

In limited space, only one of the several articles that deserves it can be called specially to the attention of specialists in other fields: that in which H. R. Mahler writes on those complex many-stage enzymic reactions which remain functionally in gear in cell-free extracts containing mitochondria and smaller particles. The *kind* of system that gives functional coherence to the metabolic activities of the cytoplasm is slowly beginning to appear, and it seems to be particulate rather than, in the ordinary sense, 'skeletal'. Indeed, the cytoskeleton seems to have a rather ether-like status: one feels that something of the kind should be there, but more than one observation (for example, on ultracentrifugation) that could rank as an *experimentum crucis* can be reconciled to its non-existence. Now that complex reaction sequences appear to have an anatomical as well as a functional unity, it might be argued that the whole concept of 'separate' enzymes has no place inside the cell, however well it has done duty by the perhaps highly specialized and unrepresentative enzymes that are secreted by cells and work outside them. The argument is tempting, but it will not do. 'Separateness' does not stand or fall by separability, and the enzymes of complex many-stage reactions could be identified by specific inhibitors and substrate competences (or, in micro-organisms, by the skilful use of gene mutations) even if not one of them had been isolated. As it happens, many have been; but what is important about these complex reactions is not their divisibility but their actual indivision, and the biologist will be satisfied to learn of the existence of a level of integration that is so much larger than the molecule and so much smaller than the cell.

P. B. MEDAWAR

SENSORY GATEWAY TO THE MIND

The Human Senses

By Prof. Frank A. Geldard. (Wiley Publication in Psychology.) Pp. x+365. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1953.) 40s. net.

THE study of the human senses has long been and still remains among the most rewarding fields of psychological inquiry. More than a third of Stevens's "Handbook of Experimental Psychology" is devoted to it. A book exclusively occupied with the subject is therefore to be welcomed. The present effort covers partly the same ground as Piéron's "The Sensations", the English version of which appeared in 1952, though in mastery of the subject it scarcely bears comparison with its distinguished predecessor.

The usefulness of Prof. Geldard's book lies chiefly in its careful review of the recent literature on those aspects of the subject in which he is primarily interested, and those aspects are at least as much physiological as psychological. His own publications include papers on visual phenomena, retinal fatigue and brightness contrast, and on somesthesia. He has also made an exhaustive study of the so-called vibratory sense, arriving at the conclusion that it is not a separate sense but simply 'pressure in movement'. But he is equally at home in the chapters on hearing, temperature and labyrinthine sensitivity, kinæsthesia, smell and taste, though he makes little attempt at synthesis or critical evaluation of rival theories.

Prof. Geldard has not confined himself to American sources. The omission of any reference to the researches

of Piéron, doyen of sensory psychophysiology, is all the more noticeable. Nor does the chapter on "The Skin and its Simuli" leave the reader with any glimmering of the haptic qualities of the hand as studied by Révész or Katz.

At one brief stage, in the chapter on colour vision, the author decides to drop the psychophysiological approach and assume a phenomenal viewpoint. It is a pity he did not sustain this second viewpoint throughout. He might then have found it unnecessary "to sidestep the vexing problem of form perception". He might also have found it possible to give more adequate consideration to the problem of pain; no part of the book reveals the limitations of a purely psychophysiological approach more sharply than the discussion of pain. Conceivably he might also have been led to see the importance of inter-modal phenomena in sense perception.

Prof. Geldard's initial manifesto raises our expectations. "The highroad to the understanding of human nature," he declares, "is by way of an appreciation of man's senses and of the fundamental role they play in the attainment of knowledge and the regulation of behaviour." This may be the case; but we shall never convince anyone that it is unless we extend our interests to the personal and social aspects of sense perception. Prof. Geldard's inclinations do not seem to reach so far. He does not seem to share the view that the psychologist's task is not to concern himself with eyes, ears and skin as such but with a person seeing, hearing, touching. His restriction of interest is scarcely calculated to lead the reader on the "highroad to the understanding of human behaviour".

JOHN COHEN

THE PRACTICE OF FORESTRY

Forestry

By Prof. H. G. Champion. (The Home University Library of Modern Knowledge, No. 226.) Pp. vi+230. (London: Oxford University Press, 1954.) 6s. net.

THERE has been a long-standing need for a simple survey of what is meant by forestry. It is, of course, difficult to write an outline of any large subject, and the method of approach depends partly on the background of the author. Prof. Champion spent a considerable part of his professional life in India, and he has travelled widely in other parts of the world, both tropical and temperate. He has accordingly drawn his illustrations from a wide field. This is the distinctive quality of the book, and it adds greatly to its interest.

The book is comprehensive and the reader may rest assured that he has got at least a glimpse of every facet of the subject. The first chapter deals with "Forests and Trees", and brings together varied information from all over the world: the oldest trees, the tallest trees, the greatest girths, as well as short discussions on all aspects of the life-history of trees from light requirements and pollination to mycorrhiza. This is one of the most interesting chapters in the book. The second chapter, entitled "Structure of Forests", presents the forest as a plant community, discussing not only its structure in an ecological sense, but also the effect of competition, certain aspects of succession, the classification of forests on climate, and the ecological influences of man on the forest. Again, the illustrations are drawn from a world background. Chapter 3 discusses