more intensive, since the Mhc was discovered. It is very well illustrated with figures and tables, and presents the many aspects of an extremely complex and confusing subject with remarkable clarity.

Professor Klein explains that he was inspired to write a natural history of the Mhc by Buffon's great *Histoire Naturelle* (how many of us, I wonder, have dipped into those 36 volumes?). He has designed the book 'for anyone who is working on one particular aspect of the Mhc but wants to step back and view the complex in its entirety, for anyone who wants to be introduced to the Mhc, and for anyone who is just curious about this much-talked-about region'. The needs of these diverse customers are met by presenting the whole story in its historical context and discussing the many cul-de-sacs which led numerous scientists astray, as well as their steps forward and the arguments and problems still to be resolved.

A good deal of basic molecular biology and genetics is included to help the reader with a rather general biological background, and – of particular value – the numerous experimental procedures and tests which have advanced our knowledge are explained in detail and their merits and limitations are assessed. As an aid to readability the author has also tabulated most of the detailed information, so that the text is not cluttered up with the wealth of factual material being presented. Jan Klein suggests that this makes the book suitable for reading in bed, and the only problem there is its size and weight.

The book is in large format ($8\frac{1}{2} \times 11$ inches), solidly bound in hard covers. Its 762 pages (excluding 13 pages of index) contain a short historical first chapter (The Story) and nine very solid chapters entitled The Gene – Organismic Approach, The Gene – Molecular Approach, The Protein, The Antibody, The Cell, Function, The Population, Sociology, and Evolution. Each chapter has a number of subheadings listed in the general Contents list, and many sub-subheadings listed in the separate contents lists which begin each chapter; and this structure makes it particularly easy to find one's way in the book. As examples, putting sub-subheadings in parentheses, we find in chapter 2: *HLA* Complex (Chromosome localisation, *HLA* loci) and *H-2* Complex (A mouse is not a mouse, Genetic map of chromosome 17, chromosomes 2 and 18, Identification of class I loci, Identification of class II loci, *H-2* recombinants, *H-2* mutations).

Forgetting sub-subheadings, which are very numerous in chapter 6: The Cell, its subheadings are: T Lymphocyte, Lymphocyte activation, T-cell receptor, T-cell clones, Mixed lymphocyte reaction, Cell-mediated lymphocytotoxicity (CML), Graft-versus-host reaction, delayed-type hypersensitivity and contact sensitivity, Allograft reaction, Transplantation tolerance, Nature of alloreactivity. This chapter occupies 131 pages and includes 46 tables and 33 figures, and also contains 7 full-page colour plates giving the genetic composition of the Major H-2 haplotypes and the amino-acid sequences of class I and class II Mhc molecules from mouse, rat, rabbit and man with a 12-colour code identifying shared residues, 'ancestral' residues, mouse-rat-specific residues, mouse-, human-, rabbit-, and rat-specific residues, etc.

I hope that these lists will make the reader's mouth water and his eyes glitter with anticipation, rather than sending him off to some other subject. He/she will of course find much else of interest in other chapters: e.g. an illuminating discussion in chapter 7 (Function) of the Holy Trinity of Immunology (APC = antigen-presenting cell, T lymphocyte and B lymphocyte) and their interrelationships. Chapter 8 (Sociology) discusses the many genes either within the Mhc DNA region or very close to it, some of which have been claimed to have functional relationship to the Mhc genes. These include the Complement genes which are located among the Mhc genes, the mouse *t*-complex genes, and a number of enzyme-coding and other loci. Though some of these genes code for cell-surface proteins, there seems to be no convincing evidence that any of them have a functional correlation with Mhc. Chapter 8 discusses the associations, or lack of them, between *HLA* types and both infectious and non-infectious diseases, correlations between haplotype and races, and polymorphism of the mouse *H-2* complex. The last chapter, on Evolution, considers 'Whence the Mhc?', Relatives of the Mhc, Homologies among the Mhc genes, Evolution of Mhc and associated loci, Forces propelling the evolution of Mhc genes, Rate at which Mhc evolution takes place, Chromosome evolution, and finally, The parable of the Blue Chrysanthemum.

I do not think this book will go rapidly out of date, in spite of the intensity of current research, and it certainly deserves to be widely studied. It is written clearly and elegantly, and brings out well the many areas of controversy, uncertainty, ignorance and complete mystery which are still embedded in the Mhc complexity. If a few of these have been solved since the book was written, reading it will help these new discoveries to be put in their proper context. It is a misfortune that, at this time of money shortage in the pocket and in the Library purse, the book cannot be sold more cheaply.

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Electron Microscopy in Molecular Biology: A Practical Approach. Edited by J. SOMMERVILLE and U. SCHEER. Oxford: IRL Press Ltd. 1987. 248 pages. £16.00, US $29.00. ISBN 0 947946 54 3.

This book is primarily addressed to those who wish to obtain visual dimensions of biological macromolecules and macromolecular complexes. Transmission elec-

tron microscopy is generally regarded as tedious and time-consuming and this is the case with ultrastructural investigations of cells and tissues. This book should, however, highlight the fact that E.M. methods for analysis of purified molecules are relatively simple and rapid. The step-by-step preparative procedures described in the book should encourage more biochemists, geneticists and biologists of similar interests to take advantage of the demonstrated potential of high resolution electron microscopy.

The instructions in chapters 1 and 2 for the preparation and experimental manipulation of nucleic acids are straightforward. These chapters also include descriptions of the basic methods of preparation of grids and support films. Repetition of these has been carefully avoided by cross references in other chapters.

Chapter 3 presents in a concise manner a collection of procedures for examining protein-nucleic acid complexes. Chapter 4 describes routine methods for spreading chromatin and this is followed in chapter 5 by three adaptations of the original Miller technique for visualizing active genes from different sources. Readers are warned about the empirical nature of some of the steps and that further modifications may be called for with other materials. Readers interested in the procedures in chapter 3 are likely to benefit from reading chapter 4 as well before commencing work. To cite an example, the instructions on page 84 (3.1.3.iv) do not specify which side of the grid should face upwards when it is introduced into the meniscus. This is made clear on page 107 (iii). A similar example for those interested in chapter 4 is on page 107 (ii); here the authors do not say whether the alternative procedure for hydrophilization of carbon surface described in chapter 3 on page 81 (2.2) would suffice if glow-discharge equipment is not available.

An adequate summary of the methods for visualization of proteins by negative staining is given in chapter 6. The procedural details have changed little during the last two decades. The additional method of rotary metal shadowing for better visualization of long rod-shaped proteins is described in chapter 7. The procedures at times are complicated but the account nevertheless makes a valuable contribution to efforts aimed at clarifying protein structure and sites of protein-protein association. Long hours at the microscope are promised in some instances.

The immunological procedures covered in chapter 8 may be expected to be particularly useful to newcomers to the field. In addition to standard protocols, readers are offered many useful tips in order to avoid unexpected pitfalls. The emulsion-coating method for autoradiography in chapter 9 appears complicated and tends to leave readers confused. The limited applications of this technique so far to preparations of spread molecules has perhaps inhibited consideration of simpler methods. The superficial treatment of the theoretical aspects might well have been omitted, leaving readers to refer to appropriate publications.

Chapter 10 describes protocols for mapping repetitive sequences in chromatin and chromosomes. The chapter extends the scope of the classical *in situ* hybridization technique and is a timely innovation.

On the whole, the protocols described are complete and the book with its many electron micrographs showing results obtained is a worthwhile buy. The instructions from authors with first hand knowledge and experience should enable beginners to embark with confidence. The theoretical aspects of the techniques and the principles underlying procedures are beyond the scope of such a compilation, and readers are rightly directed to suitable references at the end of chapters. Typographic errors are rare. This reviewer spotted only two instances; one on page 205, line 18 and the other on page 207, line 14. The hazard warnings relating to some chemicals in common usage in EM laboratories are welcome in the interests of safety and are most appropriate in laboratory manuals of this type. The index is a useful feature but minor discrepancies may have crept in; for instance, the citation for uranyl acetate staining to pages 111–112.

As the editors point out in the Preface, this is not a manual on the use of the electron microscope. Since the final outcome depends on the effective use of the EM the reviewer's advice to the uninitiated is to collaborate with a practising electron microscopist if one can be found.

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Build Your Own DNA Kit. By WILLIAM G. THILLY and ALEXANDER VARSHAVSKY. London: Butterworths. £17.25. ISBN 0 409 90094 X.

Twenty-five years or more ago I remember strings of plastic 'popper-beads' being used by biologists to help them to think about such topics as DNA replication and recombination. The kit consists of the same type of bead, but with the important addition of a second connector arm, so that two chains of beads may be linked together to represent a double-stranded DNA molecule. The two arms are arranged at 90° to one another, and each consists of a 'stick' and 'ball'. There are two 'sockets' on each bead, diametrically opposite the arms, into which the 'ball' of another bead may be fitted. Thus it is possible to build two chains of beads, linked by connectors at 90° to the chains, and there is sufficient rotational movement of the 'balls' in the 'sockets' to allow the chains to be twisted into a two-chain helix, with down to seven beads per turn to represent a double stranded DNA molecule. The helix diameter to pitch ratio however is close to one, instead of approximately six as in B form DNA.

Since all the beads are identical, this construction inevitably leaves a spare connector arm projecting

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