

280); not all eutherian 'oocytes remain suspended in dictyate' as stated (p. 88); Riggs, 1989 (p. 272 & 280) appears in the text but not in the references – but these largely editorial matters do not detract from the excellence of this publication.

The book will appeal to a wide readership and should find a place in every genetics and zoology library.

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Production of Biologicals from Animal Cells to Culture.

Edited by R. E. SPIER, J. B. GRIFFITHS and B. MEIGNIER. Butterworth Heinemann. 1991. 826 pages. Hardback, £90.00. ISBN 0 7506 1103 0.

This book gives an edited version of the papers presented at the 10th meeting of ESACT, the European Society for Animal Cell Biotechnology. ESACT has held meetings in nine countries over the last 15 years, with participants rising from 75 to over 350, while interest has moved from vaccines for foot-and-mouth disease and polio to monoclonal antibodies, recombinant proteins and recombinant vaccines. The general emphasis is, of course, on products of commercial value, and the 135 contributions to this volume make it clear that the whole area of animal cell biotechnology is very active.

The first paper is the Hyclone Award Lecture, by N. B. Finter of Wellcome Technology Ltd, Beckenham, Kent, entitled 'Animal cell culture: the problems and rewards'. After a brief summary of the successful development of their foot-and-mouth disease vaccine, now manufactured in many parts of the world, Finter describes their problems in making interferons. A British Medical Council committee set up in 1959 gave up after 12 years, but stubborn scientists at Wellcome took up the challenge and gradually solved the problem, producing 'Wellferon' in commercial quantities by 1980.

The remaining 134 papers, all much shorter and some followed by discussion or argument, are arranged in 11 sections with the following titles: (1) Cell Lines and their Characterization; (2) Nutrient Media with Special Supplements; (3) Serum-free and Protein-free Media; (4) Cell Physiology; (5) Gene Expression in Animal Cell Systems; (6.1) Bioreactors: Overview, (6.2) Bioreactors: Hardware, (6.3) Bioreactors: Particles, (6.4) Bioreactors: Membranes and Perfusion, (6.5) Bioreactors: Optimization via Metabolism, (6.6) Bioreactors: Comparative Studies; (7) Monitoring and Assay of Animal Cell Parameters; (8) Kinetics and Modelling; (9) Downstream Processing; (10) Products; (11) Regulatory Issues, which ends with paper 135 on The Media-Cult HybriTest—a new test for *in vitro* toxicology. Lists of exhibitors and participants, and subject and author indexes, bring the book to a close.

It is not possible here to discuss the immense amount of information in these papers, so I will simply paraphrase a few points made by the three editors in their introduction. Bioreactors still command intense attention (32 papers), but downstream processing and regulatory aspects, including quality control and assurance activities, need more study, since they will be the prime determinants of commercial success or failure. Use of the DNA fingerprint technique for identifying cell lines led to controversy since, for example, HeLa and BHK cell lines could be distinguished, but not HeLa and another human cell line (WI 38), and it would be impossible to distinguish an engineered cell line and its original host cell by this technique. Different investigators failed to agree about the value of two enzymes as indicators of cell lysis and therefore cell numbers in growing cultures. These were lactic dehydrogenase and the enzyme system involved in proteolysis: some reports claimed success and others failure (instability) with these systems.

Cell biotechnology is clearly a research area of growing interest, importance and commercial value, and I suggest everyone should be aware of this book and should keep an eye open for ESACT's 11th volume.

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Plant Population Genetics, Breeding and Genetic Resources. Edited by A. H. D. BROWN, M. T. CLEGG, A. L. KAHLER and B. S. WEIR. Sunderland, MA, USA: Sinauer. 1990. 449 pages. Hardback £47.95, paperback £27.95.

In this book the editors have assembled a wide-ranging collection of papers in the general area of applied plant genetics. The book arose from a symposium held in Davis, California, in 1988 to honour Professor R. Allard, and contains over 20 distinct and individualistic views of the present state of the subject. In order to impose some order on these varied topics they have been loosely grouped under the headings of Genetic Diversity, Evolutionary Processes and Breeding & Genetic Resources.

The Diversity section includes a theoretical study (Weir) of the distributional properties of the genetic diversity measure (1-SS of allele frequencies) in different types of population and illustrates the use of the methods. This is followed by a comprehensive survey of the current literature on allozyme variability in plant populations, which has enabled the authors (Hamrick & Godt) to produce some useful and reliable generalizations on the actual distribution of variability within and between populations and the relationship of this to the breeding system. Following this theme, Gepts emphasizes the potential value of storage proteins as measures of genetic variation, particularly in the context of relationships within and

between species following domestication. Dvorak reviews our present understanding of molecular diversity in plants and debates future directions of research. There is some interesting discussion about both the neutrality of RFLP alleles, given that many seem to have insertional origins, and also the rapid changes in copy number in certain multigene families in response to stress environments. The consequences of transposon-induced changes in maize and the extent and adaptive causation of molecular variation with particular reference to serine protease inhibitors are considered in the final two chapters of this section by Nelson & Nei respectively.

The second section, on Evolutionary Processes, opens with an interesting review of plant mating systems and the methods used for their characterization (Brown). Hastings examines the theory and experimental evidence for epistatic selection and linkage disequilibrium in populations, and argues that the evidence for the importance of this type of selection in all populations is strong. The study of the inheritance of quantitative traits in natural populations is of central importance to evolutionary studies but very difficult to achieve in practice. In a chapter titled 'Gene identity and the genetic demography of plant populations' Ritland explores the possibility of using a combination of marker loci and quantitative traits as a partial solution to these problems. This is an approach which deserves further consideration given the strong case presented by Ennos of the need to move away from simple population models towards complex interacting ecological systems. Such approaches, he argues, are necessary to develop a more predictive theory of population change. The importance of diversity in natural or agricultural populations for reducing disease losses is critically reviewed by Burdon & Jarosz. They emphasize that the apparently small yield increases achieved in mixtures despite considerable disease reduction may be misleading, while the costs and benefits of resistance/virulence to the host/pathogen deserve closer scrutiny. The final two chapters in this section consider aspects of population dynamics. The first by Epperson reviews the recent statistical methodology for spatial pattern analysis and explores theoretical results from defined situations of selection and gene flow. Barrett & Husband emphasize that, while a good formal theory exists to understand migration and colonization, we are still woefully ignorant about effective population size and migration rates in natural populations.

The final section on Breeding & Genetic Resources opens with a chapter on forest tree improvement, principally looking at reproductive patterns using isozymes. These reveal fertility selection with selfed progeny failing to reach maturity and conflicting patterns of within- and between-population variation as revealed by isozymes and quantitative traits (Muona).

Weber, Qualset and Wricke examine selection strategies for autogamous species, comparing the efficiencies of a variety of selfing and backcrossing systems. The problem of alien gene transfer, particularly for quantitative traits, is illustrated through *Phaseolus* breeding (Bliss). As well as the normal problems of untested germplasm and linkage to undesirable alleles, the difficulties of predicting the expression of favourable alleles in diverse genotypes and environments are emphasized. Stuber provides a useful account of the advantages of molecular marker-aided selection for quantitative traits and provides empirical evidence for its potential in his own maize experiments. The book finishes with reviews of the role of quantitative genetics (Mayo) and of future strategies in genetic resource management (Marshall).

This compilation is a very valuable addition to the plant genetic/breeding literature, and the editors are to be commended for bringing together under one cover such an interesting collection of papers. It will be most useful to breeders and geneticists both in teaching and research.

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DNA Replication: in Focus. By ROGER L. P. ADAMS.
Oxford: IRL Press. 1991. 86 pages. £6.50 paperback. ISBN 0 19 963216 2.

This book is one of a series specifically designed to enable students to keep up to date in key areas of biology and medicine. It should prove particularly useful to honours students, Ph.D. students and researchers who have an interest in DNA replication. It covers many aspects of the field and includes a good set of references, many as recent as 1990. It also directs the reader to problems that still have to be resolved and puts forward some challenging viewpoints.

DNA replication is an all-embracing subject, which has been studied in a vast number of viral and cellular systems, each with their own peculiarities. This makes the organization and cohesion of a small book on the topic extremely difficult.

The book starts with an introductory overview of the topic, which provides a framework upon which the later chapters are based. The need for brevity in a book such as this, however, has its drawbacks. I feel that a slightly enlarged first chapter would have allowed a fuller explanation of the basics of DNA replication and better prepared the less knowledgeable reader for the later chapters.

The second chapter describes the enzymes involved in DNA replication in some detail and discusses their concerted action at the replication fork. This is followed by chapters on the initiation of replication at