Mechanisms in the balance

Thomas E. McGill

Ethology. By James L. Gould.
W. W. Norton: 1982. Pp. 600.

\$22.95, £12.25.

Biology of Behaviour.

By Donald M. Broom.

Cambridge University Press: 1982.

Pp. 316. Hbk £22.50, \$39.95;

pbk £8.95, \$14.95.

IN HIS highly influential paper, "On Aims and Methods of Ethology" (*Z. Tierpsychologie* 20, 410-433; 1963), Niko Tinbergen listed the four basic types of questions posed in the study of animal behaviour: causation, development, evolution and function (survival value). Dozens of general textbooks dealing with animal behaviour have been published in the 20 years since that article appeared, differing greatly in the emphasis placed on the questions posed by Professor Tinbergen. The pendulum has, of course, swung erratically, but most recent authors have stressed the questions of evolution and survival value over that of mechanism.

The two books reviewed here represent a redress of the balance. Indeed, this shift is indicated in the subtitles the authors have selected — *The Mechanisms and Evolution of Behavior* (Gould) and *Mechanisms, Functions and Applications* (Broom). In that sense, the two books are similar and equally welcome. But there are notable differences in the approaches the authors have taken to their subject.

One of Gould's purposes is to demonstrate that E.O. Wilson was wrong when he predicted in *Sociobiology* that ethology would split into two different camps, one with a strictly mechanistic approach and the other posing evolutionary questions. Gould attempts, with a good degree of success, to intermingle both viewpoints.

He begins with some interesting, pedagogically useful, chapters on the history and development of modern ethology. He then proceeds to build his animal from the inside out, considering first neural mechanisms and sensory processes. Part III, entitled "Complex Behavior", includes excellent chapters on orientation, navigation and communication. After a section on learning, there are two brief chapters on behavioural genetics describing such familiar examples as Dilger's lovebirds, Tryon's rats and Rothenbuhler's bees. The final sections cover evolutionary mechanisms, social behaviour and human ethology. The section on social behaviour consists of five chapters each of which is concerned with a particular group of animals — e.g. honey bees, African ungulates and African carnivores — but a major omission is the lack of any description of those species

whose social structure most closely parallels that of early man; the wolves.

Each of the chapters in *Ethology* is followed by a list of carefully thought-out study questions that should prove useful to both student and instructor.

Broom's approach to the subject is quite different. He does not organize his text into parts, instead presenting ten chapters covering such topics as the allocation of resources, body regulation and maintenance, feeding and antipredator behaviour. Like Gould, he begins with sensory and motor processes and ends with group behaviour.

As his subtitle and some of his chapter titles indicate, Broom is concerned with the practical applications of animal behaviour studies. His book starts with a page called "The Behaviour of Farm Animals and Pests" which presents a list of 35 topics and the chapter and page where discussion of each topic will be found — for example, "Defence responses by farm animals to

man" refers to a discussion in the antipredator chapter indicating that the behaviour of the cowman can affect milk-yield and that particular behaviours on the part of the farmer can reduce the chances of "hysterical" reactions in bird flocks; and "Responses to poisons: locusts, rats" discusses, among other things, the work of Garcia's group on learned taste aversions.

In part because of its applied flavour, Broom's book is quite different from any other text in animal behaviour that I have encountered. I doubt that many instructors of the usual college or university course in animal behaviour would make the book their first choice. It may, however, prove useful to teachers of veterinary or agriculturally-orientated programmes. □

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Insects explained

M.E.G. Evans

The Insects: Structure and Function,
3rd Edn.

By R. F. Chapman.

Hodder & Stoughton/Harvard University
Press: 1982. Pp. 832. £19.50, \$35.

THE INTRODUCTION to *Nature's* 1982 textbook supplement emphasized that the most warmly welcomed textbooks are new editions of standard works. This third edition of a book which rapidly is becoming an entomological classic is a particularly good example.

The Insects deals with how insects work rather than how they are classified, and it uses a whole-animal approach, including behavioural and ecological details. Chapters describing the structure and functions of the head, thorax and abdomen are each used to introduce a series of related physiological chapters. A high standard of illustration is seen in the many large, clear line drawings with their simple block shading and unabbreviated labels; all have been redrawn, rather than copied, in the same effective and economical style. The third edition has grown by over 70 figures and an extra 100 pages in an attempt to include the most important work of the past decade. The new material has been integrated into the appropriate sections of each chapter, and the references are now quoted chapter by chapter rather than at the end of the book.

This book is aimed at advanced undergraduate students, and I think that it would provide a very suitable background text for an MSc course. It is as large as many multi-author volumes, but it has the coherence and lucidity characteristic of the best single-author works. Of course, this may

also produce a personal view of some controversial topics, and there are a few sections where less orthodox viewpoints might have been included: for instance, Dennell's model of the cuticle, or Baker's interpretation of migration. However, Chapman presents a well-balanced selection of work relevant to most entomology courses.

V.B. Wigglesworth considered the first edition of *The Insects* to be "a really useful book"; this was a particularly generous appraisal since his own classic text *The Principles of Insect Physiology* (Chapman & Hall, 7th Edn 1972) is one of its closest competitors. This latest revision of *The Insects* enhances the usefulness of Chapman's text and establishes it as one of the best available. □

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One type of textbook

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Genetics. By George P. Rédei.

Macmillan/Collier Macmillan: 1982.

Pp. 720. \$27.95, £15.95.

THE subject of genetics now embraces so much that it is doubtful if any one textbook can ever cover the entire subject in any detail. Yet authors remain undaunted by this formidable task. Not all have been equally successful though there have been some notable jewels, for example I.H. Herskowitz's *Principles of Genetics* (Macmillan/Collier Macmillan, 2nd Edn 1977). The other problem facing the writer of an undergraduate textbook of genetics is defining the way in which it will be used. Should it be a strictly didactic text,