which have not yet found such applications. Even the experienced reader may find himself in deeper water than he expects, and familiar theorems take fresh meaning from unfamiliar contexts and formulations.

The latter part is concerned with some areas of probability theory in which Fourier analysis plays a part. Pride of place naturally belongs to the continuity and compactness theory of characteristic functions, but the author devotes a good number of pages to topics related to the convergence of random series of different types. It might be argued that he could usefully have given a wider and more superficial survey. For example, the early parts of the book contain the prerequisites for the arithmetical theory of probability distributions (which has recently come into prominence again in the context of "delphic semigroups"). Again, there is no sign in this book of the very extensive work carried out in recent years, mainly in Eastern Europe, on the rate of convergence in central limit theorems and the theory of large deviations. Moreover, the Fourier theory is entirely classical, and there is for example no recognition of the importance of that elusive and challenging object, the convolution algebra of measures on the line.

These criticisms of course merely say that the author has not written a different book. The one he has chosen to write will prove most useful to any probabilist who wants to be able to use the tools of hard analysis, and who is not content to work on easy problems made to look significant by perverted abstraction. J. F. C. KINGMAN

# Immunotechnology

*Methodology of Immunochemical and Immunological Research.* By J. B. G. Kwapinski. Pp. xx+820. (Wiley: New York and London, January 1973.) £16.60.

To the outsider the various branches of immunology could seem equivalent to the sects of a religion; the differences of observance can obscure the common theme. The pioneer immunologists were often medical microbiologists interested in the notion of immunity as a defence mechanism against invasion by microorganisms. Their efforts in the past have been remarkably successful in eradicating a number of previously common and serious diseases. In more recent years two further major trends in immunology have emerged. First, the nature of immunoglobulin antibody molecules has been delineated; and second, the origins of the immunologically responding cell populations have been revealed. The older formulation of immunology and the newer disciplines have each developed their own technologies. In this book by Professor Kwapinski, which is a more up to date version of his *Methods in Serological Research* (1965), it is elaboration of the older formulation with which he is principally concerned. An author should not necessarily be taken to task for the information given on the cover of his book but in this instance it must be pointed out that the title and the cover are misleading in that it is only a restricted view of immunology which is presented. For example there are two large chapters on antigens and their characterization which include nothing on histocompatibility antigens; the emphasis is almost entirely on bacterial and viral products. Thus the book is something of an anachronism but it may nevertheless be of value when the roots of immunological research are re-explored as they surely will be in the not too distant future. The illustrations are of poor standard and doubtful usefulness and the price is very high if the book is to serve as the "ideal text for students in medicine, dentistry, science and biological sciences"—to quote the cover. A. J. S. DAVIES

# Behavioural Biology

*Essentials of Physiological Psychology.* By S. P. Grossman. Pp. vii+506. (Wiley: New York and London, 1973.) £6.65.

IN 1967 the author published *A Textbook of Physiological Psychology*, of 932 pages, and intended for graduates. Now five years later he has produced *Essentials of Physiological Psychology*, of 506 pages, and intended for an introductory course. The layout of this book is like that of the larger. It is divided into four main sections. The first (three chapters) is an introduction to neurophysiology and neuroanatomy. The second (five chapters) covers some of the senses, vision, audition and the chemical senses, together with chapters on the motor system and the reticular formation. The third section has seven chapters on motivation and emotion, dealing with hunger, thirst, sexual behaviour, emotional behaviour, reward and punishment, sleep and arousal, and finally with theories of motivation. The last section (five chapters) reviews work on the localization of capacities for learning, and the electrophysiology and biochemistry of learning. This book differs from the previous one in several respects other than its reduced length. It contains a chapter on research methods in the first section which briefly describes techniques of ablation and of electrical recording and stimulation. The other textbook had no chapters on any sensory system other than vision, and no separate chapter on sleep, arousal and attention. In the present book there is a brief mention of evidence on humans in the section on the hippocampus, whereas in the earlier book there was none. The last difference is the inclusion in this book of summaries and reviews at the end of chapters or parts of chapters, these being added, according to the preface, to make the book more suitable for an introductory course.

It is necessary to assess not only what is included but also what is left out from a book of *Essentials of Physiological Psychology*. Some of the omissions are serious. The chapter on research methods contains no section on behavioural techniques, and no section on experimental methods in neuroanatomy. Yet a student could hardly be said to understand a behavioural deficit if he does not know how the behaviour is assessed, or to understand the neuroanatomy of the brain if he does not know how it can be shown that area A is connected to area B. The chapter on neuroanatomy is in the worst tradition of human neuroanatomy textbooks, concerned mainly with labelling, and only with the human brain. The secrets of neuroanatomy for students of physiological psychology are not contained in the cranial nerves. This chapter is also very sparsely and poorly illustrated, there being, for example, no figures for the hypothalamus or thalamus. One last respect in which the book omits essentials lies in the very scant coverage of neuropsychological data on humans. No mention is made of language or specialization of the hemispheres, in spite of the fact that the neuroanatomy chapter is all on man.

It might have been expected that the author would not only have selected the essentials from the previous book but also have brought it up to date. The chapters covering areas in which he has done research are up to date, those on hunger, thirst, emotion and neuropharmacology containing 25% of references dated 1967 or later. But the chapters on audition, vision, the anatomy of learning, and the reticular formation, none of them subjects in which he has worked, contain only 3.6% of such references. The discussion in these chapters hardly contains the essentials. No mention is made of recent work on stereoscopic vision, the discussion of frontal association cortex is at least 10 years out of date, and there is only a single paragraph on posterior association cortex, omitting everything of importance.

A textbook for an introductory course should not only contain the essentials but also interpret studies in a way which will help the student to grasp their significance. This is not done, for example, in the discussions of the results of single unit recording in visual cortex, or in the passing mention of studies in which