

PREFACE

The commercial exploitation of plant organ, tissue and cell culture emerged several years ago with the techniques of 'shoot-tip' culture, in which the excised distal region of the apical shoot was freed from any virus present and then induced to grow and proliferate in culture to produce large numbers of individuals which retained the characteristics of the explant, the procedure now known as micropropagation. This approach has since been applied to a large number of species, many of which are important crop plants in agriculture, forestry and horticulture; and *in vitro* propagation now forms the basis of a growing 'industry'. Other techniques such as anther culture are also now making an impact on crop improvement, while the equally elegant procedures of protoplast isolation, culture, fusion and regeneration are hovering on the threshold of commercial exploitation. Here the techniques of cell line selection are proving invaluable. Other techniques and approaches, such as cryopreservation and the use of cell cultures for the production of high-value compounds for the food and pharmaceutical industries, are still in prospect but gradually becoming closer to fruition. The first applications of genetic manipulation both to improve cell lines and to produce more productive plants with enhanced resistance to pathogens are also making rapid progress. These advances have only become possible because of the very considerable advances in the techniques, together with our increasing (but still incomplete) understanding of how plants grow and differentiate. The emergence of the new biotechnology has provided new perspectives and sharpened the focus of the ways in which plant cell and tissue culture can aid man. It was because of this view, namely that technique is now becoming technology, that I invited several authors, all established international authorities in their own areas of research, to contribute to a volume on plant cell culture technology to examine that which has been achieved and to look forward to future progress. The book is aimed at senior undergraduates, post-graduates and established scientists who wish to learn how these techniques are presently being commercially exploited and how they may be exploited further in the future. It is intended that the book will provide a firm basis on which future developments can be planned and executed.

As editor I would like to thank not only my co-authors for their ready

and expert co-operation, but also Robert Campbell, Nigel Palmer and Helen Forrest of Blackwell's who encouraged me to initiate this volume and who made its production possible. We also gratefully acknowledge permission from many authors and journals to include previously published data. I also wish to make special thanks to my secretary, Mrs E.A. Raeburn, to my postgraduate students and to my research colleagues for their assistance in the general assembly of the text.

May, 1985

M.M. Yeoman