Reproduction of eukaryotic cells

Reproduction of Eukaryotic Cells. By D. M. Prescott. Pp. ix + 177. (Academic: New York and London, October, 1976.) \$14.50; £8.85.

ACCORDING to the blurb this book "integrates recent discoveries about the molecular biology of the cell cycle into a comprehensive explanation of cell reproduction". In his preface the author wisely states his purpose more modestly "... to organise into a single source the principal facts and observations on the cell life cycle ... in an effort to increase our overall understanding of how these cells reproduce themselves and how this reproduction is regulated". The book interprets eukaryote cells to be mainly vertebrate derived, but we do get occasional forays into yeasts and amoeba. The monograph is intended to be (and indeed is) complementary to Mitchison's book, *Biology of the Cell Cycle* (Cambridge University: Cambridge and London, 1971), which dealt extensively with microorganisms.

After briefly introducing the cell cycle and discussing the pattern of cell mass increase between successive divisions the author plunges straight into cell synchronisation techniques. For many workers, cell synchrony is a prerequisite for any successful biochemical or molecular biological study of cell cycle control. The author does not make the usual mistake of ignoring the variability of G_1 but he seems puzzled by the failure of many attempts to achieve perfect cell synchrony. In spite of the 560 references (mostly we are told published since 1971), no mention is made of models of the cell cycle which not only predict that G_1 must of necessity be variable, but put this variation on a quantitative footing (Burns and Tannock, *Cell Tissue Kinet.*, **3**, 321, 1970; Smith and Martin, *Proc. natn. Acad. Sci. U.S.A.*, **70**, 1263, 1973). Whether these explanations of the variation of G_1 are accepted or not the variability of G_1 is an undeniable and unavoidable fact. As a consequence, temporal studies on the biochemistry of cell division are fraught with pitfalls. For instance, even within a mitotically synchronised population some cells enter S-phase within a few hours but other cells do not start DNA synthesis until many hours later. As a result, biochemical phenomena observed in an "early G_1 " population are a mixture of events occurring in some cells just before DNA synthesis begins and events that occur in cells that will

sit around for many hours before initiating S-phase. In "mid G_1 " or "late G_1 " the situation is worse. This unavoidable problem means that much of the biochemistry of G_1 is at best of questionable value and at worst useless. Synchronisation at other stages of the cell cycle is slightly more successful, but it is G_1 that is at the centre of cell proliferation control. A knowledge of what happens in G_1 will only come with a proper understanding of its variable nature and the nature of its variation. Until then even the best of monographs can throw little light on the subject.

Although those who have not been exposed to the cell cycle literature will find much of this book of interest, it is a pity that the author has drawn his brief so narrowly. The "molecular biology" we are promised on the dust-jacket turns out to be a rather dry

series of studies with inhibitions of protein and RNA synthesis. There is nothing (for instance) on the role of microtubules in the formation of the mitotic spindle, little on the process of cytokinesis and very little (apart from a discussion of RNA and protein synthesis) about the process of mitosis itself. There is a chapter on that slumping commodity cyclic AMP but little indication of what interesting futures the author would invest in.

In short, although the book is a useful source of references about the bare essentials of the cell cycle it fails to convey much of the excitement which surrounds the study of cell division and its control. **Robert Shields**

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Characteristic seeds

The Seeds of Dicotyledons. By E. J. H. Corner. Vol. 1: pp. ix + 311; Vol. 2: pp. 552 (illustrations.) (Cambridge University: Cambridge, London and New York, 1976.) Vol. 1: £15; Vol. 2: £25.

THE flowering-plant taxonomist, struggling with a welter of data, may at times be forgiven for regarding Occam's razor as a more useful tool than the microtome. Not so his brother the phylogenist, for Nature has concealed the origins and ancestry of the angiosperms with such skill, that every scrap of evidence may be required to unravel the mystery, and transform hypothesis into proven fact. In this respect, seeds (surely of some significance in seed-plants) have been seriously underrated by taxonomists and phylogenists alike, perhaps because they are not the easiest things in the world to examine, or to describe.

Professor Corner claims that every natural family of dicotyledons has a characteristic seed, and that, in consequence, the classification of families into orders should be consistent with their seeds. To substantiate this claim 218 pages of volume 1 of *The Seeds of Dicotyledons* consist of brief (but perfectly ample) descriptions of seeds and ancillary structures from most dicotyledonous families, together with descriptions of the seeds of many genera within these families. Volume 2 furnishes the necessary illustrations, 647 plates in all, comprising what must amount to several thousand individual figures, each a clear *camera lucida* outline, the salient features emphasised by

judicious stippling and shading. The amount of work involved in sectioning (free-hand) so much material at every stage of development from unfertilised ovule to ripe seed, and in illustrating the resultant observations, must have been stupendous, so that it is almost mean to suggest that the plates might have been even more useful had the individual figures and corresponding legends been more uniformly labelled with numbers or letters.

The phylogenetic conclusions which Professor Corner reaches as a result of his seed studies are (coming from the father of Durianology) not quite so startling as might have been supposed. All depends upon one's criteria of primitiveness. Professor Corner regards the elaborations of the Myristicaceae seed as the closest approximation to the primitive; thereafter it is but a step to the *Magnoliaceae*, *Annonaceae*, *Lauraceae* and *Monimiaceae*, and indeed to a situation which, through Hutchinson, Takhtajan and others, has become so familiar that we may well be too inclined to take it for granted. If so, the hypothesis that *Paeoniaceae*, *Cucurbitaceae* and *Convolvulaceae* belong to the same phyletic line; that *Grossulariaceae* should be allied to *Cruciferae* and *Polygalaceae*, and *Proteaceae* to *Papaveraceae* and *Fumariaceae* will jolt us out of complacency, and perhaps make us question (as Professor Corner anticipates) if "agreement in seed-structure should be employed to align such diverse plants in a phyletic series". I take his word for it that "it can stand enquiry". It is nonetheless surprising. **R. D. Meikle**

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