a very good view of the current research around the world on the enzymology and bioenergetics of plant mitochondria and the characteristics of cyanide-insensitive respiration in mitochondria from plants, yeasts and fungi. It does not cover any aspects of DNA/RNA/protein synthesis/biogenesis in mitochondria. The section on physiological aspects is interesting since it shows the wide range of organisms and tissues and cells where mitochondrial activity play a crucial role, e.g., photorespiration in leaves, fruit and tuber storage, maize mutants susceptible to *Helminthosporium* attack, seed germination, suspension cultures of plant cells, root tissues.

The overall impression is a broad experimental approach to basic and applied research in the field of plant (not only higher) mitochondria. Now that techniques are available for isolating intact, functional mitochondria from a wide variety of plants and tissues (e.g., leaf mitochondria can now be obtained free of chloroplast contamination) and that plant mitochondriacs have a host of experimental devices available to them (and not only to animal mitochondriacs) we can look forward to them solving the biochemical and physiological properties of plant mitochondria soon!

D. O. Hall

Organelle Heredity

by Nicholas W. Gillham
Raven Press; New York, 1978
602 pages. $64.35

Recent years have seen a great increase in our understanding of the mechanism of biogenesis of mitochondria and chloroplasts; in particular the discovery of mitochondrial and chloroplastal DNA has resulted in the development of a new technology with its own language, esoteric terms and mysterious practices – the technology of organelle genetics. Gillham's book is a most timely addition to the literature on the subject because it brings together in one volume (albeit a rather bulky one) the theory and practice of research on mitochondrial genetics in yeast, *Neurospora* and *Paramecium* and of chloroplast inheritance in *Chlamydomonas, Euglena* and higher plants (e.g., *Nicotiana*). Thus the major cell types that have been used for the study of organelle genetics are considered in full detail.

In addition to the accounts of the genetics of these systems, the book includes a useful introductory section on the structure and function of chloroplasts and mitochondria and of their replicative systems. At the end of the book there is an equally useful section on the biogenesis of chloroplasts and mitochondria. The text is richly illustrated with high quality diagrams and electron micrographs and there is an extensive bibliography at the end of each chapter. The author states that the book '. . . is designed for advanced undergraduates, graduate students, and the general biologist and geneticist interested in the biogenesis of chloroplasts and mitochondria' and the text is perfectly suited to this aim (perhaps with the proviso that the 'advanced' undergraduate would have to be 'hyper-advanced' to cope with some of the detail).

As one turns the pages of 'Organelle Heredity' it is difficult to escape a feeling of awe at the pace and depth of discovery that is now taking place. It is clear that new sorts of problems are being tackled – problems of supramolecular organization, of migration of membrane components from their site of biosynthesis to their final resting places, of complex interactions between genetic systems and of control processes that are more sophisticated than the relatively 'simple' systems involved in the biosynthesis of individual enzymes. Gillham's book guides us in a most erudite manner through these exciting developments and should be a useful source book for several years to come.

D. B. Roodyn