

Book reviews

Chromosomes: a synthesis. R. P. Wagner, M. P. Maguire and R. L. Stallings. Wiley-Liss, New York. 1993. Pp. 523. Price £60.00, hardback. ISBN 0 471 56124 X.

This volume aims to give a broad integrated treatment of the structure, organization, activity and evolution of eukaryotic chromosomes and is directed at advanced undergraduate and postgraduate students and their teachers. This is far more than a cytogenetical treatise, since it sets out to synthesize the findings of cytologists, geneticists, cell and molecular biologists, biochemists and biophysicists towards “a better understanding of what chromosomes are structurally and functionally”. This is an ambitious task and one which has rarely been undertaken in recent years, perhaps not surprisingly considering the sheer quantity and diversity of new information to be synthesized. Inevitably a compromise has had to be struck between breadth of coverage and the amount of detail on specific topics. Although one can easily find specific points of omission or light treatment to quibble about, by and large the point of compromise is about right. Where, for reasons of economy, a subject is introduced but not pursued in detail, relevant review articles are cited as a source for further information.

The book is arranged in ten chapters which cover, among other things, basic chromosome structure, chromosome organization (higher order), the cell cycle and chromosome replication, meiosis and recombination, gene and chromosome action and activity, gene linkage and chromosome maps and genome/chromosome evolution. Most of these chapters are sensibly organized, but one massive chapter of more than a hundred pages, under the pantechnic title “Variation in chromatin organization and amount” covers chromosome rearrangements, transposable elements, somatic DNA rearrangements (for example, immunoglobulins), genome size variation, gene amplification, chromatin diminution/elimination, euploidy, aneuploidy and gene dosage/dosage compensation! This range of topics within a single chapter is daunting to the seasoned campaigner but must surely be a big turn-off for the average student. As expected, the balance of coverage reflects the expertise and special interests of the authors and it is therefore not surprising to find that classical aspects of cytogenetics, meiosis and recombination, and genome organization and physical mapping are well treated. There are, however, some surprising lapses. For instance, although most topics are well treated, the section on genetic mapping contains some terrible howlers such as the suggestion that map distance reaches a limit of 50 cM, and that “map units actually equal half the percentage crossover frequency between two genes”. Evidently a student reading this book is unlikely to be enlightened on the relationship between genetic recombination frequency and map distance.

Leaving aside the specific content, this book is notable in general for its enthusiasm for chromosomes. The authors

evidently have “the chromosome bug” and their enthusiasm for these aesthetic bodies infects every page and cannot fail to inspire the reader. Chromosome enthusiasts are prone to speculate on whether chromosomes are mere passive carriers of genes, or whether they have an existence and rules of their own, transcending those governing the cells, individuals and species they inhabit. The authors revive this metaphysical question in their preface but they do not promise answers and indeed the reader is largely spared any further consideration of this hoary old chestnut. Surprisingly, the one area in which this theme could have been profitably developed, namely B chromosomes, is barely mentioned.

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An Introduction to Genetic Analysis (Fifth Edition). A. J. Griffiths, J. H. Miller, D. T. Suzuki, R. C. Lewontin and W. M. Gelbart. W. H. Freeman, London. 1993. Pp. 840. Price £25.95, hardback. ISBN 0 7167 2285 2.

Knowledge of genetics has come a long way since the 1860s when Gregor Mendel formulated the concept of the gene from studies on the garden pea. Today genes can be detected, isolated, cloned, mutated and even transferred between phylogenetic groups due to our increased level of understanding. Genetic text books have also come a long way in the last decade, since I was an undergraduate struggling to grasp the fundamental principles of genetics. I would have welcomed this book with open arms.

The book appealed instantly due to its beautiful and meticulous layout containing many attractive coloured illustrations and photographs. The colour photographs at the beginning of each chapter are particularly inspiring and bring a real-life significance to genetics that pen drawings couldn't hope to achieve. True to its title, the book doesn't simply state the facts for students to learn by rote. Instead, it attempts to provide the reader with an understanding of the way in which important principles have been obtained. The book also considers the significance of these principles to the general understanding and elucidation of genetics. The landmark experiments in genetics are frequently recreated so that the reader can be led through the analysis of the data. This approach allows readers to draw conclusions as if they had conducted the research themselves.

Throughout the book, care has been taken with the presentation of information. This provides optimum benefit to the reader, both for initial study and for revision. Each chapter opens with a list of key concepts and an overview of