Book reviews

Human Genetics: Problems and Approaches (3rd edn).
F. Vogel and A. G. Motulsky. Springer-Verlag, Berlin.
1996. Pp. 851. Price £69.00, hardback. ISBN 3 540 60290 9.

This book should be essential reading for all geneticists, especially trainees, involved in the field of human genetics. It aims to 'provide a treatise on the conceptual basis for the entire field of human genetics'. This is exactly what it does, and it does it well. As such it covers an enormous breadth of information. Reading the contents alone sparked a sense of anticipation that made this book essential bedtime reading! What's more, the easy readability, good presentation and simple illustrations throughout stopped me falling asleep — there's nothing boring here. In 750 pages plus 100 pages of appendices, Vogel and Motulsky's *Human Genetics* covers the field of human genetics from all angles starting from an historical perspective with the Greeks, Mendel and Galton. A table of contents on some of the issues of the Eugenics Movement and the moral and ethical lessons from the first half of this century and discusses those challenging us in the next. The bulk of this fascinating book, however, goes on to explore, explain and expand on the principal discoveries of modern genetics, including recent techniques in cytogenetics, DNA and molecular technology and particularly mutation detection, analysis and new mechanisms.

So what's new compared with the 2nd edition? *Human Genetics — Problems and Approaches* has now been divided into 14 sections compared to the previous 7. This partly reflects incorporation of entirely new sections, such as the 'Genetics of Embryonic Development' and 'Multifactorial Inheritance' whilst other fields, such as 'Somatic Mutation, Cancer, and Ageing', have now expanded sufficiently to justify their own section. Recent advances are included particularly where novel mutations have led to an increase in our understanding of the basis of genomic mechanisms, for example, genomic imprinting and triplet expansion. Tables and lists have also been jazzed up making them more readable. I didn't find too many major mistakes, although there is a real howler in the diagram explaining imprinting which has been incorrectly copied from Halls' original. That aside, I would heartily recommend this book.

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Gregor Mendel — The First Geneticist. Vítěslav Orel.
Oxford University Press, Oxford. 1996. Pp. 363. Price
£29.50, hardback. ISBN 1 854774 9.

Any actions or events, human or physical, can obviously be interpreted in at least two ways: with reference either to their antecedents or to their consequences. The endeavours constituting science are no exception. An enlightening account of any scientific innovation will consider its sources, and also what it has led to, what avenues it has opened up. Tensions arise when these two lines of interpretation are contemplated in inextricable conjunction with one another. What has been called scientists' history of science insists on the conjunction. Mendel, to take the case before us, must be read, by the scientist, not only as responding to what went before but as making possible, anticipating, even groping towards what Bateson, Morgan and others were to do years later in the next century, decades after Mendel's death. Historians' history of science insists, no less strongly, that no-one could have been influenced by what was not available because it had not yet happened, so that we must never confuse how it was for Mendel in his time and circumstances and how it was for others, including ourselves, subsequently. Hind-sight, anachronism, teleological fallacies implying backwards-in-time causation — all such are eschewed by the historian writing on Mendel. The tensions between these two lines of interpretation run right through Dr Orel's splendid book. But he leaves us in no doubt as to his own allegiances. He writes as a loyal Czech, anti-Stalinist and, above all, as a scientist. His very subtitle is anathema to the historian. There is, until well into the twentieth century, no such institutional and intellectual role as geneticist, the historian will protest. Mendel's influence was decisive in the emergence of that role, but he was no more the first geneticist than Machiavelli was the first spin doctor. The historians' views of Mendel are, however, comprehensively and conscientiously discussed and so made accessible by Orel's book. Some years ago, Robert Olby then at Leeds — and with a little help and encouragement from your reviewer — characterized what it was to be a Mendelian around 1902 when the word first became current. Olby then argued that, on that characterization, Mendel was himself no Mendelian. Olby went on to ask what it was Mendel was being and was attempting, given that he was not doing Mendelian genetics. Olby's (and others') answer was that Mendel's principal preoccupation was not with heredity and its laws, but with hybridisation as an alternative to creationism and to

evolutionism as a theory of the origin of species; it was a theory common among botanists and one with a long ancestry going back at least as far as Linnaeus over a century before.

Orel gives a very fair hearing to all such historians' proposals, but ultimately declines to endorse any of them. Mendel for him is still the giver of the Mendelian laws of heredity. In upholding this view Orel gives detailed and fascinating accounts of several further issues. 'How may linkage among the traits Mendel investigated have conditioned his work? Are his data too good to be true, as Fisher most notably thought they were? Even more valuably, perhaps, we benefit here from Orel's own, unique knowledge of the science, the education, the agriculture and the religion peculiar to the times and places where Mendel lived and worked. This book, in sum, goes beyond all others in its coverage of its subject, not least because of its sustained, expert engagement with the burgeoning secondary literature. Although writing scientists' history of science, Orel has produced a masterly text that everyone interested in Mendel can learn a great deal from, no matter what are their agreements and disagreements with its assumptions and conclusions. In any case, no-one can read Mendel's famous paper and not agree that, in the words of the late historian Bernard Norton, this was one smart monk.

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Nucleic Acids in Chemistry and Biology (2nd edn).

G. Michael Blackburn and Michael J. Gait. Oxford University Press, Oxford. 1996. Pp. 544. Price £29.95, paperback. ISBN 0 19 963533 1.

It is not always easy to convince a student of biochemistry, let alone biology or genetics, that it can be profitable and illuminating to get to grips with the chemical reasoning behind biological phenomena; the task often appears daunting, and the connections difficult to make. Student, and teacher, need all the help that they can get to ease this process, and in the area of nucleic acids the first edition of Blackburn and Gait's book published in 1989 provided much needed assistance. In this second edition, the authors have taken the opportunity of updating and revising coverage in a fast moving field and introducing new material; the presentation of the book has also received a face-lift by improving the diagrams and introducing full colour plates. Despite extensive revision, the essential aim of the book remains the same: to provide a compact molecular perspective on nucleic acids that will be widely accessible to students and research workers. In this, the authors have succeeded splendidly; the perspective is distinctly different from the plethora of texts on the molecular biology of nucleic acids, and the coverage is

authoritative and well-balanced. The principal authors have recruited a set of expert co-authors to assist them, and the result has the virtue of authority of coverage without some the drawbacks of disjointed presentation that are often associated with multi-authorship.

The scene is set in a short introductory chapter which traces the origin and early development of the partnership between chemistry and biology in this area, surely one of the most vigorous and fruitful ecumenical movements in science in modern times. Chapters 2 and 3, on DNA and RNA structure, and chemical synthesis, respectively, are very much home ground for the authors, and the treatment reflects that fact. DNA and RNA structure are discussed with much greater rigour than in many other texts setting a solid foundation for appreciating not only the main features of DNA secondary structure but also the subtleties of sequence-dependent variation of structure which are functionally so important. Chapter 3 on chemical synthesis will hold no fears to the reader coming from a chemical background, but it is here that the interested student of molecular biology may find the material less familiar and the challenge greatest. However, the organisation and objectives of the chapter are clear, and the chemical detail is sufficient for the purpose without being overwhelming. The case is convincingly made that physical-organic reasoning can be very illuminating in understanding stability and mechanism and, as one would predict, the section on oligonucleotide synthesis is balanced and authoritative.

The chapter on nucleotide biosynthesis, an important topic in its own right, could so readily have proliferated, but that danger has been avoided by focusing on fundamentals and illustrating how many important drug targets are steps in nucleotide biosynthesis; the links between the biology and the chemistry are made very evident here.

Chapter 5 (on DNA sequence information, replication and rearrangement) and chapter 6 (on RNA sequence information and transmission) are in some senses the most difficult in a book of this kind, because here the overlap with the available molecular biology texts, some of which are of exemplary quality, is at its most problematic. Clearly, it is necessary to include these subjects in a balanced text, but it is harder to strike the individual tone which characterises the rest of the book. That tone is evident, particularly in the discussion of new advances in RNA structure and function. However, it seems to this reviewer that a greater emphasis on mechanism, particularly biophysical aspects of mechanism which are not otherwise well represented in texts, would have provided such a distinct approach, not out of place in this book.

Chapters 7 and 8 on the interactions of nucleic acids with small molecules see us return more clearly to the interface of biology and chemistry which is the special area of the book. Covalent interactions are discussed in chapter 7, and reversible interactions in chapter 8, and within each chapter a broad range of examples is considered, emphasising general principles and moving on to consider biological consequences such as the mechan-