explosion when the first volume was produced in 1939. The preface to this volume advised authors "to attempt a critical appraisal of the contemporary field". The present editorial policy of further restricting the coverage of any field should lead to a better description of recent work. There seems little point, anyway, in reviewing a field in which there has been no significant advance. The problem seems to be defined by R. V. Short in his entirely enjoyable review on reproduction. He mentions that the *Bibliography of Reproduction* lists 10,000 articles, of which he is aware of 5 per cent and influenced by about 1 per cent. With the use of 195 references he gives the reader an outstanding account of reproductive physiology. If more chapters were written in this vein it may be that the *Annual Review of Physiology* would find its way into more personal libraries in addition to university libraries, where it still justly remains one of the pillars of the physiological establishment. D. MENDEL

QUANTUM MERUIT

Vision and the Eye

By M. H. Pirenne. Second edition. Pp. xvi + 224 + 16 plates. (London: Chapman and Hall, Ltd., 1967.) 50*s*. net.

ONE of the enchanting aspects of the polymorphous subject of vision is that it can accommodate both the cantabrian crank and the oxonian omnivore. Dr Pirenne's far-flung interests, his erudition, and profound understanding, all characteristic of the latter species, have made him singularly suitable for the authorship of this academic treatise. And by "academic" I wish to convey the original notion of the word as depicted by Raphael in the Vatican. We are led from pin-hole camera photography (in connexion with which Fig. 1.15 needs some thought to grasp it) to the splendid illusions of baroque turmoil; from the eyes of insects to the anatomy of the brain; from some unpublished experiments due to Hartline to the directional properties of the retina. Dr Pirenne's vigorous analytical approach, followed, it should be noted, practically without any algebra at all, will be familiar to the readers of the first edition. The chapter on the nervous response to light is somewhat extended in comparison with its antecedent and concentrates on the properties of the lateral eye of the horseshoe crab. While there are people who might wish for details of recordings obtained from the eyes of higher vertebrates, if not primates, a great deal is to be said for the grasshopper's approach, which subsists in sampling tit-bits in various places.

Yet puzzles remain. There is no hint in this finely produced book why the Stiles-Crawford effect, "which cannot be described here" (last edition, page 11), can now be described. The section on binocular vision makes no mention of one of the most dramatic discoveries in the whole of this subject, namely the demonstration by Julesz that contours may arise from stereopsis rather than, as Helmholtz contended, that the contrary should be true. While Dr Pirenne wisely refrains from a discussion of the relation between visual pigment regeneration and the time-course of adaptation to darkness, his faith in some results bearing on the alchemy of human colour vision is simply endearing. But the principal puzzle relates to the inordinately large number of pages reserved for the role that the quantum and probability play in vision. The demonstration of this role is due in no small measure to the experimental work done twenty-six years ago by Pirenne in conjunction with Hecht and Shlaer. That this important contribution has received its due desert is also attributable to Dr Pirenne's many writings on the subject. Does he believe that any one in his right mind could ever challenge the basis of the experiments? Then why omit important new material and repeat the story with the detail which was necessary in 1948 but seems redundant in 1967? Perhaps only those who have shouted in the wilderness know the answer; maybe only those whose shouts have been in vain will understand. R. A. WEALE

AFRICAN FISHES

Freshwater Fishes of Southern Africa

By R. A. Jubb. Pp. vii + 248 + 57 plates. (Cape Town and Amsterdam: A. A. Balkema, 1967.) R. 12.50.

MR JUBB aims at a wide audience, in particular the naturalist, the angler and the fishery biologist. They are well served by this, the first book of its kind to give comprehensive coverage to the freshwater fishes of southern Africa, taken in this context to be that vast area stretching from the Zambezi and Cunene rivers in the north to the multitude of smaller rivers in the Cape Province of South Africa.

Although not strictly a taxonomic revision (the author, too modestly, calls it a "pictorial guide"), this book is clearly based on many years of detailed and critical systematic research, backed by much fieldwork and consequently a first-hand knowledge of the fishes' ecology. Thus *Freshwater Fishes of Southern Africa* is bound to find a place also on the professional ichthyologist's bench.

The text is divided into four principal parts, of which the longest is the systematic section dealing with the 157 indigenous species of southern Africa. With few exceptions, there is for each species a description and figure (usually a photograph, but sometimes a coloured drawing as well). The brief specific description gives live coloration and diagnostic anatomical characters distinguishing the fish from related species in the area. Distributional data, vernacular names, remarks on feeding habits and other ecological information, and often short accounts of intraspecific variability in diagnostic characters are also included.

Here I must compliment the author's wife, Hilda Jubb, on the excellent figures which she has prepared. Most of these are skilfully retouched photographs in which, without creating any imbalance or obscurity, she has emphasized the main diagnostic characters and yet retained the essential character of the fish as a whole. Opinions differ on the value of photographs as illustrations for taxonomic papers (I for one favour line-drawings); Mrs Jubb's expertise has certainly reduced my opposition, and amply justified the use of photographs in a work of this nature. In addition, Mrs Jubb has added to the value and aesthetic appeal of the book by providing more than fifty original coloured drawings.

Because the illustrations are a vital part of this work (especially in its role as a pictorial guide for amateurs) it is regrettable that there is often poor spatial correspondence between text and relevant figure. This arrangement is the more regrettable because most users of the book will have wet or dirty fingers, and the illustrations can only be found by leafing through the pages, because no figure reference is given with the species description.

Following the section on indigenous fishes there is a shorter but equally comprehensive one on introduced exotic freshwater fishes, and native euryhaline species found in fresh waters. The introduced species (all of European or north American origin) are carefully documented from the historical as well as from the ecological and distributional points of view.

A semi-pictorial key serves as an introduction to both systematic sections. This key is simple to use, and avoids the common pitfalls of many "popular" keys because of the author's skilful avoidance of too finely divided dichotomies. Instead, the user is led, in most cases, to a group of similar species and must then refer to the fuller descriptions to make his final identification. Frequent use of simple outline drawings further helps to prevent the novice from straying far down the wrong branches.