures

*Picture Language Machines.* Edited by S. Kanef. (Proceedings of a Conference held at the Australian National University, Canberra, February 24–28, 1969.) Pp. xiv+425. (Academic: London and New York, December 1970.) £4.50.

ALTHOUGH the title of this book reflects an overall concern for some general understanding of what would characterize an acceptable picture processing system, individual papers span a variety of topics. The collection starts with four reviews, by Narasimhan on picture languages, Bobrow on question-answer systems, Clowes on a layman's guide to Chomsky, and Jacks on design principles for an industrial graphics system. Then jackets are taken off and the fun begins. The general effect of the book is that of a broadside. Away with the restrictive attitudes of classical pattern recognition with its naive hope for classification based on independent feature extraction. In with the view that any picture processing system worthy of its salt must come to grips with the full range of deep problems associated with systems which can bring to bear an open ended corpus of knowledge about depicted domains to the interpretation of what is depicted. It is this last theme, aspects of which are referred to as "an ability to appropriately articulate structure" (paraphrasing Clowes) and an "ability to use models which are isomorphic to those of the human interacting with the system" (paraphrasing Stanton) which is emphasized in various forms in different papers. It is this theme which motivates the inclusion of the particular review papers and also interesting

papers on topics such as natural language behaviour, the role of learning in picture processing, and on dynamic data structuring.

Several stimulating discussions have the theme of the desirability of problems posed by picture processing systems which would make use of descriptions to generate appropriate and different algorithmic behaviour in different contexts.

I found the collection heavy going, largely because of the prolix style of many of the authors—why use a phrase when a paragraph will do? By contrast, the unedited discussions at the end of each paper have an Alice in Wonderland flavour, but like Alice they are sometimes remarkably rewarding.

Nevertheless, given that one is not reading to obtain answers but rather to seek for sensible questions, and those not just about picture processing, the book is well worth the effort involved in reading much of it two or three times.

E. W. ELCOCK

## Flying Mammals

*Biology of Bats, Vol. 1.* Edited by William A. Wimsatt. Pp. xii+406. (Academic: New York and London, December 1970.) £11.65.

*Biology of Bats, Vol. 2.* Edited by William A. Wimsatt. Pp. xv+477. (Academic: New York and London, January 1971.) £12.15; \$26.

EVERY biologist secretly believes that his "group" is underrated by the scientific community which fails to appreciate the variety of its forms, the beauty of their adaptations and the importance of the problems posed. Those who study bats are of course quite different: they know their subjects get a raw deal. One has only to analyse any general zoology text or university course: bats fly and thus have unique skeletal modifications (differing from those of pterodactyls and birds) and most use echolocation to catch insects (the rest eat fruit). But whoever quotes a desert bat in an essay on water regulation?

The reasons for all this are quite simple. In addition to the irrational popular repugnance or indifference due to lack of confrontation, there is a natural reluctance to tackle the large and diffuse literature. The lack of a general account of bat biology has been remarkable. Allen's excellent monograph of 1938 was republished, unaltered twenty-four years later and still seems to be in demand after a third of a century. Yet its treatment is semi-popular and necessarily superficial; more recent texts, in German and French, are even shorter.

The deficiency is now being made good by a treatise, edited by William

Wimsatt, of which two volumes are now published. It would be unfair to try to assess the scope of the work at present—a third volume and possibly a fourth are planned but no information is yet available on their probable contents. One can only hope at this stage that current omissions will be made good when the work is complete. The present two volumes contain seventeen essays by twelve authors, all American and all authoritative. Each volume carries an introduction by the editor, who has not yet contributed to the text, and detailed author and subject indices. They are beautifully produced, with copious illustrations of high quality, except for some old engravings which have not reproduced well, and one diminutive pair of X-ray photographs.

The first volume has ten chapters on a wide variety of topics and they are necessarily very variable in length. The first and longest chapter, on bat origins and evolution by Jepsen, deserves special mention. It contains a more detailed description of *Icaronycteris index* (the oldest and most complete fossil bat) than has hitherto been published and is illustrated by numerous superb stereo photographs. For many workers this material alone will justify the purchase of this volume. In addition the author gives a general discussion of the Chiroptera that forms an excellent introduction to the whole treatise. The general taxonomy of the order has not changed since Miller (1907), but Jepsen adds some stimulating ideas on relationships. He also argues that flying and gliding make different demands on the body so that bats could never have been gliders.

The second chapter is on karyotypic trends by Baker, and then follow three chapters by Vaughan, giving detailed descriptions of the skeletal and muscular systems respectively, and a discussion of flight patterns and aerodynamics. This last is surprisingly brief although new work is known to be in hand. The remaining five chapters are diverse. Orr writes on development, prenatal and postnatal, giving only two and a half pages to prenatal aspects, which will presumably be expanded later under reproduction. Griffin reviews migration and homing, Davis discusses hibernation ecology and physiological ecology and Lyman deals with thermoregulation and metabolism, but not the metabolic and thermal problems of active flight. Finally Rosenbaum gives a detailed comparative account of the urinary system.

The second volume, although longer, contains only seven chapters, all but the last being closely related. Quay, writing on the integument and its derivatives, mentions, but does not describe, the elaborate and varied facial structures. Sensory aspects of the skin lead natur-