

Good but expensive fare

Introduction to Physiology. By Hugh Davson and M. B. Segal. Volume 1: Basic Mechanisms, Part 1. Pp. xii+561. Volume 2: Basic Mechanisms, Part 2. Pp. xi+481. (Academic: London and New York, June 1975.) £6.80 each part.

THESE two volumes are the first to appear in a series of five. A reviewer thus faces a similar dilemma to a diner passing judgement on a complete meal after sampling only the soup and fish. In this instance, however, the renown of the chef de cuisine, Dr Hugh Davson, is such that it is only necessary to decide for what type of clientele he is catering to predict what is in store. It turns out that, along with his co-author, Dr Segal, he is providing good, solid and easily digestible fare without too many sophisticated trimmings but also without succumbing to the hazards of oversimplification.

Volume 1 deals, in the opening chapters, with cellular physiology and includes a good deal of material usually classed as biochemistry—for example, the tricarboxylic acid cycle and protein synthesis. Such fundamental topics in general physiology as osmosis and the genesis of bioelectric potentials are also covered and up-to-date descriptions of ultrastructural findings related to cellular function and interactions are provided. Some elementary thermodynamics is also included but, although simple equations are used, the approach is essentially descriptive. The concept of chemical potential, although it receives a passing mention, is not seriously developed and the section on

entropy is one of the few instances in which the exposition is a trifle confusing, if not actually misleading. The remaining chapters are devoted to haemodynamics, respiratory exchange, in testinal absorption and renal function, all of which are treated in considerable detail. The second volume is concerned with the nervous system (chiefly the peripheral and spinal divisions), hormonal control (discussed in rather general terms), the effector systems (muscles and glands), defence mechanisms (mainly haematology and immunology) and reproduction (including some 20 pages on lactation).

The overall presentation is clear and commendably free from errors, although an occasional slip such as the heading "carbonate" over a section evidently devoted to carbamate could be tiresome to a beginner. The illustrations are of high quality and generally well chosen, but it seems odd to reproduce a typical Gamble diagram and attribute it to a recent review, and to opt for an oxygen dissociation curve published in 1958 which adds little to the one published by Bohr and Krogh in 1904. Students with hardly more scientific preparation than a nodding acquaintance with chemical formulae and graphs, should find these books comprehensible. After mastering the five volumes (if the succeeding ones resemble the first two) such students will be not only introduced to but thoroughly at home in physiology. Some, however, may find this protracted initiation and the entrance fee (presumably in five instalments of £6.80 each), which goes with it, too disheartening and will feel tempted to seek another portal of entry to the subject.

R. V. Coxon

very good account of the evolution of display movements although the motivational analysis of displays which has played such a large part in the development of this area of ethology, and which has strong evolutionary implications, is mentioned only in brief.

For the final sections of his book Brown chooses some topics on what he calls "the physiological basis of species constancy and species diversity in behaviour." The chapters on reflexes and fixed action patterns do fit the plan, but he goes on to deal with sensory systems, migration and circadian rhythms. They are all good, modern accounts, but I fail to see where they fit into Brown's evolutionary scheme. I have similar problems with the contents of the final section on development, in which the behaviour of embryos is covered in detail, but there is no mention of learning. The concluding chapter on bird song, however, does provide an opportunity to discuss the evolution of

development itself. The birds provide such a good range of ecological and social variants which we can now begin to correlate with the manner in which their song develops.

So this review ends as it began, quibbling about the selection of material. Brown's evolutionary theme has sufficient strength to give a solid backbone to his chapters even though all of us would leave some things out and include others. I think this is a distinguished textbook. In Britain it is probably too long for most undergraduate courses, but it can nevertheless unhesitatingly be commended as a book for students to consult. I defy anyone to browse in the central chapters without having their attention riveted by some elegant and fascinating example of the manner in which their behaviour has come to equip animals for survival and I can pay Brown no higher compliment.

Aubrey Manning

Cryogenics

Heat Transfer at Low Temperatures. (The International Cryogenics Monograph Series.) Edited by Walter Frost. Pp. xiv+382. (Plenum: New York and London, 1975.) \$42.00.

THIS book "is intended to enhance the knowledge of the thermal design engineer faced with solving heat transfer and fluid flow problems at low temperatures." The temperature range which is covered lies, in effect, between room temperature and 1K: thermal transfer problems peculiar to lower temperatures than this are not described at all. The book consists of 15 chapters, in reality separate articles prepared by 20 different contributors.

The first two chapters deal effectively with 'classical' thermal transfer through conduction and convection. The second, and main, part of the book consists of ten chapters devoted entirely to two-phase phenomena of various sorts. Topics such as nucleate pool boiling, film boiling, two-phase flow, and the condensation of gases on cryogenic surfaces are treated in considerable detail. The third part consists of two chapters on topics which, presumably, did not seem to the editor to fit in conveniently anywhere else: one on radiative heating, with particular reference to the influence of cryodeposits on the cold surface; and a final chapter on thermal transfer to HeII.

No attempt has been made to standardise nomenclature or units between the different chapters: pounds and feet coexist uneasily with kilograms and centimeters; BTU with ergs and joules; and Kelvins with degrees Centigrade and even Fahrenheit. The remark on the dustcover about "surveying the literature to date . . ." was no doubt accurate at the time of writing. While three or more years may perhaps be a fairly normal publishers' gestation period these days, it seems rather a pity that more could not have been done to update the book at the proof stage: this would, at least, have enabled some modification of the amusingly anachronistic remark in the final chapter to the effect that liquid 'He and the superconducting electron gas are the only known superfluids.

The book does contain a great deal of information, however, so that, in spite of these minor shortcomings, it should certainly be useful to aspiring designers of rockets, space simulators, superconducting generators and other large scale cryogenic machines involving the flow or storage of liquified gases.

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