calling upon spores to defy the laws of matter and to occupy the same space; the logic in the penultimate line of that paragraph is also shaky. The author has confused phthalimide with phthalimidine; this seriously weakens his argument on pp. 205, 206 and 213.

There is, indeed, too great a tendency to extrapolate and to speculate from speculations. There is ample room in the laboratory and meetings for inspired guesses; I am not sure that there is a place for them in books where they so quickly become expired guesses. Fortunately, the author is very willing to admit past errors. The style is not improved by occasional lapses into current American *patois* which, contrary to intention, tend to reduce clarity, except perhaps to the local inhabitants.

Printers' errors are very few, and the type is much better than that used in the previous book. The table of contents is enlivened with some tantalizing facsimiles from various publications of historic interest; the list of illustrations is rather hidden at the end of the book.

The bibliography contains nearly 700 references, including a few from 1955, and there is an author index.

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MODERN CYTOLOGY

International Review of Cytology

Edited by G. H. Bourne and J. F. Danielli. Vol. 5. Pp. xii+570. (New York: Academic Press, Inc.; London: Academic Books, Ltd., 1956.) 11.50 dollars.

THIS book contains fourteen papers ranging from such subjects as the histochemistry of labelled antibody, enzyme adaptation in micro-organisms and the chemical composition of the bacterial cell wall, to the evolution of the mitochondrial nebenkern and the acrosome reaction. One reviewer alone could not cope with all this. It would be regrettable if the three papers mentioned above were overlooked by pathologists and bacteriologists because they appeared in a volume containing a round dozen of reviews on metazoon cell inclusions. The authors of these three useful papers are Albert Coons, of Harvard; C. S. Cummins, London Hospital Medical School; and J. Mandelstam, of the National Institute for Medical Research at Mill Hill.

The other papers are on more familiar cytological ground. There is a masterly review by Peter Caldwell, of University College, London, on the intracellular *p*H, the various methods being critically discussed. R. and C. Vendrely, of Strasbourg, have written on the results of cytophotometry of deoxyribonucleic acid in resting and dividing nuclei. These authors give a pleasing account of the work of that inspired investigator, T. Caspersson. This article and those on protoplasmic contractility in relation to gel structure by Douglas Marsland, of New York University, on the activity of enzymes in metabolism and transport in the red blood cell by T. A. J. Prankerd, of University College Hospital, and on the uptake and transfer of macromolecules by cells in growth and development written by A. M. Schechtman, of Los Angeles, all recall the editors' stated task—to form in the reading cytologist's mind a unified concept in this field. Schechtman's paper includes a review of the work of Brambell *et al.* on the passage of macromolecules in the mammal.

In 1942, Bensley began the analysis of the particulate constituents of the cytoplasm: from this emerged a type of cytological experimentation which, in the case of muscle, is here dealt with expertly by John W. Harman, of Wisconsin.

Junquiera and Hirsch of São Paulo, Brazil, have written on cell secretion based on the study of pancreas and salivary glands. They have dealt competently with some structural and many biochemical aspects of the work under review. Their report on microsomes, cell ribonucleic acid, and the information obtained by the use of radioactive isotopes is particularly lucid. Unfortunately, their description of the Golgi apparatus is much less satisfactory, and they have failed to present a clear-cut presentation of different theories of secretion. During recent years it has again been clearly shown by J. Dalton *et al.* and by D. Lacy in Hirsch's chosen material that the Golgi apparatus is not a number of discrete neutral-red or methylene-blue staining bodies, a theory strongly supported in the past by Hirsch. Both types of inclusions exist side by side in pancreas cells. Yet Junquiera and Hirsch have identified them as a single type of organelle. The confusion to which this has led in their review is difficult to describe.

Warren Andrews's paper on the mitochondria of the neurone reminds us of the debt we owe to E. V. Cowdry in this field; perhaps a perusal of T. Moussa's papers on the neurones of toads, etc., might have assisted Andrews in his section on recent observations. From Japan comes a well-illustrated and original contribution on acrosome reaction. This subject dates back to Popa's work in 1927; Afzelius's electron micrographs of sea urchin sperms are included by Jean E. Dan in this contribution. Vishwa Nath has collected his spermatogenesis work, mostly published previously in the Research Bulletin of East Panjab University and generally unknown in Britain. For fixed material, Nath and his pupils used exclusively Flemming-without-acetic and iron alum hæmatoxylin. Many of the points raised by Nath can now be settled by study of electron micrographs. We do not believe that mitochondria metamorphose into Golgi bodies. Nor do we believe with Nath that the *Lepisma* sperm is unique among insects in having its acrosome where its middle piece should be, a centriole at its tip in lieu of an acrosome, and no mitochondrial part. No doubt Nath will find further stimulus in the wonderful electron micrographs of spermatogenesis by Beams *et al.* and Afzelius.

Finally, we have to congratulate Fritiof S. Sjöstrand on his 78-page article on the ultra-structure of cells revealed by the electron microscope. For the non-cytologist teacher, and for the senior undergraduate facing 'Finals', this paper is unreservedly recommended as a straightforward non-controversial account of the subject. There is no doubt that some of the other contributors in this volume will be helped by reading Sjöstrand. As to nomenclature—are the γ-cytomembranes or agranular reticulum related to endoplasmic reticulum? So far as the reviewer can make out, this means 'Is the Golgi apparatus related to ergastoplasm (basophil substance of histologists)?' Finally, on fixation for electron microscope studies—Sjöstrand claims that the veronal–acetate buffer for osmium tetroxide (Palade) is not so important as originally claimed. The isotonicity and the accessibility of the fixative are now said to be more important. This has a familiar ring.

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