and the lymphomas. Chapter 3 then moves on and discusses using these cytogenetic and molecular tests in diagnostic work-ups; for example, in differentiating the host of different lymphomas, whereas Chapter 4 looks at molecular pathology of precursor lymphoid leukaemias.

The fifth chapter provides a thorough discussion of the molecular pathology of the acute myeloid leukaemias, listing all relevant chromosome aberrations and mutations, and explains the precise molecular lesions that lead to disease, such as the inappropriate activation of tyrosine kinase genes that have downstream roles in apoptosis, proliferation and differentiation. Chapter 6 offers similar explanations in the lymphomas, such as how certain mutations generate fused genes and therefore their protein products.

Chapter 7 is perhaps my favourite as it deals with probably the most well-characterised genetic lesion, that of the Philadelphia chromosome and its characterisation as a *BCR-ABL1* fusion producing altered tyrosine kinase activity. What follows is a fascinating account of the development of the tyrosine kinase inhibitor imatinib, and how this serves as a template for the development of other drugs. This chapter also describes a second mutation, *JAK*2 V617F, and its role in other disease such as polycythaemia rubra vera.

Chapter 8 explains deletions, translocations and trisomy leading to chronic lymphocytic leukaemia, and also looks at high-throughput molecular methods (e.g., gene array) to assess these mutations. The book concludes with a Chapter on targeted therapies, such as monoclonal antibodies (e.g., to CD20) and small molecule drugs (e.g., the tyrosine kinase inhibtors and drugs inducing apoptosis).

Each chapter is heavily referenced (often over 100) with full-colour photographs and diagrams. It is certainly an example of a highly technical reference volume that has been put together with great care by undoubted academic experts. Consequently, it will find a home in regional cytogenetics units, but perhaps less so in routine laboratories.

A. D. Blann

Clinical Biochemistry

N. Ahmed ed. Oxford: Oxford University Press, 2010.
ISBN: 978-0-19-953393-0. 714 pp. £34.99.

Biomedical science forms the foundation of modern healthcare and spans a broad and complex subject area. The 'Fundamentals of Biomedical Science' series of books aims to blend the essential basic science with insights into laboratory practice to provide an understanding of how biology of disease is coupled to the analytical approaches that lead to diagnosis and treatment monitoring in the modern healthcare environment. *Clinical Biochemistry* is one textbook in this series of nine books and attempts to provide a knowledge resource suitable for undergraduates, trainees working in the field, and particularly those undertaking professional qualifications.

There are 22 chapters written by various authors currently active in the field. The layout of the book generally has some very nice features. Each chapter is introduced with a set of learning objectives, followed by an introduction to the subject area. The text is interspersed with excellent, clear and colourful illustrations and various coloured inset boxes which contain useful additional information. For example, there are numerous green boxes containing useful case studies, pink boxes highlighting key points from the text, orange boxes with self-check questions, and green cross-referencing boxes to other chapters and, in some cases, to other books in the series.

Unfortunately there is no consistency to the use of these features, with some chapters using the cross-referencing and information boxes more than others, and some for different purposes. Each chapter finishes with a brief summary, references for further reading, and a set of questions. The answers to these questions, coupled with some additional useful content, are available through an online resource. The book also has useful tables of reference ranges for the more common biochemical analytes, and at the end a glossary of terms

The first chapter is an introduction to the subject which lays the foundation of the modern clinical biochemistry department and features a potted history of the development of the discipline. It is a well-written and illustrated chapter covering the essential basics involved in the functioning of a modern laboratory, from method validation, quality control and quality assessment, specificity and sensitivity, accuracy and precision to the audit cycle. Another useful topic – automation – is the subject of the following chapter and covers the development and principles of the modern automated analysers and robotic systems currently found in many laboratories. The following 20 chapters cover topics such as kidney disease, hyperuricaemia and gout, clinical enzymology and biomarkers, disorders of calcium, phosphate and magnesium, biochemical nutrition, specific protein markers, to mention just a few.

The chapter on lipid abnormalities uses the blue information boxes to include interesting snippets such as the possible naming of Kringle domains after the Danish doughnut, and the discovery of statins. These tend to increase the interest factor for the reader.

The pituitary gland and its disorders are dealt with in a single chapter but is supplemented by further separate, well-focused chapters each dealing with diabetes, thyroid disease, reproductive endocrinology, and the adrenal gland. There is a well-structured and informative chapter on inherited metabolic disorders which describes the laboratory investigations that can be used to aid the diagnoses of the various disorders. Brief coverage is given to each of the groups of metabolic disorders and screening programmes for inherited disorders. Notably, there is no mention of antenatal screening for Down's syndrome.

The last two chapters provide a good overview of therapeutic drug monitoring and chemical toxicology. These aim to provide the reader with a practical insight into dealing with sampling and the laboratory investigations involved with drug analysis, and include the pros and cons of the various methodologies available for the analysis of these substances. Generally, however, only brief coverage is given to the analytical tests and thus the biomedical science student or newly qualified practitioner will not find sufficient information on the basic science which lies behind the laboratory investigations described in this book. However, when coupled with other suitable texts that cover

laboratory techniques in more detail, this book will be a valuable resource both for undergraduate students and qualified staff studying for further professional examinations in clinical biochemistry.

A feature which I'm sure will appeal to lecturers and training officers is the Oxford University web resource for this volume (www.oup.com/uk/orc/ahmed) which offers registered adopters of the text the opportunity to access the figures used in the volume in electronic form so that they can use them in their own environment and lectures.

G. Lloyd

Healthcare Biotechnology. A Practical Guide

D. Dogramatzis. London: CRC Press, 2010
ISBN-10: 1439847460, ISBN-13: 978-1439847466. 689 pp. £63.99.

This book is probably best suited to those wishing to evaluate the commercial potential of a biotechnology company, including biotechnology business students, bio-incubation managers, pharmaceutical leaders and those wishing to set up a business for themselves in the biotechnology sector. It covers all aspects including the healthcare biotechnology industry, intellectual property, funding, new products, marketing, and running a business. The background of the author, who held leadership positions with Hoffman-la Roche and Serono, does slant the book's perspective towards that of a pharmaceutical executive determining the buy-out potential of a biopharmaceutical business. That said, it does cover most aspects of setting up, running and commercialising a business, with the ultimate goal of a sale or collaboration with 'big Pharma'.

The book offers small sections, with practise questions at the end of each section, to reinforce application of the knowledge. So, for example, the chapter on biopricing ends with the question 'Biopharmas have used various innovative pricing strategies in Europe. Which are the main advantages and disadvantages of these approaches?' The questions also force the reader to assume the thought processes of various stakeholders, such as civil servants within a country's health department, a biopharmaceutical employer, clinicians and customers.

Of particular interest to someone setting out on this biotechnology business journey is the tricky path through biofinance, including venture capital and business angels. The section on marketing is also particularly strong and well thought through. There are some slight criticisms, however. For example, biomanufacturing is also covered but from the very specific angle of protein manufacture.

Biopharmaceutical/biotechnology companies operate in a highly regulated environment, as do large well-known pharmaceutical companies. Although this regulatory environment is mentioned, briefly, it is not covered in any depth in the book. This may be a serious oversight when one considers the legal powers of the US Food and Drug Administration (FDA). The emerging sector of personalised healthcare is touched on briefly but not covered to any great extent, and some of the current leading players in the world of companion diagnostics are not discussed.

To summarise, this useful book provides an oversight into the biotechnology business sector. My only criticisms of the book are that it cannot possibly keep up with the latest developments in the biotechnology sector (what book can?), and that biotechnology is such a vast topic that it can only skim the surface of the subject.

J. Theaker

Medical Genetics

I. D. Young. Oxford: Oxford University Press, 2010.
ISBN 978-0-19-959461-0. 297 pp. £29.99.

This is a second edition of a general introduction to genetics set out over 14 chapters. The layout of the book is well structured, with recommended reading and multiple-choice questions to check understanding. Each chapter also includes a review of key papers or research on the topic as well as interesting case notes to sustain the reader's interest.

The first three chapters cover the basic structure of the gene and chromosome. This is then followed by two chapters on simple Mendelian inheritance and one covering polygenic inheritance for complex disorders. Chapters 7–12 are entitled 'Genes and...' and cover a range of topics including population genetics, human development, cancer and pharmacogenetics. The last two chapters deal with clinical skills required by a clinician and applications to clinical genetics. The book is up to date and covers more modern research topics such as pharmacogenetics and pharmacogenomics.

The book is clearly written for medical students and provides in the appendices the basic knowledge and clinical skills recommended by the American Society of Human Genetics Information and Education Committee and the Joint Committee on Medical Genetics and the British Society of Human Genetics in the UK. However, biomedical scientists should find the clinical details of the single gene disorders and the diagnostic tests available of interest and the basic genetics covered in the first three chapters are accessible for anyone studying a genetics module.

T. Pinel

Microbiology. An Evolving Science

J. L. Slonczewski, J. W. Foster. London: Norton, 2010: 2nd edn.
ISBN-13: 978-0-393-93447-2. 1100 pp. £48.99.

This is a comprehensive textbook aimed at undergraduates in biology, biomedical science and microbiology. The text is modern in appearance, with many excellent colour diagrams, including many 3D models of proteins and other macromolecules, biochemical and signalling pathways, and blocks of text highlighting key points. There are also icons to inform the reader that online resources are available (e.g.,