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## BOOK REVIEWS

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**Annual Review of Neuroscience** by W. M. Cowan, (Published by Annual Reviews Inc., 4139, Elcamino way, Palo Alto, California 94306, USA), 1985, pp. vi + 603, price \$30.

The volume contains 18 reviews contributed by the outstanding experts in the respective areas: two reviews in developmental neurobiology, one review on membranes, two on neuropeptides, two on techniques, one on neurotransmitters, two on neuroethology, four on visual system and four on motor system.

G. S. Stent and D. A. Weisblat contributed the review on cell lineage in neurodevelopment; M. Jacobson on clonal analysis of vertebrate central nervous system; M-m. Poo on mobility and localisation of proteins in membranes; M. O'Shea and M. Schaffer on invertebrate neuropeptides; R-R. J. Kaldany, J. R. Nambu and R. H. Scheller on *Aplysia* neuropeptides; K. L. Valentino, J. Winter and L. F. Reichardt on monoclonal antibodies in neurobiology; A. Grinvald on optical monitoring of neuronal activity; S. H. Snyder on adenosine as a neuro-modulator; M. Konishi on birdsong neurobiology; D. Ingle and D. Crews on vertebrate neuroethology; E. A. Schwartz on phototransduction in rods; R. Shapley & P. Lennie on spacial frequency analysis in the visual system; R. G. Boothe, V. Dobson and D. Y. Teller on development of vision in primates; J. Allman, F. Miezin and E. McGuinness on beyond the classical receptive fields of visual neurons; S. P. Wise on pre-motor cortex; A. F. Fuchs, C. R. S. Kaneko and C. A. Scudder on brain stem control of saccades; J. F. Tallman and D. W. Gallager on GABA and Benzodiazepines; and S. Grillner and P. Wallen on central pattern generators for locomotion in vertebrates.

All the reviews are stimulating. The following are some of the interesting highlights.

The opening review of Wise on the pre-motor cortex argues on the point: "the best evidence favours a role for pre-motor cortex in the preparation for and the sensory guidance of movement." The pre-motor cortex differs from the motor cortex in that it has an input from the amygdala, and receives projection from nucleus X of venterolateral complex of thalamus. In the review on benzodiazepines action, it has been discussed that their important role is in the modulation and interaction with the GABAergic system. Jacobson's review on cell lineages in the central

nervous system of vertebrate embryo is another highlight of the volume. He argues that cell fates could be determined by any combination of lineage, induction and position. He also points out the inherent difficulties in the existing methodology of analysis of cell lineages and that none of the existing methods fully satisfies the requirements of an ideal study of the cell lineages. The review on monoclonal antibodies provides information on areas of their applications which are being exploited in researches in cell biology of the neuron, in developmental neurobiology and in tracing connections in the nervous system. The immunological methods have revolutionized the course of progress of neurobiology in this decade. The review also points out important cautions, and areas where the antibody methods are not suited well. The review of Grinvald on the new approach for studying neuronal activity optically with voltage-sensitive dyes explains how this method provides the facility to study much more neurons than the electrophysiological methods, and how it can eliminate the limitations and drawbacks of the 2-deoxy-glucose method which has time resolution of minutes rather than milliseconds, and the positron-emission tomography and the magnetic imaging technique which have limitations of time and spacial resolution for neuronal dimensions. The optical method is supposed to monitor electrical activity from more than 100 neurons at a time. The review contains very interesting sample data obtained with the optical monitoring method. The volume has an interesting review on neuroethology by Ingle and Crews. Neuroethology is concerned with study of an animal's competence (not its capabilities) under naturalistic conditions rather than under artificial conditions, in respect of complex behaviours and not on simple reflexes. It draws heavily on behavioural adaptations rather than on task-oriented problems. Neuroethology contributes to the understanding of such questions as: how does the behaviour develop, and how does it help to adapt the organism to the nature in which it is a part? What are the causal factors of behaviour and how has it been evolving? These are the large issues which concern man in his nature and his future. The review concludes with the words of T. H. Bullock: "Neuroscience is part of biology, more specifically zoology, and it suffers from tunnel vision unless continuous with ethology, ecology and evolution."



The reviews cover all the significant developments with a high quality and critical authority. Any one working in any of the neurosciences will greatly benefit by studying the Annual Review of Neuroscience.

T. DESIRAJU

Department of Neurophysiology,  
National Institute of Mental Health  
and Neuro Sciences, Bangalore 560 029.

**Ustilaginales of the British Isles.** By J. E. M. Mordue and G. C. Ainsworth, (Published by Commonwealth Mycological Institute, Kew, England), 1984, Pp. vii + 96; Price: not stated.

This publication under review (as *Mycological Paper No. 154*) is a revised version of The British Smut Fungi authored by G. C. Ainsworth and K. Sampson which appeared in 1950. The revision reflects the current understanding of these fungi and conceptually and nomenclaturally it is far different from the 1950 edition. Currently the view is gaining ground that these fungi are neither basidiomycetes nor ascomycetes. The Smut Fungi together with anamorphic and teleomorphic basidiomycetous yeasts (Sporidiomycetales) deserve to be raised to the status of a class. In fact, R. T. Moore has accorded them the status of a Division Ustomycota. The order Ustilaginales has been divided into the two well known families – Ustilaginaceae and Tilletiaceae. However, the most predominant and prominent spore form has been now designated as *ustilospore* rather than teliospore/chlamydospore; it is in conformity with the view that the Smut Fungi belong to Class Ustomycetes.

In all 58 species belonging to 13 genera – six in Ustilaginaceae and seven in Tilletiaceae – have been described and illustrated. Synonymy also has been included. A key for the two families is followed by one for the 13 genera. A key of all the species “by families of host plants”, apart from those given under each genus, constitutes a valuable adjunct for taxonomic determination of Smut Fungi more particularly those occurring in the British Isles. Host plants of as many as 25 families of phanerogams have been found to be parasitised in England.

The monograph is fully illustrated including as it does 172 photographs (grouped in 20 plates) – optical microscope photomicrographs, scanning electron micrographs and a few showing symptoms on certain host plants. The descriptions are well drawn up and

adequate for taxonomic determination. The month(s) of occurrence, the distribution of each taxon in England together with details of herbarium and exsiccati accessions also find a place in the work.

The most noteworthy nomenclatural changes pertain to the smuts affecting wheat, barley and oats. The loose and covered smuts of these crops are now considered to constitute one species—*Ustilago segetum* (Bull.) Roussel. The name *U. segetum* var. *segetum* applies to covered smuts of barley and oats, while the loose smut of oats under the new arrangement, becomes *U. segetum* var. *avenae* (Pers.) Brun. The loose smuts of wheat and barley are grouped under *U. segetum* var. *tritici* (Pers.) Brun. Plant Pathologists and others not wishing to designate them by varietal names have a choice under the Code. They may call these respectively as: *U. segetum* (Bull.) Roussel var. *hordei* (Pers.) Rabenh; *U. avenae* (Pers.) Rostrup and *U. tritici* (Pers.) Rostrup.

The rough-spored bunt of wheat previously known as *Tilletia caries* now changes to *T. tritici* (Bjerk) R. Wolff., and the smooth-spored one (*T. foetida*) becomes *T. laevis* Kuhn. These changes in wheat bunt names and some others were inevitable since the starting date for nomenclature of Fungi has been moved to 1st May 1753 (*Species Plantarum* of Linnaeus) from 1801 (*Synopsis Methodica Fungorum* of Persoon). Similarly the Common Smut of maize known as *Ustilago maydis* (DC) Corda now becomes *U. zae* (Beckm.) Unger because the basionym *zae* of Beckman is the oldest one (1768).

The *Ustilaginales of British Isles* constitutes a valuable reference work on Smut Fungi and the authors deserve the congratulations of the mycological community.

M. M. PAYAK

Division of Mycology and Plant  
Pathology, Indian Agricultural  
Research Institute, New Delhi 110 012

**Annual Review of Plant Physiology** by Winslow R. Briggs, Russel L. Jones and Virginia Walbot, (Published by Annual Reviews Inc. 4139, Palo Alto, Elcamino Way, California 94306, USA) Vol. 35, 1984, pp. 736, Price US \$27-00, Elsewhere \$30-00.

The Annual Review of Plant Physiology (Vol. 35) is an exposition of the ever increasing dimensions and spheres of plant physiology. It contains 23 review



articles, written by such people who either had a long experience of research in a particular field or those who have contributed to fresh thinking or innovation of new techniques. As usual, the first article, the Prefatory Chapter, has been written by C. Ralph Stocking, a doyen in the area of chloroplast biology and photosynthesis. The chapter has lessons for both young and experienced plant physiologists. No area of research is the monopoly of any individual, howsoever great one might be, because the same thoughts might be occurring to others at the same time. Besides this, I wish to quote Stocking for the benefit of many of us. He says "One of the temptations of being a scientist is to use scientific endeavours as an excuse to escape from the unpleasant and sometimes frightening realities of life. Scientific research can be an island of tranquility, but it is too easy to rationalize by thinking that the research that one is doing is so important that no time is left even to write a grant application, or a research paper, much less to become involved in any way with local, national or international problems". Further on he says "We may not be experts in foreign affairs or nuclear disarmament, in controlling toxic substances, in the resolution of nutritional needs of Third World citizens in the resolution of social inequities, in slowing population growth, or in reducing the depletion of global resources, but at least we can become reasonably informed and concerned".

The remaining chapters are grouped under (I) Molecules and Metabolism (II) Organelles and Cells (III) Tissues, Organs and whole plants (IV) Population and Environment. There is now a certain amount of definiteness in areas such as Ethylene Biosynthesis and Regulation, Chloroplast ATPase and Photorespiration. For those attempting to eliminate photorespiration for increasing net assimilation and hence productivity, the prospects are not very bright. A new approach to assay plant growth regulators through immunoassay is suggested as promising, though there are still many problems to be tackled. The evidence is now presented for the presence of haemoglobin in both Rhizobium and non-legume actinorhizal symbiosis. Some important aspects of Rhizobium strain ORS 571 in association with

Sesbania, a plant commonly occurring in India, are described.

Biogenesis of Glyoxysomes and Membrane Transport of Sugars and Amino Acids are nicely described. The physiological significance of Plant Transposable Elements and Insertion Sequences is highlighted by bringing forward the 'Genome Stress' hypothesis of Dr McClintock.

Regulation of Root Development and Cell Division Patterns in Multicellular Plants are both interesting and informative. The chapters highlight the area of ignorance in such important aspects of whole plant system. Osmoregulation as a mechanism of drought resistance in crop plant is emphasized in another chapter. This chapter for a change as compared to the previous reviews, draws conclusions about crop plants using data on crop plants, rather than extending the work on lower plants and wild species to crop plants. The chapter on Phytoalexins and their Elicitors should create more interest among plant physiologists in plant pathological problems in this country.

The chapters grouped under Population and Environment, deal mostly with cellular and molecular aspects of photoinhibition of photosynthesis, freezing and cold injury and crown gall. The last of these could as well be included under Molecules and Metabolism.

While most of the chapters are good and interesting, but one gets a feeling that plant physiology is being studied more and more at cellular and sub-cellular level. In a sense it is inevitable, but at the same time a plant functions as a whole and not in parts alone. It would, therefore, be nice to see some emphasis on whole plant, and particularly on the applied aspects of plant physiology unless plant physiology comes to mean only the curiosity of mind or only a supportive discipline to plant science.

Nonetheless, no student of plant physiology can afford to miss this series of Annual Review of Plant Physiology

S. K. SINHA

Department of Plant Physiology,  
Indian Agricultural Research Institute,  
New Delhi 10012.