

It is easy nowadays to criticize any book of moderate size for its omissions. But in this case the limited size and the restriction to the rat is doubly unfortunate in that several topics basic to the modern study of ethology find no place. Thus, although releasing stimuli are mentioned, there can be no discussion of the relation of these to the filtering processes in the sense organs and in the central nervous system. Again, the significant work of von Holst and von St. Paul on the effects of brainstem stimulation in the domestic fowl, whereby a considerable series of fully co-ordinated and unpractised items of innate behaviour (instinctive acts) are elicited, finds no place. Further, the problem of imprinting and the sensitive period can scarcely be dealt with adequately in a book which is centred around the rat. Yet again it is unfortunate that all mention of the considerable volume of recent work, mostly in the U.S.S.R., which deals with interoceptive conditioning and its relation to conscious and unconscious processes, is omitted. Interoceptive conditioning is in fact classical conditioning in which either the conditioned stimulus or the unconditioned stimulus or both are delivered directly to the mucosa of some internal organ. Interoceptive stimuli are, by their very nature, closely bound up with the life of the organism and they tend to be much more recurrent and regular than do many of the stimuli which impinge from the external world. The study of such stimuli is probably as yet in its infancy and is likely to produce results of great importance in the future. It would have been interesting to have had it related to what is known of the learning powers of the rat as studied by other techniques. However, most of these criticisms derive from the title (reinforced by the sub-title) by which we are led to anticipate a general text-book on the principles of ethology and of behavioural physiology only to find that those subjects for the study of which the rat is not outstandingly good tend to be glossed over or omitted. This is a pity, because the book will be that much less successful in the very important task of presenting ethology to the behavioural psychologists. On the other hand, the work has many good features and will be a useful work of reference. It is attractively produced and the illustrations are excellent, though the price seems somewhat high in relation to the size.

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PLANT HISTOCHEMISTRY

Botanical Histochemistry

Principles and Practice. By William A. Jensen. Pp. vi + 408. (San Francisco and London: W. H. Freeman and Company, 1962.) 70s.

MICROSCOPIC histochemistry, it is stated, can be regarded as having been founded by the French botanist Raspail, who published work at his own expense after its rejection by a committee consisting of a physiologist, a chemist and a botanist. Raspail stated that the physiologist was ignorant of chemistry, the chemist of microscopy and the botanist of both! Zoologists presumably were uninterested.

Botanists contributed much of the early developments, but latterly 'botanical histochemistry' has not shown the striking advances of 'zoological histochemistry'. Dr. Jensen's book is thus welcome as a stimulant.

It combines the functions of a text on micro-analytical methods with one on methods available for investigations of localization of constituents within tissues. The term histochemistry may possibly include any analytical method but to me (the reviewer) it suggests a chemical technique revealing localization of specific materials within a tissue, rather than straight micro-analysis.

A section of each chapter is devoted to localization technique (termed here microscopic histochemistry):

these sections are useful. Many of the methods developed by animal and medical histochemists have been applied to the special structural and other peculiarities of plant tissues. The sections on freeze-drying and freeze-substitution of plant tissues in which Dr. Jensen's own work is significant are timely and useful.

Successive sections deal with general histological procedures and with certain micro-analytical techniques. Techniques for isolation of mitochondria, plastids and nuclei are dealt with. The section on 'histochemical techniques' has chapters dealing successively with carbohydrates and cell walls; proteins; nucleic acids; lipids; minerals; enzymes; autoradiography. 'Minerals' is possibly an odd word to apply to a chapter where microchemical methods applicable to organic phosphate esters are dealt with. Each chapter has a section on localization (staining) procedures and also a section on micro-analytical procedures. It is convenient that these should be compiled together, but the micro-analysis sections do not in several cases compare very favourably with standard texts on microanalysis.

The book is rather obviously designed for the American market as it lists American dealers in equipment and reagents in the United States, materials which in most cases are very easily obtained elsewhere. Local trade names are an inconvenience in scientific literature. Canada balsam is international probably but 'permount' and 'drierite' are local jargon. Misprints occur, such as nitrate instead of nitrite, and uricil for uracil; hyposulfite is presumably dithionite (it is not thiosulphate).

This book should prove to be a valuable stimulant to botanical groups to use some of the techniques proving useful in dealing with animal tissues.

TOWARDS FOOD SCIENCE

Advances in Food Research

Vol. 11. Edited by C. O. Chichester, E. M. Mrak and G. F. Stewart. Pp. ix + 454. (New York and London: Academic Press, 1962.) 103s. 6d.

A SCIENTIST who works in the food industry is soon compelled to recognize that his thinking must be done at two levels. Part of it is required to be strictly scientific—the structure of protein, the mechanism of enzyme reactions, the intermediary metabolism of micro-organisms, the determination of the chemical configuration of vitamin B₁₂—these are all examples of topics that would interest a scientific investigator wherever his laboratory might be situated. Other topics, however, for example, continuous dough-making for the plant bakery, the manufacture of potato crisps, the utilization of natural polysaccharide gums in food manufacture, need scientific understanding, to be sure, but they also require more diverse talents as well.

The last subject, namely, the use of natural gums in food manufacture, is dealt with by Dr. Martin Glicksman as one of the five long, detailed and well-documented monographs of which *Advances in Food Research* is composed. Dr. Glicksman's article exemplified the second aspect of food research. In it he discusses the use of agar—"structurally . . . still a mystery"—in chiffon pies, doughnut glaze, pickled tongue and sherbet; of carrageenan as a component of eggless 'custard', for the preparation of artificial meat-like products and for converting a mixture of tomato juice, lemon juice and vodka into "high quality Bloody Marys". An equally catholic variety of uses is described for alginates, furcellaran, locust bean gum, guar gum, gum arabic, gum tragacanth and gum karaya.

W. H. Stahl's article on the chemistry of tea and tea manufacture is an admirable survey of the state of knowledge of the subject. It contains a wide review of the literature, including papers from Japan and the Soviet