H. SANTAPAU, S. K. ROY, A. K. GHOSH, S. CHANDA, AND S. K. CHAUDHURI (Eds.). 1969. *J. Sen Memorial Volume*. J. Sen Memorial Committee and the Botanical Society of Bengal, Calcutta. Pp XXII +408. Price Rs. 40·00 in India and $ 10·00 abroad.

This volume has been published to perpetuate the memory of Dr Jitendra Kumar Sen, late Deputy Director, Botanical Survey of India, whose brilliant scientific career was abruptly cut short in 1966 by a heart attack at the premature age of 46. It is based on invited contributions whose variety and number are a testimony to the diverse scientific interests and popularity of Dr Sen.

The volume can be divided into two parts. The first part consists of a tribute to Dr Sen by Professor John Walton and a brief sketch of his life by Dr Sunirmal Chanda, followed by a chronological list of Dr Sen's publications. The second part comprises 58 papers pertaining to palaeopalynology, recent palynology, palaeobotany, taxonomy and allied disciplines.

It is not possible for an editorial board to control or modify the contents of invited articles. However, the contributions in this volume, coming from eminent scientists and active workers in their respective fields, not only contain mature assessments of various important aspects but also furnish a wealth of fresh information. Especially worth mention are the papers on (i) the spores of *Cordaianthus* (Potonie), (ii) a variation study of *Lueckisporites* (Hart), (iii) computer techniques in palynology-palaeobotany (Kremp), (iv) fine structure of the exine in *Macrozamia* (Erdtman and Dunbar), (v) palynotaxonomy of Casuarinaceae (Chanda), (vi) naming of a fossil conifer (Harris), (vii) the earliest plant life (Plumstead), (viii) Some evolutionary aspects of Indian flora (Vishnu-Mittre), and (ix) chemical and botanical characters as aids to the taxonomy of Meliaceae (Chakraborty and Datta).

Although a few spelling mistakes have creeped in at places, the general standard of printing is fairly good. There is considerable scope of improvement in the reproduction of photographic illustrations. A better quality of paper would have added further to the get up of the volume.

On the whole, the Sen Memorial volume is a useful publication for palynologists, palaeobotanists and plant taxonomists and should find a place in all important botanical, palaeobotanical and geological libraries.

R. N. LAKHANPAL

ROUDOLF SCHLECHTER. *Die Orchideen* 3rd thoroughly revised Edition by F. G. Brieger, R. Maatsch and K. Senghas. 1970. Verlag Paul Parey, Berlin. 1 Issue Pp. 12 coloured Plates + 75 figures (mostly photographs) Price D M. 24 (each issue).

It is very heartening to learn that a team of eminent orchidologists has decided, with the active cooperation of Paul Parey, to bring out the third thoroughly revised edition of this standard and now rare work. It is being published in about 18 separate issues comprising some 1200 pages, several

hundred accurately executed figures and some 18 coloured Plates. The entire work is proposed to be completed in four years. The team of editors is being assisted by such other specialists as Prof. Dr. H. Mergner, Prof. K. H. Meyer, Prof. Dr. W. Sauthoff, Dr. G. Schmidt, etc. This ensures the quality and standard of the work.

The first issue deals in part with the Evolution, Development and Structure of Orchids and covers the vegetative organs, the inflorescence and the flower. This is copiously illustrated with beautiful photographs, line sketches and two coloured plates. The production is superb and flawless.

The topics proposed to be discussed in subsequent issues are Fruit, seed, Germination, Cytological and Genetical Investigations, Plant Geography, Taxonomy, Culture, Diseases and Pest, Glossary and Literature.

I have pleasure in commending the work for every botanical library and to individual students who can afford.

V. PURI

F. C. STEWARD. 1967. *Growth and Organization in Plants.* Addison—Wesley Publishing Co. Pp. 564. Price $ 15·00.

The book presents an exhaustive but well-integrated account of the structure, development, metabolism and physiology of plants treated in a simple easily-understandable manner. The subject matter of the book is actually a compilation of lectures on plant growth and metabolism, that were delivered by Professor Steward to college teachers. The upto-date information documented in the book is stmiulating and interesting for students of botany.

The book has 10 chapters, covering about 550 pages. Chapter 1 introduces the broad outlines of the problem and the scope of the book. Chapter 2 deals with inorganic nutrition of plants in relation to growth and development and their interaction with environment; and chapter 3 with organic nutrition, beginning with carbon-dioxide as the ultimate source of carbon through photosynthesis and with nitrate or ammonia as the ultimate source of nitrogen, then considering the molecular architecture of the substances of which cells are composed and finally bringing home the fact that events of organic and inorganic nutrition are necessary not only to nourish cells but also to maintain them as finally balanced working machines. Chapter 4 discusses the nature and action of growth regulatory substances which control the sequential steps in the growth of cells. This is the subject which is engaging the attention of many workers and in which exciting new facts modifying the previous concepts, are rapidly forthcoming. In an attempt to condense the information on the role of auxins, gibberellins and kinins the author has not dealt with all the available concepts. The methods for fractionation and isolation of regulatory substances and the possible metabolic sites at which these may operate have also been discussed.

Chapter 5 covers a course in the structure of cells and meristems and different aspects of cell divisions, while chapter 6 deals with cell physiology relating to protein and carbohydrate metabolisms; energy relations; regulatory control of respiration, absorption and redistribution of salts, solutes and water; and the correlations of all these with growth, organization and developmental phenomena. The concept of morphogenetic stimuli and

their effects on different manifestations of growth and development have been discussed in chapters 7 and 8. The concept of flowering dealt with in chapter 8 is rather elementary ; but such a treatment is inevitable in a book of this type, particularly as detailed information is available in books and reviews exclusively devoted to this subject. Chapter 9 deals with quantitative interpretation of growth, various indices used to express it, characteristics of growth curves and problems of relative growth. The control system involving factors inherent in the nucleus, the chromosomes, and the genes which send signals that trip the switches connecting the circuits necessary for growth, have also been discussed. The subject though conventional has been treated in a simple and interesting manner.

The last chapter gives a stimulating speculation on the origin of life, totipotency of plant cells, their culture, organization and capacities to grow and differentiate, with experimental evidences obtained by the author in his own laboratory working with carrot and other plant tissues. In the end the author has posed some of the problems of plant growth and development that one would still like to see solved.

In this book Professor Steward has treated the subject in terms of systems that grow and develop, emphasising the importance of organization. In his own words "The properties of chemical substances may be interpreted at the molecular level, and the chemical reactions in the cells likewise proceed at the molecular level. But the essential characteristics of biological systems occur through organization which is more complex than that of molecules."

The book is well-illustrated. There is a summary at the end of each chapter and a list of selected references at the end of the book. These features will be extremely useful for those who desire further details on various aspects of the subject. The book can be used as a reference book by graduate as well as post-graduate students of biology and allied subjects and even by college teachers.

K. K. NANDA