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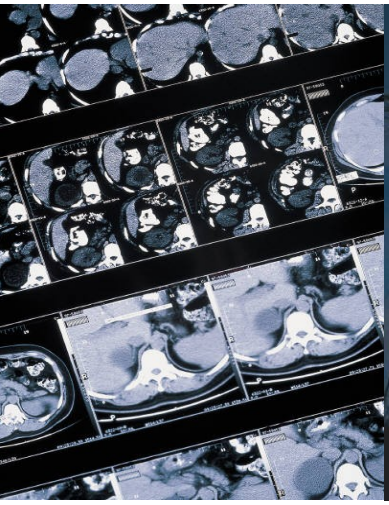


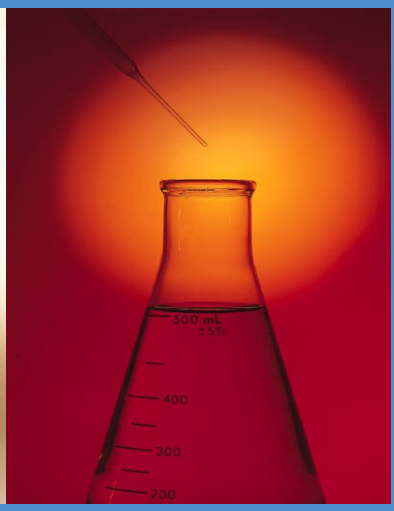

Reviews

A guide to publications in the Physical Sciences

CELEBRATING 10 YEARS ENHANCING LEARNING & TEACHING

Number 21
Volume 11 Issue 2

The Higher Education Academy
UK Physical Sciences Centre
...enhancing the student experience in chemistry, physics, astronomy and forensic science within the university sector

Reviews

'Reviews' is the journal of the UK Higher Education Academy Physical Sciences Centre. It is issued twice yearly in Spring and Autumn.

The journal is free of charge to academics in UK higher education institutions. The material is also published electronically on our web site. Subscriptions are available for those outside the UKHE sector who wish to receive the paper version. Contact the Centre for details.

Items for review and offers to contribute to the review process are welcomed. We also welcome any comments on this publication. Please contact the Centre.

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The Centre is supported by the Universities of Hull, Liverpool and Surrey.

Editor

Tracey Madden
UK Physical Sciences Centre
Department of Chemistry
University of Hull
Hull HU6 7RX
Tel: 01482 465418
Fax: 01482 465418
Email: t.madden@hull.ac.uk

Editorial

Once again, we are delighted to be able to present you with a large range of reviews from across the breadth of physical science topics. The 34 reviews include several general student textbooks on chemistry and physics, specialist texts on such topics as voltammetry, crime scene management, sustainability and communicating scientific research. We also have reviews for several science books for the non-scientist.

COMMENTS PLEASE!

If you have any comments you would like to pass on to us regarding this or any other publication or service we provide, please contact us at psc@hull.ac.uk or telephone 01482 465418.

Tracey Madden
Editor

In this issue...

Book reviews...

Chemistry with Mastering Chemistry

Subject area
Chemistry

Description
General chemistry undergraduate textbook

Authors
Catherine E Housecroft and Edwin C Constable

Publisher/Supplier
Pearson Education
<www.pearsoned.co.uk>

Date/Edition
2010/4th Edition

ISBN
978-0-273-71545-0

Level
Undergraduate

Price
£44.96

Summary Review	
range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

Catherine Housecroft and Edwin Constable have taken their mighty tome into a deserved fourth edition. Now at over 1500 pages, with 36 chapters and 14 appendices, this is one of the largest paperbacks on the market and may yet replace Jerry March's masterpiece as the proverbial undergraduate doorstop! This new edition is expanded to include chapters on Chemistry at Work and some very good introductions to bio-organic molecules and their chemistry. Unusually for a general chemistry text, around one third of the chapters are dedicated to organic chemistry, making this a very well balanced offering both for the chemistry undergraduate as well as the joint-honours student and of course those taking chemistry as a subsidiary or core part of their programmes.

The fundamentals of inorganic and physical chemistry are also covered well and in appropriate depth, with periodicity, p and s Block chemistry interspersed with electrochemistry, equilibria and reaction kinetics. There are also four chapters dedicated to spectroscopy. Although little prior knowledge of chemistry is assumed, the text rapidly gets into the meat of the subject and the less familiar student might be advised to begin with a more basic text such as Lewis and Evans (Palgrave Foundations) or Atkins and Jones' *Chemical Principles*, but this text will certainly work for someone with AS level or a good GCSE background.

The text is peppered with excellent full colour diagrams, photographs, historical references and good data. Each chapter has problems, additional problems and, in most cases, everyday examples of chemistry in daily use.

Structures are drawn conventionally but with good dimensionality and frequently related to ball and stick models and making use of space-fill representations where appropriate. This goes a long way towards helping the student think in a molecular way and facilitates a deeper understanding of the subject which will aid mechanistic and stereochemical studies which are also well presented and clearly explained. This book is as comprehensive as one could wish, clear in its explanations and very pleasingly presented. The font is not too small and the lay-out is easy to read with diagrams and photographs interspersed with text.

The book also comes with 12 months free access to 'Mastering Chemistry' a suite of very good on-line learning materials.

This text has a very international feel which reflects the background of its north-American, Swiss based authors and it draws from a wide range of examples, many of which are European. This makes a welcome change in an American dominated market and will appeal to the UK based student.

Pricing information was not available at the time of writing, although I suspect that this will not priced at the cheaper end of the market. However, its robust paperback form probably reflects an understanding by the publishers of the student budget and it is to be hoped that students will continue to see this book as a useful investment. Certainly every university library should look at it, if they have not already done so.

David J Harwood
Institute for Science Education
University of Plymouth
Portland Square
Plymouth PL4 8AA
October 2010

Crime Scene Management: scene specific methods

Subject area
Forensic science

Description
Introdcutor text for the student or professional.

Authors
R Sutton and K Trueman

Publisher/Supplier
John Wiley & Sons, Inc
<eu.wiley.com/WileyCDA>

Date/Edition
2010/1st edition

ISBN
978-0-470-01678-7

Level
Introductory

Price
£20.00

Summary Review

range: * poor to ***** good

Academic content	***
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	****
Accuracy	****

This is an introduction to crime scene management for students, those employed in the criminal justice sector and members of the general public. The editors state that the book should be used in conjunction with the website which accompanies the book so that students can take advantage of high resolution images that are not available in the book itself. It is also implied that course tutors could also use these images in lectures. Students should also expect to be involved in rote learning. The text has been prepared in small chunks of knowledge to assist this.

The book is laid out logically starting from general principles and then progressing through each stage of the crime scene management process. Each main section begins with an introduction. This is followed by subsections which contain very helpful self assessed questions and suggestions for further reading. This allows students to learn and revise at the same time. The book is well illustrated and includes many useful tables. The figures in the book are informative but the clarity of some of the photographs is poor. This was to be expected from explanations in the general introduction but they do detract from the general quality of the of the finished book. An index of tables and figures would have been useful.

Most of the subject areas that would be expected in such a book are there. Part one deals with crime scene principles, part two with evidence gathering techniques and part three with specialised scenes and report writing. These are well written and reflect the diverse expertise of the contributors. Some specialist areas are not sufficiently covered such as the outdoor crime scene, botanical evidence and other areas of field biology. The comprehensive coverage of the subject areas inevitably means that the depth of study is limited. There is little discussion of ethical considerations and new developments in, for example, the DNA database. This level of depth is evident throughout. An additional section dedicated to ‘new developments’ or ‘current issues’ might obviate the need for frequent new editions.

The emphasis on rote learning does not prepare students for the intellectual development implicit in higher education. This is only partially mitigated by the self assessed questions and suggestions for further reading at the end of each section. These seem to be designed to test recall rather than understanding. This book should be read in conjunction with other more in depth texts to ensure that students become accustomed to not only remembering but also to evaluation.

Crime Scene Management: scene specific methods is an appropriate text for the targeted audience. I would recommend its use as a primer for first year undergraduate teaching in forensic science, crime scene management and criminology.

Anthony M Cowell
University of Lincoln
Brayford Pool
Lincoln LN6 7TS
November 2010

Effective Experimentation for Scientists and Technologists

Subject Area
Science, Technology, Experimentation

Description
A guide to designing experiments and analysing their outcomes under realistic conditions

Authors
Richard Boddy and Gordon Smith

Publisher/Supplier
John Wiley & Sons, Inc
<eu.wiley.com/WileyCDA>

Date/Edition
2010/1st edition

ISBN
978-0-470-68460-3

Level
Researchers in industry

Price
£29.95

Summary Review	
range: * poor to ***** good	
Academic content	****
Usefulness to student	**
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

This text sets its stall out from the opening sentence of the preface: 'This is a practical book for those engaged in research within industry.' In keeping with this intended audience, if I were to choose a single word to describe this book, it would be 'pragmatism'. Whereas many books devote themselves to highly idealised situations or scenarios contrived for clarity at the expense of realism, **Effective Experimentation** is shot through with a keen eye for what is actually practical and achievable, with a direct and unfussy style.

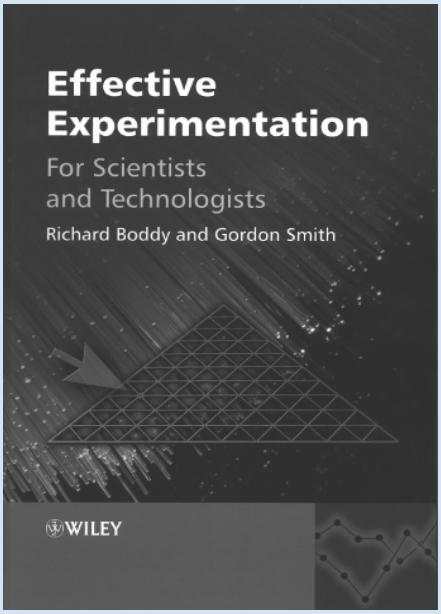
As the title suggests, this book covers the complete process of experimentation, from identifying the desired outcomes, to selecting a suitable experimental strategy, designing a procedure compatible with that strategy, analysing the data, and evaluating the performance and outcomes of the experiment. A 'case study' format is employed throughout, with all techniques and approaches being introduced in a realistic context, warts and all. Experimental analysis techniques explored in the text range from the familiar, such as regression analysis, to approaches more rarely seen, such as incomplete block experiments. I particularly enjoyed the chapter devoted to a pleasingly lucid and sensible treatment of experimental outliers

Each topic is introduced in its own self-contained, bite-size chapter. The salient points are easy to assimilate quickly, without being lost in the formal verbiage which often characterises more academic statistics texts. The downside to this brevity is that at times the book verges on being too terse: as an example, a quantity as fundamental as the standard deviation is dispensed with in a couple of sentences, without the use of equations or any mathematical definition. Generally, in keeping with the pragmatic approach, theoretical considerations and formalism are kept to the minimum, with an emphasis on what needs to be done. For this reason, this book is (unsurprisingly, given its stated target audience) probably not well-suited as a primary text for undergraduates seeking a detailed understanding of the statistical underpinnings of the techniques.

However, academics and postgraduate students who already have some familiarity with standard data analysis techniques will find much to like in this book. It highlights practical considerations rarely discussed in more theoretical works, such as how best to efficiently explore parameter spaces when the optimum (theoretical) experimental design is not usable (if, say, the required raw materials are simply too expensive). I found at least one thought-provoking insight in nearly every chapter: the industry-focussed approach brings a genuinely different viewpoint. Instructors who have grown accustomed to reiterating the importance of keeping all but one variable constant while investigating trends in a laboratory experiment are likely to raise an eyebrow at a list of '23 ways of messing up an experiment' whose second entry is 'Attacking one variable at a time'; however, the authors argue convincingly why it's important to look for interactions between variables without conducting excessive numbers of independent measurements. They have similar interesting observations to make about why it's sometimes not a good idea to fully explore the parameter space of an experiment.

Ross Galloway
School of Physics and Astronomy
University of Edinburgh
Edinburgh EH9 3JZ
November 2010

Effective Experimentation for Scientists and Technologists



From the publisher...

Effective Experimentation for Scientists and Technologists

By Richard Boddy and Gordon Smith

Effective Experimentation is a practical book on how to design and analyse experiments. Each of the methods are introduced and illustrated through real world scenario drawn from industry or research. Formulae are kept to a minimum to enable the reader to concentrate on how to apply and understand the different methods presented.

This book is a valuable resource for researchers and industrial statisticians involved in designing experiments. Postgraduates studying statistics, engineering and mathematics will also find this book of interest.

978-0-470-68460-3 270pp 2010 £29.95

This is not a book to turn to if you have a question like 'What is the Kolmogorov-Smirnov test?' (but then it was clearly never intended to be). However, if you have a practical problem, like 'How do I maximise the output of this process while keeping costs to a minimum?' then it will almost certainly contain something of use to you. The table of contents is sensibly laid out, making the text easy to dip in and out of, which is fortunate given the distressingly limited index (a mere single page featuring barely fifty entries). Practical exercises for the reader are to be found at the ends of the chapters, with impressively detailed and helpful solutions at the end of the book.

In summary, this is an insightful, interesting and readable book. While its heavy industry focus and economical text make it hard to recommend as a primary source for undergraduates (though it might well make a good companion textbook), academics and postgraduates should find that its refreshingly different emphasis provides valuable insights. Anyone who ever conducts 'experiments', in the most general sense, should give this book a try.

Electronic, Magnetic and Optical Materials

Subject Area
Materials, Electronic Engineering, Physics

Description
Wide-ranging survey of materials and devices in the fields of electronics, magnetics and photonics, with an emphasis on practical applications

Author
Pradeep Fulay

Publisher/Suppliers
CRC Press (Taylor & Francis Group)
<www.crcpress.com>

Date/Edition
2010/1st edition

ISBN
778-0-8493-9564-2

Level
Final year undergraduate; first year postgraduate

Price
£44.99

Tony Harker
Department of Physics and Astronomy
University College London
Gower Street
London WC1E 6BT
November 2010

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	****
Accuracy	*****

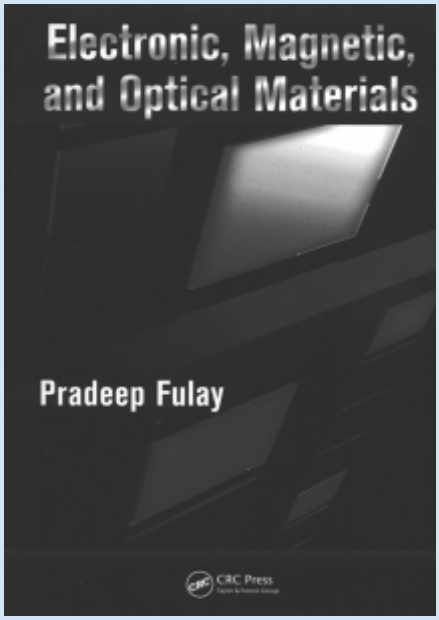
An enormous number of the devices we use in our daily lives rely on the electrical, optical and magnetic properties of materials. As technology advances, we do not just get smarter in our use of existing materials, but we create new ones. We can do that in several ways. The oldest technique is to create a homogeneous compound or alloy, but more recently we have been able to control the microstructure of materials, discover new phenomena, and create completely novel devices. The science and technology behind these innovations spans a range of disciplines: physics, chemistry, materials science, electronic engineering and even the biological sciences.

With such a broad scope, difficult decisions have to be made about which topics to include and the depth of treatment. Inevitably not everybody will be satisfied. From the point of view of breadth, coverage of graphene would have been helpful in sparking the interest of readers who might well have seen it mentioned in the popular press and want a more authoritative treatment. In terms of depth, there are no details of the way in which electronic spins are coupled to the crystal field to provide easy and hard directions of magnetisation. Overall, though, the author has steered a safe course between the Scylla of inclusiveness and the Charybdis of detail.

The nine chapters start, almost inevitably, with the structure of solids. There is a good discussion of the importance of defects, but polymers are not described and amorphous and nanostructured materials get very brief coverage. The practical aspects of electrical conduction are covered next, and that chapter ends with a description of the electronic structure of solids and the introduction of band structure. Given its importance for what follows, this seems a slightly odd placing for this material, but the discussion is clear. The next four chapters cover semiconductors: fundamentals; Fermi energy levels; p-n junctions; devices. Topics which are often omitted from traditional solid-state texts, such as degenerate semiconductors, are covered. The devices described include diodes, solar cells, light-emitting diodes, and bipolar and field-effect transistors, with useful schematic diagrams, equivalent circuits, performance characteristics and interesting presentations of the evolution of performance.

The last three chapters cover dielectric and magnetic properties. There is a comprehensive description of the origin of dielectric susceptibility and loss mechanisms, starting from the atomic level, and schematic graphs of frequency dependence are complemented by real data. Once again, practical aspects are included in the form of equivalent circuits. Technological aspects of ferroelectric, piezoelectric and pyroelectric materials are discussed in detail, in a way that should allow the reader to select an optimal material for a particular application. The basics of magnetostatics are described clearly, as are a wide range of magnetic properties of materials, but it would have been useful to have had a discussion of read-write technology to accompany that of magnetic storage media.

Electronic, Magnetic and Optical Materials



From the publisher...

Electronic, Magnetic and Optical Materials

By Pradeep Fulay

More than ever before, technological developments are blurring the boundaries shared by various areas of engineering (such as electrical, chemical, mechanical, and biomedical), materials science, physics, and chemistry. In response to this increased interdisciplinarity and interdependency of different engineering and science fields, Electronic,Magnetic, and Optical Materials takes a necessarily critical, all-encompassing approach to introducing the fundamentals of electronic, magnetic, and optical properties of materials to students of science and engineering.

778-0-8493-9564-2 436pp 2010 £44.99

Every chapter contains both worked examples and a large number of problems. The variety of problems is wide, ranging from simple applications of formulae from the text through the extraction of data from graphs to more open-ended problems requiring significant insight. Here, as in the text, there is a lot of emphasis on real-world applications.

This is a very accomplished presentation of an important and fast-moving range of technologies. One can imagine this work being used as a text book for a final undergraduate or first postgraduate year course in electronic engineering or materials science. It is also a very useful source of examples of applications for courses which go more deeply into the fundamental physics.

Energy – the subtle concept...

Subject area
Physics, Physical chemistry and Chemical physics

Description
A largely non-mathematical account which tracks the discovery of energy, and places historical events in the context of the intellectual revolutions that they initiated

Authors
Jennifer Coopersmith

Publisher/Supplier
Oxford University Press
<ukcatalogue.oup.com>

Date/Edition
2010/1st edition

ISBN
978-0-19-954650-3

Level
Undergraduate, postgraduate, academic

Price
£29.95

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

Over the last few years, I have been teaching quite a popular course on energy conversion and storage via electrochemical systems to final year chemistry undergraduates at the University of Hull, so it was with a degree of excitement that I read this beautifully-written text, largely on historical perspectives of energy discovery, and the developmental transformation of those origins into novel ideas and concepts. Throughout, the book is sprinkled with anecdotes and, most-importantly, insightful commentary, with a plethora of figures that assist the reader in digesting the concepts detailed.

The book starts with the author's aim of seeking to unravel energy concepts, and the first few chapters focus on those extracted from the known technologies on perpetual motion systems. This is followed by a chapter on the contributions from the Renaissance Greats: Galileo, Descartes, Huygens, Newton and Leibniz. In the spirit of enabling the reader to focus their thoughts, at the end of the chapter, thereby encouraging paradigm shifts in understanding the key points, the author has introduce a short paragraph overview. This innovative feature concludes most chapters throughout the book, and the author is to be congratulated on the anticipation of this much-needed closure readers generally require.

The next three chapters are devoted to thermal energy and mechanics, with the following chapter weaving the two concepts together using steam engines as an example. This elegant example allows the author to build-up the views that this technology engendered and, via subsequent chapters, to illustrate how new experiments can shed light on the problems with older theories, thereby directly engaging the learner in the scientific approach to discovery.

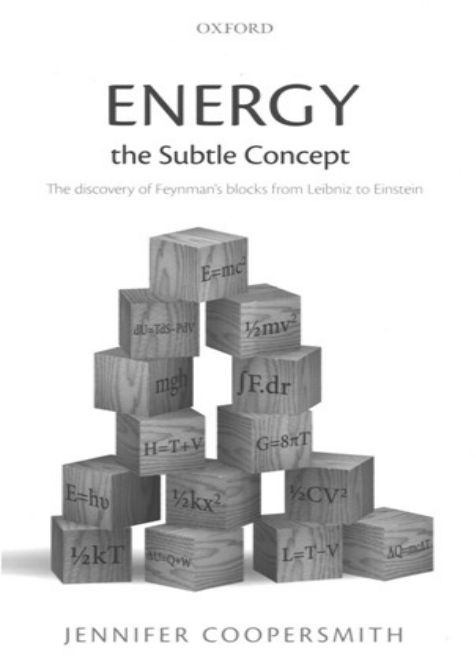
It is perhaps fitting that the author devotes about 6% of the book to Sadi Carnot's infamous cycle, emphasising the link between physical discovery and socio-economic policies by the simple question 'what, if any, are the limits to the efficiency of a heat-engine?'. After learning that Carnot's nephew was President of the Third French Republic, it is amusing that the author notes '...one should always follow one's haunches, but only if one is a genius, like Carnot...'!

The next few chapters direct the readers to discoveries in electromagnetism and light, and provide a small taster for quantum mechanics, highlighting Faraday's experiments on the electric eel, and his research in electrochemistry, noting that his law for electrolysis was Faraday's 'only *quantitative* law'.

In chapter 16, the author then presents the Laws of Thermodynamics as we teach them today, regarding energy conservation and the distribution of energy. This is followed in Chapter 17 by examining the usefulness of the concepts of energy for a variety of fields, including 'public energy' via the light bulb.

Jay Wadhawan
Department of Chemistry
University of Hull
Hull HU6 7RX
November 2010

Energy – the subtle concept...



From the publisher...

Energy – the subtle concept: the discovery of Feynman's blocks from Leibniz to Einstein

By Jennifer Coopersmith

Energy is at the heart of physics (and of huge importance to society) and yet no book exists specifically to explain it, and in simple terms. In tracking the history of energy, this book is filled with the thrill of the chase, the mystery of smoke and mirrors, and presents a fascinating human-interest story. Following the history provides a crucial aid to understanding: this book explains the intellectual revolutions required to comprehend energy, revolutions as profound as those stemming from Relativity and Quantum Theory. Texts by Descartes, Leibniz, Bernoulli, d'Alembert, Lagrange, Hamilton, Boltzmann, Clausius, Carnot and others are made accessible, and the engines of Watt and Joule are explained.

978-0-19-954650-3 392pp 2010 £29.95

The last chapter allows the reader to reflect on the learning material, by examining 'difficult concepts'. Perhaps it is this that is the most important feature of the text for the undergraduate reader. The book concludes with a timeline of important discoveries from 1618 until Einstein's discoveries in 1915, and a series of questions for the reader to examine how well they may have understood the material – a useful learning-assessment innovation, which would add further value if the author included suggested answers to those questions.

Overall, this is a highly enjoyable and eloquently written book. It is one I fully recommend to all students in the physical sciences.

Environmental Chemistry: a global perspective

Subject area
Environmental chemistry

Description
Undergraduate textbook on environmental chemistry

Authors
Gary W vanLoon and Stephen J Duffy

Publisher/supplier
Oxford University Press
<ukcatalogue.oup.com>

Date/Edition
2010/3rd edition

ISBN
978-0-19-922886-7

Level
Undergraduate

Price
£34.99

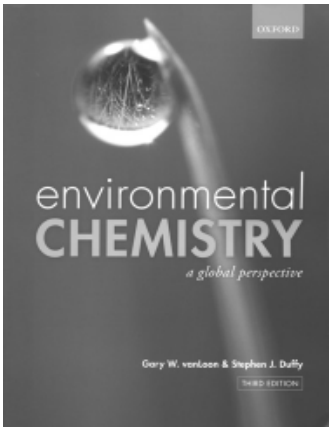
Summary Review	
range: * poor to ***** good	
Academic content	****
Usefulness to student	*****
Usefulness to teacher	****
Meets objectives	****
Accuracy	*****

This third edition of vanLoon and Duffy's **Environmental Chemistry** is on the track of the two previous editions. With the same structure of the first edition: three parts dedicated to the atmosphere, hydrosphere and terrestrial environment; twenty-one chapters, that have essentially the same structure as in previous editions; and some appendixes. It could look like a reprint, however, this is not the case. Environmental chemistry is a fast-moving scientific field, a huge amount of new information has been generated during the last decade and new environmental problems have been detected. vanLoon and Duffy have largely updated their book, incorporating part of this new information and also some of the problems recently detected.

Among the new features of the book is the inclusion of so-called 'literature links': short boxes revising recent relevant papers related to the topic being discussed. Of course, they have also updated the sources of information, including references to reliable websites and databases, some of which are searchable. Each chapter includes additional resources and, with the exception of chapters 1 and 21, good collections of problems (a pity results are not included in an appendix). Some sections include worked examples and, for each one, the main points to be retained are highlighted at the end. Here there are interesting 'Fermi questions', seeking from the students quick, rough estimates of quantities that are relevant to the topic under study.

Through the book, the authors manage to show the student the complexity behind environmental chemistry, revealing it to be a multidisciplinary scientific field and stressing the multiple interconnections between natural cycles, human activity and current environmental problems.

In summary, the book could be of benefit to undergraduate students who are newcomers to environmental chemistry. It builds knowledge from the fundamentals of the different disciplines of chemistry, with special emphasis on important concepts from physical, organic and inorganic chemistry. It could be of use to any student of experimental sciences, or even technology, seeking to get a basic knowledge of the subject, but it is especially recommendable to chemistry students who are in the final stage of their degrees.



Moisés Canle López
Department of Physical Chemistry & Chemical Engineering
Faculty of Sciences
University of A Coruña
Rúa da Fraga, 10
E-15008 A Coruña
Spain
November 2010

Essential Mathematics and Statistics for Forensic Science

Subject area
Forensic science

Description
An introductory text to mathematics and statistics for entry level undergraduate students, which only presumes GCSE level maths.

Author
Craig Adam

Publishers/Suppliers
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2010/1st edition

ISBN
978-0-470-74253-2

Level
Undergraduate forensic science students, possibly postgraduate students

Price
£75.00

Fritjof Korber
Department of Applied Sciences
The University of the West of England
Frenchay Campus
Coldharbour Lane
Bristol BS16 1QY
November 2010

Essential Mathematics and Statistics for Forensic Science delivers what the title promises. Its underlying contents are very similar to other introductory texts for entry level undergraduates, with the notable exception of chapter 11 which is a comprehensive introductory treatment of 'Statistics and the Significance of Evidence'.

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

For me, this chapter of 32 pages - roughly 10% of the contents - really sets the book apart from other introductory maths/ stats text books. The Bayesian approach to the interpretation of evidence centres on likelihood ratios and these are clearly explained. Background theory is kept to a minimum, and the author concentrates on applications, including the computation of likelihood ratios from continuous data and those for transfer scenarios. Literature citations enable the reader to go back to the original sources.

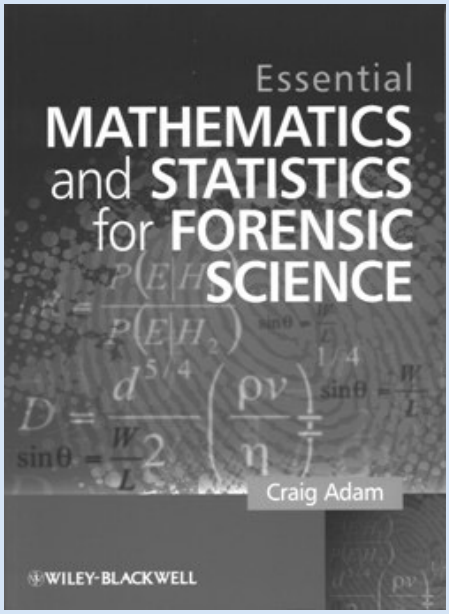
The book's main selling point is its pedagogical approach to make the contents relevant to the intended audience by using subject-specific examples. This is successful in the main, with examples originating from a wide variety of areas in forensic science, so that neither the forensic biologist nor the forensic chemist or physicist need to feel neglected. It is even more commendable that Craig Adams manages to find a forensic context for the development of essential skills, such as the computation of concentrations from spectrophotometric measurements and the plotting of standard curves for HPLC data.

As stated by the author, the structure of the book is linear, leading from the basic understanding of the concept of numbers to arithmetic, algebra, trigonometry and graphs. Quite appropriately, approximately half of the book is devoted to probability and statistics, as these are absolutely crucial for the impartial and rational evaluation of the probative value of physical evidence. The topics are introduced clearly and concisely; lengthy derivations are avoided. The book is studded with worked examples of applications which bring the subject matter to life. Self-assessment exercises permit readers to test their understanding. The solutions for these are brief, consisting often of a single number or sentence, and could possibly be slightly expanded by showing formulae used and intermediate steps. However, the short format seems to be the industry norm. I looked through quite a few of the worked examples and detected only two minor errors, which is remarkable for a volume with so many numerical examples.

I found it difficult to dip into individual chapters. Chapters seem to be designed to be read as a whole as problems often contain references to material discussed earlier in the chapter. This is not a weakness, but readers should be aware that this is not necessarily a reference book, although it could be used as one when one knows its contents well.

Continued on page 12

Essential Mathematics and Statistics for Forensic Science



From the publisher...

Essential Mathematics and Statisitics for Forensic Science

By Craig Adam

From a basis of high school mathematics, the book develops essential quantitative analysis techniques within the context of a broad range of forensic applications. This clearly structured text focuses on developing core mathematical skills together with an understanding of the calculations associated with the analysis of experimental work, including an emphasis on the use of graphs and the evaluation of uncertainties. Through a broad study of probability and statistics, the reader is led ultimately to the use of Bayesian approaches to the evaluation of evidence within the court.

978-0-470-74253-2 366pp 2010 £75.00

Continued from page 11

As stated before, there are unavoidable similarities with other entry level mathematics and statistics texts, notably Currell and Dowman's *Essential Mathematics and Statistics for Science*, also published by Wiley-Blackwell. This text is slightly longer than Adam's, and covers a wider range of traditional statistical methods, such as two-way ANOVA with post-hoc analysis, and non-parametric tests. Currell and Dowman's book is accompanied by extensive material on a companion website, including additional topics, such as an introduction to Bayesian statistics. It features an extensive index of more than double the length of the one in Adam's book, but contains no references or bibliography. Currell and Dowman make more use of Excel and Minitab, whilst still practicing calculations by hand. Worked examples and self-assessment exercises are of comparable quality and quantity in both books.

The choice between the two and similar texts is difficult, and will depend largely on whether one wants a book with a predominantly forensic focus and a Bayesian statistics section of immediate usefulness to forensic science students.

Explaining Research: how to reach key audiences to advance your work

Subject area
Science and engineering research

Description
This text is designed to assist scientists and engineers communicate their research effectively to their peers, lay audience and the media

Author
Dennis Meredith

Publisher/Supplier
Oxford University Press
<ukcatalogue.oup.com>

Date/Edition
2010/1st Edition

ISBN
978-0-19-973205-0

Level
Undergraduate and above

Price
£22.50

Summary Review

range: * poor to ***** good	
Academic content	***
Usefulness to student	*****
Usefulness to teacher	****
Meets objectives	*****
Accuracy	*****

The author explains that this guide was written for the purpose of filling gaps in the knowledge that some scientists and engineers potentially have in explaining their research to both professional and lay audiences. This guide is aimed not only at students of journalism, science, engineering and medicine, but also their related 'Public Information Officers' and managers who have the role of explaining to different levels of audiences the research taking place within their institutions and organisations.

The overall aim of this book is to ensure that its readers not only have the ability to communicate their research to others, but also more importantly to 'explain' it to both their peers and audiences that have no background or even real interest in the reader's research.

The book is divided into four main sections examining the basics of how to communicate, reaching your peers, engaging the lay audience and explaining your research to the media. Each of these sections then has their own sub-chapters breaking down each section into smaller important categories covering the basic principles or each point and giving interesting and relevant examples throughout. There are several amusing anecdotal examples of the correct and incorrect ways to explain your research throughout the book, for example, how to give a memorable presentation, where the author then goes on to discuss a presentation he saw about uni-sex clothing that was entirely filled with graphs rather than the actual use of clothing. These anecdotes are used throughout the book and help make an already very readable book more engaging. The author makes regular reference to the books accompanying website and blog where he states there are further resources and amusing reasons why scientists / engineers should feel confident about sharing their research, for example there is a list of all 'good' and 'bad' scientists portrayed in Hollywood films. I did not have the opportunity to sample these resources.

This book is written in an easy to read style that helps to keep the reader engaged and wanting to read and learn more from the author. Students of the sciences or engineering would certainly benefit from this text and would learn novel approaches about how to disseminate their research. The reader would need no prior knowledge of the subject or any prerequisites before reading this book, the reader does not necessarily have to have a career in science / engineering but all examples given are related to these fields so any relevance to the readers work can easily be seen, however, a researcher in a non-science or engineering field may also find this text beneficial as it does cover some generic issues such as putting together an effective PowerPoint presentation.

In summary, I feel that this book is well structured with clear methods and advice as to how to explain your research, it is very easy to read and engaging with many amusing points of advice and cartoons. I am sure that this book would benefit any person in the field of science and / or engineering who has had to disseminate their knowledge and work at any level.

Laura Finlay
Institute for Energy Systems
School of Engineering
University of Edinburgh
Edinburgh EH9 3JL
November 2010

From Atoms to Galaxies...

Subject area
Astronomy, Physics

Description
Textbook for students not majoring in physics

Author
Sadri Hassani

Publisher/Supplier
CRC Press (Taylor & Francis Group)
<www.crcpress.com>

Date/Edition
2010/1st edition

ISBN
978-1-4398-0849-8

Level
Graduate and research

Price
£57.99

Summary Review	
range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

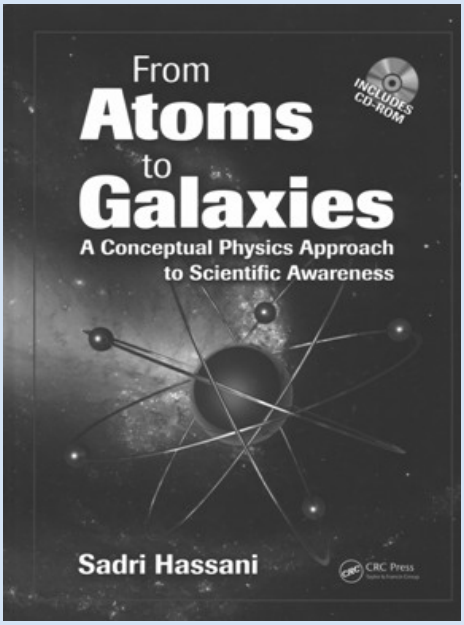
Intellectually inspirational, comprehensively informational and tangibly consistent in title, substance and organisation respectively. This is perhaps the closest description of the book by Sadri Hassani who invites all; the student, teacher, researcher, scholar, and even the layperson, to visit the wonder world ranging From Atoms to Galaxies which the author aptly subtitles as A Conceptual Physics Approach to Scientific Awareness. The most distinguishing feature of this unique title is its originality in terms of addressing the scientific phenomena with pragmatic rigor and spirited vigour. The former speaks for itself in the methodological approach adopted by the author, while the latter appears to be true philosophy when addressing the scientific phenomena and, paradoxically, denial of the same in its provocative attacks on many of the disciplines which are most fundamental in the transition of humankind from the 'state of nature' to the 'state of society.' Indeed, this transition was a prerequisite for all subsequent scientific inquiry ranging from the invention of flint instruments to the latest space technologies. Notwithstanding the philosophical controversy of some of its arguments, the book demonstratively stands out as one of the most friendly guide for recognising many interconnected strands of natural philosophy which help understand science in general and physics in particular.

This is a voluminous book structured round nine parts and forty three chapters, a tall order which scarcely compromises on continuity and consistency while moving along the organisational hierarchy. Part I of the book offers a chronological perspective to all and the sundry interested in the genesis of the humankind's effort to understand the eternal laws of natural philosophy. This part contains five chapters with titles which should be ascribed to the refined literary taste of the author. The genesis of scientific discovery and its application in sociology and technology of the bygone societies are varyingly described on a temporal scale, ranging from what author calls foggy horizon of time to the birth of scientific methodology. The latter, in turn, leads to the Newtonian era in Part II of the book. The pedagogical controversy briefly highlighted by the author at the end of Chapter 2, merits serious heart searching to help human society sustain the glorious tradition of scientific inquiry. This reviewer shares author's discontent and will like to add that students' ability for inquiry-based learning is an affective characteristic which in almost all cases is subject to the sound cognition of pre-existing relevant knowledge.

Part II of the book, begins by unravelling the generalised concept of motion and over a rhythmic flow of five chapters, 6-10, waves into Part III. The material in this part fundamentally addresses the concept and cause of motion, translated into its first, second and third law, in Chapters 6-7, followed by the discussion of some further important topics on the subject in Chapter 8. The food for thought is further enriched, even for the layperson, in Chapter 9 which is devoted to the description of gravitational force of both terrestrial and celestial objects with the help of easy to follow mathematical formulations. Part II ends with Chapter 10 which is largely a highly motivational and inspirational tribute to Newton, appropriately attired in engaging reflections on Newtonian physics.

Zia Khan
CA/151,9/A, Modeltown A
Bahawalpur
Pakistan
October 2010

From Atoms to Galaxies...



From the publisher...

From Atoms to Galaxies: a conceptual physics approach to scientific awareness

By Sadri Hassani

A primary textbook for undergraduate students not majoring in physics, **From Atoms to Galaxies** examines physical laws and their consequences from a conceptual perspective that requires no advanced mathematics.

Each chapter includes a glossary, review questions, and exercises as well as asides, which use the material developed in that chapter to debunk misconceptions, clarify the nature of science, and explore the history of physics as it relates to the development of ideas. The book also includes an accompanying CD-ROM, which provides algebraic details for readers who have the background and the desire to see the concepts of physics through the poetry of mathematics.

978-1-4398-0849-8 753pp 2010 £57.99

Part III of the book is devoted to waves and electromagnetism, symmetrically described in five chapters, 11-5. This part begins in Chapter 11, which is on waves, with an inspiring anecdote from Newton's youth, one of the many sublime pedagogical features of the book inviting emulation by authors interested in ensuring maximum addition to spontaneous and creative learning. The other topics included in Part 111 provide sufficient and coherent descriptions and formulations on the phenomena of electricity, magnetism and electricity, and electromagnetic waves; Chapter 12, 13 and 14 respectively, along with the epilogue, a common feature of all nine parts of the book, in Chapter 15 which vividly reflects on power of the mind for unravelling the endless complexities of matter.

The next part introduces the challenging phenomena of thermodynamics. The methodical organisation of Part IV appears to emphasise the need for equipping the students with analytical skills which essentially are the prerequisites for understanding theoretical precepts on the subject. Hence the first two chapters devoted to probability and statistical mechanics, Chapter 16 and 17 respectively. The latter also includes the discussion on mess making, entropy and the law of entropy increase. The epilogue of Part IV, Chapter 19, largely appears an argument favouring synergy between diverse intellectual endeavours, both within and across disciplines, which helps improve the precision of each specific aspect of knowledge over a continuum. The case in point, of course, happens to be the evolution of knowledge on thermodynamics.

Part V opens the discussion on Twentieth Century Physics which continues to span over entirety of the body text that follows before the last and concluding part of the book. The focus of Part V is the quantum theory. The description and the analysis of relevant concepts is again organised round five chapters, systematically addressing the scientific endeavours on the subject, quantum theory I and quantum theory II, from its birth onward. The section heading are very catchy and the analytical formulations provide easy to follow operational definitions of highly abstract conceptual phenomena which underscore the study of all matter in the universe. The epilogue, Chapter 24, highlights the characteristics of the quantum theory and pins down its similarities as well as differences with classical Newtonian physics. The natural sequel of Twentieth Century Physics is essentially the relativity theory which is focus of Part VI of the book. It is perhaps the inherent difficulty level of the this theory that this Part VI is extended by a chapter, as the discussion on the subject occupies Chapter 25-30, a pattern also observed in Part VII which is devoted to microcosmology. The discussion on relativity theory

Continued on page 16

From Atoms to Galaxies...

Continued from page 15

encompasses a wide range of topics from birth of the phenomenon to the general theory of relativity. The epilogue of Part VI, Chapter 30, begins with the emphasis on the continuity of the classical physics in both quantum theory and relativity and ends with a grave concern on the 'marketplace' of ideas. Indeed, the latter, frequently camouflaged as the inductive method, though very often erroneous in both approach and substance, promotes intellectually complacent notion of 'pile t'em high and sell t'em cheap.

The six chapters on microcosmology, Chapter 31-6, provide sufficient detail of various experimental and theoretical dimensions of the relevant phenomena with the help the standard model. Chapter 35 of Part VII again provides provocative, though largely justified, reflections on the 'marketplace' of ideas uniting science, religion and philosophy. However, authors emphasis on the distinction between physics and philosophy appears to be misguided, while considering literal meaning of the latter which essentially is the driving force for developing all sort of cognition. The heated arguments in Chapter 35 are followed by the epilogue of Part VII which opens The Eye of Physics on the inseparability of modern and classical physics, though with the apprehension that dwindling funds for fundamental research may hamper the movement of Homo S. Sapiens along the evolutionary scale.

Part VIII of the books offers the last lessons of this title on the Twentieth Century Physics with a holistic focus on the heavens. The discussion on macrocosmology is carried on in four chapters, 37-40, inclusive of the epilogue. This is perhaps the most engaging part of the book documenting the efforts of humankind for unveiling the nature including the genesis as told by physics. Specifically, the awe inspiring seven epochs described in Chapter 38, which is on early universe, expose the inquisitive learner to a marvel that appears to be almost as much mystical as seven skies of the scriptures of various faiths. Nonetheless, the comfort zone extended by the faith is spectacularly absent in the entirety of Part VIII, and that for a pretty simple reason: faith works on the instinct, while knowledge requires sound cognition and strong analytical ability, all the more so when questioning origin of the matter. The epilogue of the last of topic specific parts, I-VIII, is mainly an dialogue between preacher and the seeker and the former in his conclusion appears to agree with the old woman in the anecdote told by Hawking in the preface of his History of Time. Hence the everlasting paradox of dogma and science, always looking up to the divine gift of philosophy for optimal resolution.

The showstopper, Part IX, of this one of the most amazing titles offers value commensurate with the richness of rest of the body text. The argument extended over three distinct chapters, 41-3, addresses the Nature of Sciences by discussing the characteristics of science and highlighting the misconceptions which abundantly surround both the terminology and the phenomena itself. The argument ends in Chapter 43 with highly provocative views on what the author calls pseudoscience and anti-science. Ironically, while determined to relegate everything which is not matter to an inferior status, the author appears to contradict himself since the tangible matter happens to have intangible properties. Hence the universal paradox, which Einstein rather erroneously called locality and reality. The latter, however, can be only appreciated with the third eye, the insight distinguishing the humankind from all other species of the zoological world, programmed by nature and destined never to transcend beyond id. Unfortunately, in the contemporary times, this is also becoming true for quite a large number of the family members of Homo S. Sapiens and, paradoxically, the institute of formal higher learning itself is in many ways responsible for regression of the species, because it appears to be producing more of the narcissists than philosophers valuing humility as a concomitant part of personal integrity, a human trait which, when at its best, transcends to super ego, the most cherished phenomenon blatantly relegated to unreason by the otherwise highly accomplished author of this title.

Last but not least, especially for students and instructors, like any other standard textbook the title throughout provides study help by writing and explaining formulas along with explanatory line-drawn figures, other exhibits, conceptual exercises, mathematical notes, numerical and other examples, glossaries, and review questions.

Finally, in all fairness, this title is recommended as an investment promising fat dividends translated into very high levels of utility accruing from its private and public consumption with personal ownership and placement of multiple copies in the libraries respectively.

Green Chemistry for Environmental Sustainability

Subject area
Green chemistry, Environmental chemistry, Sustainability

Description
This is a research monograph into the various branches of green chemistry, with particular emphasis on reaction processes for technological utility, with some chapters devoted to environmental polices, models and ethics.

Authors
Edited by Sanjay Kumar Sharma and Ackmez Mudhoo

Publisher/Supplier
CRC Press (Taylor & Francis Group)
<www.crcpress.com>

Date/Edition
2010/1st edition

ISBN
978-1-4398-2473-3

Level
Undergraduate, postgraduate

Price
£99.00

Summary Review	
range: * poor to ***** good	
Academic content	**
Usefulness to student	**
Usefulness to teacher	***
Meets objectives	***
Accuracy	***

Over the last 15 years, the environment has become a major focus for physical scientists offering 'green' and socially-responsible solutions for a plethora of areas, notably the clean and efficient production of fine chemicals required for modern society, with a minimisation or elimination of the resulting industrial waste. One may be thus be forgiven for expecting that electrochemical methods should feature in a book on **Green Chemistry for Environmental Sustainability**, noting that electrolysis, conventionally undertaken with non-thermal activation can use clean (minimum reagent, and therefore intrinsically 'environmentally-friendly') conditions, that are chemically-mild (owing to activation via electron transfer at ambient temperatures). Disappointingly, this important and economically-valuable extensive research area is barely mentioned within this book. Nevertheless, the editors have sought to examine other aspects of green chemical research.

The book commences with an overview of research within green chemistry and highlights the usual areas (biomaterials, bioenergy, catalysis, 'green' solvents, efficient chemical synthesis and activated processes via microwaves and ultrasound). The book then moves into an exploration of selected areas of research in these topics. For example, chapter 2 is concerned with the use of aliphatic nitrocompounds to as building blocks, whilst chapter 3 examines the use of various materials derived from plants and animals as chelators for a variety of toxic metals. Rarely is the structure of these materials related to the observed ion-uptake, which is perhaps the biggest disappointment of this chapter. Chapter 4 then shifts to modifying polymers with enzymes. These topics are not very well woven together so that the reader is left wondering whether the entire book flits from one subject to the other.

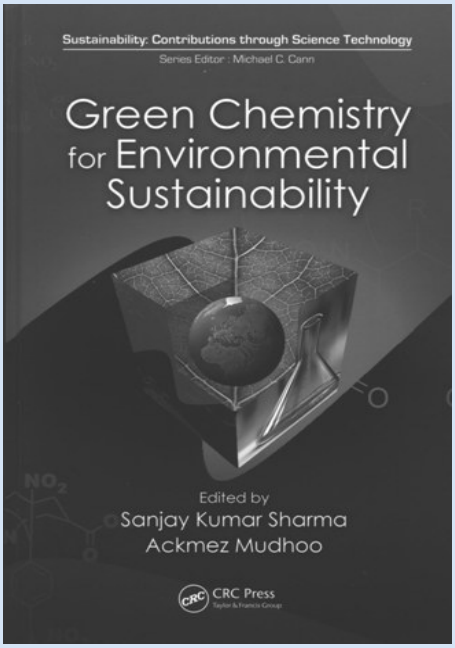
After a brief fray into the ethics of green chemistry, the focus is shifted to the important topic of remediation of arsenic by plants. This is followed by an examination of the influence of nitrates from fertilisers on the antioxidant systems for red blood cells in infants. Although a selected topic, the reader is able then to learn about microwave-assisted organic chemistry, which focuses first on reactor design and then several interesting chemical processes. This highly interesting chapter is followed by a chapter that examines the use of composting for bioremediation of hazardous chemicals including PAHs, PCBs and phenols. The emphasis is primarily on what has been undertaken, rather than to provide insight into the biochemical pathways within the responsible bacteria colonies. The next chapter then returns to policy, with an examination of promotional green policies in Europe, with due attention given to the REACH programme.

After a brief chapter on the use of simulations tools to examine public health protection, which sees a mention of the one-dimensional convective-diffusion equation that electrochemists enjoy seeing, but the reader is given no boundary conditions for its solution, let alone an outcome! This is followed by a good chapter which explores the use of green solvents (polyethylene glycol, surfactants, ionic liquids and supercritical fluids) for chromatography eluents.

Continued on page 18

Jay Wadhawan
Department of Chemistry
University of Hull
Hull HU6 7RX
November 2010

Green Chemistry for Environmental Sustainability



From the publisher...

Green Chemistry for Environmental Sustainability

Edited by Sanjay Kumar Sharma and Ackmez Mudhoo

Eminent international experts present research on and the application of green chemistry and engineering in addressing current issues of an environmental and social nature. They cover sustainable development and environmental sustainability with chapters on green chemistry and engineering research, the design and synthesis of environmentally benign chemical processes, green approaches to minimize and/or remediate environmental pollution, the development of biomaterials, biofuel, and bioenergy production, biocatalysis, and policies and ethics in green chemistry. The book also explores economics, environmentally benign technologies for greener processes, computational methods and modeling, and green approaches to minimize air and water.

978-1-4398-2473-3 450pp 2010 £99.00

Continued from page 17

The final quarter of the book focuses on biorenewable systems, with chapter 14 concerned with ultrasound applications, chapter 15 usefully looking at microbes as 'nanofactories' for the production of nanoparticles, chapter 16 on methods used by plants for selenium biofortification, with the book concluding with an excellent chapter on the use of biocatalysis for transformations of the nitrile functionality.

All in all, this is an interesting book. I do not think it has been edited to afford a particularly fluid read, but there are several useful and enjoyable chapters contained within it. I have been disappointed by the editors not taking an holistic approach to the subject, but the editors' approach has been '...to be a work that encompassed some of the various relevant aspects linked [to green chemistry] and linking green chemistry practise to environmental sustainability.'

Group Theory for the Standard Model of Particle Physics and Beyond

Subject Area
Particle physics

Description
A graduate level text book on group theory in gauge theories

Author
Ken Barnes

Publisher/Suppliers
CRC Press (Taylor & Francis Group)
<www.crcpress.com>

Date/Edition
2010/1st edition

ISBN
978-1-4200-7874-9

Level
Graduate and beyond

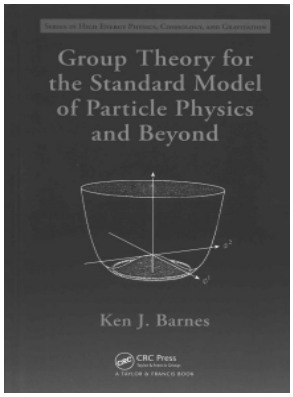
Price
£38.99

Summary Review	
range: * poor to ***** good	
Academic content	*****
Usefulness to student	****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

The best understanding we have of the laws of our universe is enshrined in the standard model of particle physics and various extensions. This model describes the matter and interaction content of the universe and has been tested to an enormous degree of precision. The framework of the standard model is the gauge theory, which is built on underlying symmetries obeyed by the particles in the theory and, as a result, an understanding of the mathematics of symmetry, known as group theory, is now essential to any student or researcher in particle or theoretical physics. This new book, by Ken Barnes, provides a lucid and readable account of group theory relevant to gauge theories and is a welcome addition to the available texts in the area.

The book arose from several lecture courses given at the University of Southampton, and the approachable and chatty book style reflects this origin. The presentation of difficult topics is clear and suitable for a reader new to the subject, while enough material is included to make this book useful as a reference for more experienced researchers. The book opens with a discussion on symmetries and conservation laws, followed by very useful chapters on angular momentum and tensor-like objects. This serves as a useful review and defines the notation used in the rest of the book. Following this are chapters on external and internal symmetries (including the basis of special relativity) and a chapter on Lie group techniques directed towards the needs of the standard model. These chapters are well written and shed a lot of light on these tricky areas. Following this, the author describes many features of the standard model in a group theoretic context, including spontaneous symmetry breaking and the Higgs mechanism. The material is a pleasure to read and enlightening. Finally the topic of beyond the standard model is discussed, with references to expected developments and discoveries in this sector.

Overall, this book is well written and presents this important topic in an excellent and clear way. The author himself admits that students of experimental particle physics may get a little lost along the way but will have plenty to gain, and readers with a more theoretical background will find this book an essential read. In conclusion, every student and researcher in high energy physics should read this excellent book



Robert Appleby
School of Physics and Astronomy
Oxford Road
Manchester M13 9PL
October 2010

Heterocyclic Chemistry

Subject area
Organic chemistry

Description
A comprehensive overview of heterocyclic chemistry useful to both undergraduate and post-graduates useful in enhancing their organic chemistry. Lecturers will also find this a great source book for teaching material.

Authors
J A Joule and K Mills

Publisher/Supplier
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2010/5th Edition

ISBN
978-1-405-13300-5

Level
undergraduate

Price
£39.95

Summary Review	
range: * poor to ***** good	
Academic content	****
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	****
Accuracy	****

As a reviewer I love receiving a new edition of a book from authors I admire tremendously. Bias? Of course! Being a heterocyclic chemist with medicinal and nitrogen-based natural product leanings how could I not been engaged by the thought of reading Joule and Mills fifth edition of their 'Heterocyclic Chemistry'. I was so glad to see that they have taken this edition to another level. The book has been enhanced by colour coded chemical structures, mechanistic schemes and orbital diagrams. It is a given that the introductory chapters are so well honed to be concise and no burden to read. Chapter 3, on substitution reactions, is well resourced from 1980-1990 chemistry, as might be expected. Dr Who may have had a hand in supplying reference 15, where the emboldening indicates the year 2097! Closer inspection reveals a slip of the command-B keys on the page number rather than the year, 1973. This is one of the few slight errors in very comprehensive references. Instead of cataloguing all the chapters, that provide a complete overview of the essentials, I thought I would concentrate on the author's efforts to introduce new material, although not in order within the book.

The special topics include (i) ring fluorinated systems, again as potential blocks to metabolism, the synthesis has to be considered core for today's drug industry, (ii) introducing isotopic labelling, (iii) bioprocessing of building blocks and (iv) Green chemistry, amongst others. I must say I feel this chapter does little more than raise undergraduate's awareness of these topics. The last two chapters on heterocycles in nature and medicine are an attempt to do likewise. The authors are opening Pandora's Box here and can never, as I am sure is their intention, do these subjects justice. In some way I believe they actually detract from the real strength of this edition.

My favourite chapter is the organometallic chemistry that presents an up-to-date treatment of the topic and helps confirms a colleague's observation that 'With today's techniques one can be convinced that a modern organic chemist can make any small molecule he or she desires.' I particularly like the treatment of the concatenation of five-membered ring systems, an increasingly important area in medicinal chemistry. This chapter proves a real 'coup de grace'.

In conclusion, I love this book. As a bookshelf version of Katritzky and Rodd's tomes it is a heterocyclic chemist's dip-in bedside reading with which I would challenge you not to learn something every time you pick it up. As an undergraduate book on the topic you couldn't ask for better.

Lee Banting
School of Pharmacy and Biomedical Science
University of Portsmouth
Portsmouth PO1 2UP
October 2010

Introduction to Chemistry: international student version

Subject area
Chemistry

Description
A general introduction to chemistry, for students not following a chemistry degree and with little background in the subject.

Authors
Morris Hein and Susan Arena

Publisher/Suppliers
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2010/13th edition

ISBN
978-0-470-50591-5

Level
Access/non chemists

Price
£47.99

Lee Reilly
Biology, Forensics and Sport
University of Derby
Kedleston Road
Derby DE22 1GB
November 2010

This book was written with the American market in mind, and is used on preparatory courses for University or chemistry modules for non-science majors. As this is the 13th edition, it can be assumed that it fills a niche well. With its remit, it assumes that student has little or no background in chemistry.

Summary Review

range: * poor to ***** good

Academic content	****
Usefulness to student	****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

Presentation is clear, with a good use of coloured figures and photos to illustrate the text and as the 13th edition this should be expected. Writing is simple, and terminology is well explained. The main body of the text is of a high standard. To place the chemistry discussed in context, use is made of boxes of text entitled 'Chemistry in Action'. These I generally disliked. The writing style became more journalistic, some read like PR for the companies mentioned, and most were very American in focus. Others, that did not mention companies or a specific American context, were better (e.g. fluorescent parrots on page 196). It is a shame that for this non-USA edition of the book, that some of these had not been removed or rewritten for the European market.

Content is, understandably, basic. The book is divided into twenty chapters dealing with most areas of the chemistry. Starting with a simple introduction to the subject, the book moves through the maths needed, atomic structure and relating that onto chemical reactions and compounds. Later chapters deal with bonding, gases, solutions, acids and bases and one is dedicated to nuclear chemistry. The level of the book is similar to an A-level text. Reaction kinetics is introduced but no development is made to reaction orders, for example. Organic chemistry is dealt with in a single chapter (19) and deals with the simpler organic molecules, looking at systematic naming compounds, Lewis structures, molecular shape and simple reactions. The final chapter is an introduction to Biochemistry. Probably helpful as many of the courses this book is used upon are for trainee nurses. Again the information presented is well described but no great depth is developed. Exercises and examples are used throughout the book. An appendix provides a number of answers but not all; allowing the student to build confidence and the lecturer to set questions directly from the book as assessed assignments.

The book is accurate and I spotted no major or minor errors, including the common one of saying that there are 92 naturally occurring elements. The number given here is 88.

This book is well written and a student with little Chemistry background would find this a more useful textbook than more advanced general texts such as *Chemistry* by Housecroft and Constable. A student with chemistry A-level, or equivalent qualification, would find this book too basic and not challenging enough. It is not suitable for a Chemistry degree, and is not aimed at that market. It would be useful on access or foundation courses and possibly as an extra text for A-level students. Lecturers teaching at access level would find this book useful, as it gives clear explanations of simple concepts. Other texts published in the UK and Ireland, probably have advantages in terms of cost and placing chemistry in a European context.

Introduction to Coordination Chemistry

Subject area
Inorganic chemistry

Description
The book provides an overview of traditional and modern aspects of coordination chemistry

Author
Geoffrey A Lawrance

Publisher/Supplier
John Wiley & Sons, Inc
<eu.wiley.com/WileyCDA>

Date/Edition
2010/1st edition

ISBN
978-0-470-51931-8

Level
Undergraduate

Price
£37.50

Jim Thomas
Department of Chemistry
Brook Hill
University of Sheffield
Sheffield S3 7HF
November 2010

Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	***
Usefulness to teacher	****
Meets objectives	*****
Accuracy	*****

This is a very readable introductory textbook to coordination chemistry written in a likeably informal style. Although Geoffrey Lawrance assumes that students will already be familiar with some of the basics concepts of undergraduate chemistry courses, he keeps mathematical and theoretical descriptions to the essential minimum, supplying further reading references for students wanting to know more. The structure of the book is clear, but is organised in a somewhat unconventional manner.

The brief first chapter is entitled The Central Atom and, using the Lewis acid/base model, explains why this is usually - but not always - a metal ion. A much longer chapter two on the common characteristics of ligands, introduces concepts such as denticity, chelation, and bridging ligands. Chapter three, which describes common concepts used to describe how metal ions and ligands of a complex interact, is much more theory heavy; introducing crystal field and ligand field descriptions of octahedral and tetrahedral geometries and a simple description of π-bonding interactions. This chapter also touches on kinetics by introducing the notion that complexes can be described as inert or labile. A fourth chapter on the shape of complexes, allows Lawrance to present a CFT description of square planar, trigonal bipyramidal and square pyramidal geometries; something that is missing from many introductory texts in this area. There is also a clear description of all the possible isomerisation phenomena - including optical isomers - that occur in coordination complexes and an unnecessary. A very brief romp through some of the structures produced by supramolecular chemistry, such as host-guest assemblies and catananes, is somewhat unnecessary and doesn't really add anything of worth to this chapter. Chapter five delves deeper into thermodynamic and kinetic descriptions of stability. For example, the introduction of stability constants, allows the familiar (but not necessarily entirely accurate) reasoning that the chelate effect is due to favourable entropic changes. Mechanisms for associative and dissociative substitutions as well as inner and outer sphere electron transfer are also lucidly covered. Chapters six and seven present a succinct, but thorough, précis of modern methods to synthesise and isolate metal complexes, and all too brief overview of the spectroscopic and physical methods used in characterisation of these products. In the final two chapters biological and commercial applications of coordination chemistry are introduced. By covering both of these huge areas in just less than forty pages, the text sacrifices depth for breadth, leaving the reader to romp through a smorgasbord of swiftly introduced structures, subjects, and theories.

Overall then, I applaud this attempt to produce a slightly different and distinctive introduction to a major area of modern chemistry, but I feel it is a bit of a curate's egg; some aspects of the book are very good indeed for example, it is easy and entertaining to read, and all the core concepts are introduced very clearly. However, as a textbook, it would be considerably improved if it did not attempt to cover every aspect of the current state of play in this burgeoning field as currently it feels spread a little too thin in places.

Introduction to Mechanics

Subject area
Classical mechanics, Physics

Description
A modern introduction to Newtonian dynamics and the basics of special relativity

Author
Mahendra K Verma

Publisher/Supplier
CRC Press (Taylor & Francis Group)
<www.crcpress.com>

Date/Edition
2008/1st edition

ISBN
978-1-4398-0127-7

Level
Undergraduate

Price
£38.99

Summary Review	
range: * poor to ***** good	
Academic content	****
Usefulness to student	*****
Usefulness to teacher	****
Meets objectives	*****
Accuracy	*****

As so many do, this undergraduate textbook started life as an introductory lecture course provided for the author's university. While the end product can certainly serve as the original aim and title suggests - as an introduction to the subject - undergraduates at all levels of study could benefit from leafing through its pages. Indeed I suspect many graduate students and even professors could gain fresh insight into concepts and problems. I certainly did, and have benefitted in my own teaching by reviewing this book.

In 20 chapters over 300 pages Verma's work covers a broad range of subject matter, managing to go into quite some depth in some areas - for example the sections on Euler's equation and the potential function are admirably detailed and should provide intellectual stimulation for even the most advanced of undergraduate students. That it manages to do this without seeming crammed or cluttered says much about the excellent setting out and organisation of the sections.

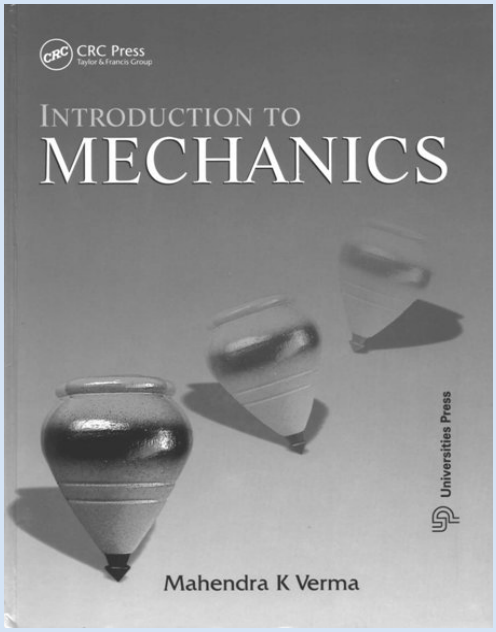
Mechanics textbooks are plentiful and any new addition should justify its existence; it is probably the range of this book that sets it apart from others. As well as all the standard mechanics topics that could and should be encountered in such a volume, Verma manages to include fascinating and detailed analysis of phase space, tensors (in an appendix), special relativity, non-linear dynamics and solutions of differential equations (not to mention interludes on scientific history) all without loss of detail and this is highly commendable. There is even a short appendix in the use of MATLAB (following from discussions of numerical solutions on the equations of motion) that some readers will certainly benefit from.

While the author's understanding of the subject is obviously excellent, and for the most part the explanations of the mathematics and the physics are very clear, there is the occasional lapse which may well confuse the reader. I was particularly alarmed early in the book by the section on Newton's Third Law of Motion: After stating the law, in what I believe to be an incomplete form, Verma then details two situations which supposedly violate the law. While one of these, (to do with plucking away the Sun and there being a time delay before the forces reach the planets) is a neat thought experiment and may lead to some interesting discussion, the other (to do with the force between two perpendicular current carrying wires) contains an analysis which is fundamentally incorrect in both the mechanics and the electromagnetism! Such a discussion is to be expected on Internet discussion forums but has no place in an elementary physics textbook.

Vijay Tymms
Department of Physics
Imperial College London
South Kensington Campus
London SW7 2AZ
November 2010

Continued on page 24

Introduction to Mechanics



From the publisher...

Introduction to Mechanics

By Mahendra K Verma

A modern introduction to Newtonian dynamics and the basics of special relativity, this book discusses standard topics such as Newton's laws of motion, energy, linear and angular momentum, rigid body dynamics, and oscillations, then goes on to introduce modern topics such as symmetries, phase space, nonlinear dynamics and chaos. The author presents Newton's equation of motion as a differential equation, bringing out key issues such as phase space and determinism in mechanical systems and helps introduce modern research topics such as chaos theory in a natural way. He highlights key assumptions of Newtonian mechanics and incorporates numerical solutions of many mechanical systems using MATLAB®.

978-1-4398-0127-7 356pp 2010 £38.99

Continued from page 23

Each of the book's chapters has a (variable) number of reasonably standard Exercises at the end to consolidate the material learned in the preceding pages and improve understanding. In most chapters these are then followed by a few more open ended Problems designed to further stretch the understanding, breadth of knowledge and scientific imagination (both theoretical and practical) imagination of the student. I found these all of great merit in principle, however some of them are a little underdeveloped (a typical example simply reads '4. Study about a yo-yo') and I suspect very few readers would be inclined to tackle these items without further professorial guidance.

Flaws aside though, this mechanics textbook will be of use to physicists at all stages of their development, from undergraduate right through to professorial level. I will indeed be recommending it to my students, perhaps not as a starting point for their understanding of the subject but to take an alternative and in depth viewpoint at some of the more advanced areas of classical mechanics and that is where I believe its principal merits lie.

Laser Physics

Subject area
Physics

Description
Comprehensive treatment of laser, from the basic theory of the interaction of radiation with matter to the practical aspects of laser construction and operation

Authors
Simon Hooker and Colin Webb

Publisher/Supplier
Oxford University Press
<ukcatalogue.oup.com>

DateEdition
2010/1st edition

ISBN
978-0-19-850692-8

Level
Final year undergraduate and above

Price
£45.00

Tony Harker
Department of Physics and Astronomy
University College London
Gower Street
London WC1E 6BT
November 2010

Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	****
Accuracy	****

Having, for several years, given tutorials on Radiation and Matter based on an excellent 50-page set of lecture notes by one of the authors (Hooker) I was eager to see what had been added to make this book. The short answer is, a lot. At 586 pages this volume dwarfs the other members of the Oxford Master Series on my bookshelf. So how does it differ from those lecture notes? In essence, this book has two parts. The first six chapters cover the fundamental theory of the interaction of light with matter and laser action. The remaining twelve focus on specific laser systems and applications, including developments from the past decade.

The fundamentals are developed with few assumptions of prior familiarity with the subject, from the basics of radiation in a cavity and Planck's law through absorption and emission to the rate equations. After a discussion of broadening mechanisms and lineshapes the conditions for optical gain are derived, and followed by the effects of saturation. The behaviour of a cavity with gain is covered next, including both stable and unstable cavities, low-gain and high-gain lasers. There are sections, for example on the semi classical treatment of the interaction of radiation with matter, which are marked as suitable for omission from a first course. Skipping over these might make the book look rather like an obstacle course, but does have the benefit for reference purposes of keeping all the material on each topic together.

Progressing to practical applications, the authors first consider solid-state lasers. There is a good discussion of the energy levels of ions in crystal fields and their coupling to the lattice, as well as practical details of optical configurations and flashlamp and diode pumping. A similar level of detail, taking the reader from fundamental physical principles to practical devices, is applied to semiconductor lasers, fibre lasers, atomic gas lasers, infra-red and ultraviolet molecular gas lasers, and dye lasers. Again, the book is self-contained: for example, before discussing atomic gas lasers the authors devote 16 pages to the physics of gas discharges.

The other chapters covered include dynamic cavity effects, including Q-switching and mode-locking, non-linear optics and frequency conversion. There are chapters on precise frequency control, ultrafast lasers and short-wavelength lasers. There are mentions of the applications of each of these specialist types, making it entirely clear that the days when the laser was a solution looking for a problem are long past.

The book is in the Tufte-inspired format familiar in this series, with a large number of clear illustrations and tables. Towards the end of each chapter there are suggestions for further reading: these are normally to books or reviews, but the sidebars in the text contain many references to the primary literature. There are also many exercises, some of which explore significant applications and extensions of the mathematical theory. This carefully written book can take the reader through an introductory course and still be a valuable resource on the shelf of a research laboratory. A disadvantage for the student, of course, is that its price must have been pushed up by the breadth of its coverage. It is always hard to predict which texts will be judged by posterity to be classics, but the chances for this volume must be good.

Mathematics for Chemistry: a chemist's toolkit of calculations

Subject area
Mathematics, Chemistry

Description
A mathematics textbook designed for undergraduate chemistry students

Authors
Paul Monk and Lindsey J Munro

Publisher/Supplier
Oxford University Press
<ukcatalogue.oup.com>

Date/Edition
2010/2nd edition

ISBN
978-0-19-954129-4

Level
Chemistry undergraduates

Price
£24.99

David Nutt
Department of Chemistry
University of Reading
PO Box 224
Whiteknights
Reading RG6 6AD
November 2010

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

The new edition of **Maths for Chemistry** extends, expands and improves on the excellent first edition. Changes include new chapters covering more introductory material as well as more advanced material, making this the most comprehensive mathematics text book specifically written for chemists that I have seen. If a UK-based chemistry student is going to buy one mathematics book, I can wholly recommend this one. Non-chemists, however, should look elsewhere.

The unique selling point of this book remains the fact that almost all of the worked examples, self-test questions and end-of-chapter questions are chemistry-based. The only exceptions to this are when the questions are so short that no chemical context is required, for example: 'Algebraically determine the point of intersection between the straight lines y=-2x+10 and y=x+1' (Self-test question 10.4.1). This keeps the focus of the book firmly on mathematics for chemistry, as stated on the cover. The chapters are usefully short (typically between 10 and 15 pages) and, although the original intention was to provide material for one lecture, this also means that a student can quickly turn to the right part of the book and read the required chapter. With the inclusion of many worked examples, self-test questions and end-of-chapter additional problems, this book could easily be used for directed self-study.

I was particularly pleased to see the inclusion of aspects such as long division and drawing graphs by hand. I strongly believe that students need to be able to do this sort of simple task without reaching for a calculator or computer.

The book is made particularly readable by adopting an approach which guides the reader through the steps involved, in words as well as equations. This makes the book ideal for those students who find mathematics difficult. More-able students may find this a little irritating, but they will be able to skip over the text and focus on the worked examples, the self-test and additional problems. Although the pages of the book are very blue in colour (it would have perhaps been nice for the publisher to have used a broader colour palette), the different content types are clearly differentiated, facilitating a skim-reading approach when appropriate.

The book also includes a number of tips on how to perform various calculations using Excel or pocket calculators. This is fully in keeping with the supportive nature of the book, however it is also perhaps a slight weakness, as some parts of the book will begin to have a dated feel within a couple of years. Although it is true that a small number of chemistry students struggle to perform basic mathematical operations on pocket calculators and with Excel, a hard-copy book is perhaps not the best place for this, in my opinion. Given that a minimal (although useful) number of on-line resources are available for this book (consisting exclusively of a set of multiple choice questions for each chapter), this material could perhaps have been included on-line, where it can be kept up-to-date for as long as is appropriate. However, this is only a very minor issue.

Overall, this new edition of **Maths for Chemistry** is to be wholeheartedly welcomed!

Measurements and their Uncertainties...

Subject area
Uncertainties in measurements, Mathematics

Description
A practical guide to modern error analysis

Authors
Ifan G Hughes and Thomas P A Hase

Publisher/Supplier
Oxford University Press
<ukcatalogue.oup.com>

Date/Edition
2010/1st edition

ISBN
978-0-19-956633-4

Level
1st year undergraduate onwards

Price
£19.95

Judith H Steven-Setchell
Physics
School of Engineering
University of the West of Scotland
High Street
Paisley PA1 2BE
November 2010

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	****
Usefulness to teacher	*****
Meets objectives	****
Accuracy	*****

Measurements and their Uncertainties: a practical guide to modern error analysis by Ifan Hughes and Thomas Hase, is a book firmly aimed at undergraduate students, as a recommended text which might be taken in to labs. The paperback version is certainly small enough to make this feasible, and at £19.95 is reasonably priced. A secondary aim is to contain sufficient material to extend its use into the realm of honours projects, graduate students and indeed professional scientists and engineers. Where it differs from other texts dealing with similar material is that it assumes that the majority of the number-crunching required in uncertainties and error analysis will be done using a spreadsheet package.

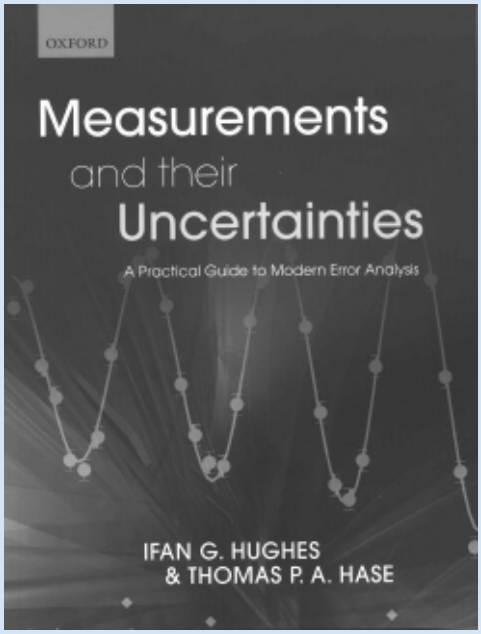
A pre-requisite for the book is an A-level maths or equivalent. Being based in a Scottish university, the majority of our students have Higher or Advanced Higher maths, and I am therefore more familiar with the content of these courses. Based on this knowledge, I would suggest that the limited knowledge base of statistics such students would have would be below the level required for this book. Statements such as 'the well known error function Erf $(x_1;\bar{x};\sigma)$' (p24) hopefully will not dishearten them. Having said that, the authors have given a good deal of thought to the use of illustrations, graphs and examples to support the text, and these are indeed helpful. The page layout also helps, with the text occupying only two thirds of the width of the page, and the diagrams arranged vertically on the remaining third, and thus easily viewed alongside the relevant text. Explanatory notes also appear in the page margins.

The book is split into nine chapters. Each chapter ends with a chapter summary and exercises relating to the chapter content. The exercises have titles which direct the reader to the relevant material in the chapter. Students who may have struggled with the mathematical content of the chapter will hopefully find these useful in illustrating the various techniques. They may however be frustrated that no solutions are given.

The first five chapters cover the basics which would be required for the first couple of years of an undergraduate course. Chapter one covers uncertainties; precision and accuracy. Chapter 2 introduces the basic statistical concepts: distributions, the mean and the standard error. Most importantly it also contains good advice on rounding, significant figures and 'five golden rules', which all students should observe. Chapter 3 treats uncertainties as probabilities and introduces the Poisson distribution and the central limit theorem. Again there are helpful illustrations which should aid understanding. Chapter 4 tackles error propagation, helpfully comparing the calculus based approach with the functional approach for single variable and multi variable functions. Worked examples are again useful in illustrating the methods. Chapter 5 tackles graph plotting, trend lines and error bars. Chapter 6 covers the theory of least squares fitting and the importance of χ^2. Strategies for a straight line fit are given, with example graphs as illustrations.

Continued on page 28

Measurements and their Uncertainties...



From the publisher...

Measurements and their Uncertainties: a practical guide to modern error anaysis

By Ifan G Hughes and Thomas P A Hase

This hands-on guide is primarily intended to be used in undergraduate laboratories in the physical sciences and engineering. It assumes no prior knowledge of statistics. It introduces the necessary concepts where needed, with key points illustrated with worked examples and graphic illustrations. In contrast to traditional mathematical treatments it uses a combination of spreadsheet and calculus-based approaches, suitable as a quick and easy on-the-spot reference. The emphasis throughout is on practical strategies to be adopted in the laboratory. Error analysis is introduced at a level accessible to school leavers, and carried through to research level.

978-0-19-956633 160pp 2010 £19.95

Continued from page 27

The remaining chapters cover more advanced material: for example, the methods used in computer fitting functions to find the best fit and the error matrix. Chapter 8 covers hypothesis testing, including useful worked examples. Chapter 9 suggests topics for further study. The final one of these is the GUM - The Guide to the Expression of Uncertainty in Measurement[1]. Mention of this document almost seems to be made as an afterthought, and this would be my main criticism of this book. The authors state 'it should be noted that, at present, the use of GUM is not widespread in university laboratories' (p129). Given that GUM is supported by the main measurement standards organizations worldwide, I would suggest that we are doing our graduates a disservice if we do not draw more attention to it. Not all graduates will continue on an academic career route, and they should be aware of what happens in the real world of work, where ISO accreditation may be an important factor in their working lives. It certainly was for me in my previous (non academic) physics career.

What then are my overall impressions of this book? I suggest that as a self-study guide it might be off-putting to first and second year students because of the mathematical and statistical content. On the plus side, I can see that it has a definite use as the basis for a course on physics skills in year one or two of an undergraduate programme. The end of chapter summaries and worked examples are very useful, and with some guidance via a taught course the students would gain the confidence to delve further into the book during the rest of their undergraduate studies and beyond.

References

1. Guide to the Expression of Uncertainty in Measurement, 2nd ed. (Geneva: International Organisation for Standardisation) 1995 (ISBN 92-67-10188-9)

Models for Bonding in Chemistry

Subject area
Chemical bonding, Chemistry

Description
Undergraduate text on chemical bonding

Author
Valerio Magnasco

Publisher/Supplier
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2010/1st edition

ISBN
978-0-470-66703-3

Level
Undergraduate

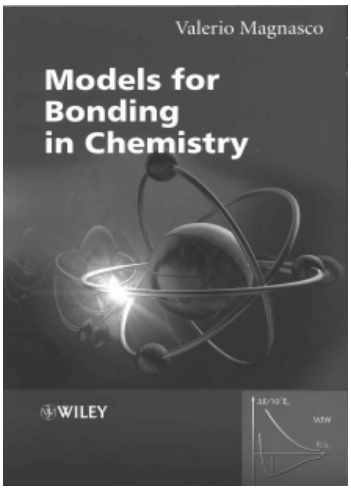
Price
£34.95

Summary Review

range: * poor to ***** good	
Academic content	***
Usefulness to student	***
Usefulness to teacher	***
Meets objectives	***
Accuracy	***

This is a relatively short account (218 pages) of chemical bonding, intended primarily for the undergraduate chemistry and chemical physics student. Chapter 1 introduces the matrix algebra required for the short presentation on the variational approximations. It also discusses briefly the electron distribution in molecules and the relationship between the exchange-overlap densities and the chemical bond. Chapter 2 on The Chemical Bond provides a classical discussion of bonding in the diatomics H_2, H_2^+, He^{2+} and He_2, followed by a simple Hückel description of hybridisation in a number of well-known molecules such as diborane, methane, water, HF and NH_3. The mathematics of hybridisation is presented in some detail. The final section in this chapter provides a short Hückel-based description of delocalised bonding in the allyl radical, butadiene and benzene. Chapter 3 continues the Hückel approach, leading to an elementary description of the band theory model of bonding in extended solids. Chapter 4 deals with the weak van der Waals interactions and the final Chapter 5 discusses the hydrogen bond, both from a qualitative MO and qualitative electrostatic approach.

There are six pages of literature references, in the main quite old material (though with some classic references to early work). However, I found the quoted literature quite idiosyncratic, with a considerable number of the author's own work, some twenty-six papers in all. Despite a whole chapter on hydrogen bonding, I was surprised to see there is no reference to classic work like Jeffrey's *Introduction to Hydrogen Bonding*. Despite the claim that the book had 'a minimal use of mathematics', there were extensive mathematical descriptions. Moreover, the molecular examples used were somewhat unimaginative, having been described in many other textbooks over many decades. There was little, if anything, new in this book, and I was disappointed that the author did not take the opportunity to introduce a new young audience to the current density-based models of chemical bonding, i.e. the quantum theory of atoms in molecules.



Louis J Farrugia
School of Chemistry
University of Glasgow
Glasgow G12 8QQ
November 2010

Physics II for Dummies

Subject area
Physics

Description
This book aims to expand upon the physics covered within Physics I - for Dummies and provides 'a crash course on the main topics covered in a typical Physics II course'

Author
Steven Holzner

Publisher/Supplier
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2010

ISBN
978-0-470-53806-7

Level
Primarily Level 2 students but applicable to anyone

Price
£14.99

Chris Finlay
Boyd Orr Building
University of Glasgow
Glasgow G12 8QQ
November 2010

This book is promoted as the sequel to a physics I course and is aimed at expanding on the topics normally encountered within a standard physics I class. Particular emphasis has been placed on electromagnetism, waves, energy and matter. The reviewer has approached this book with a background in A-level physics with some small use of similar level physics in my working environment.

Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	***
Usefulness to teacher	**
Meets objectives	****
Accuracy	*****

The content is clearly laid out and structured in a very reader friendly format. Various icons, shaded boxes detailing more advanced theories/points of interest etc helps guide the reader through the content and identify further study if the reader wishes to expand on a chosen concept.

Part one acts as a brief review of Physics I and gives a quick introduction to the topics the reader will cover throughout the book. This quickly allows the reader to determine if their current knowledge is sufficient to engage totally with the content. I do feel that some questions/tasks to test the readers knowledge would help assure the reader of the level of knowledge required.

Parts 2 to 4 cover electromagnetism, waves, and modern physics (mainly special relativity and nuclear physics) respectively. The last chapter details ground breaking experiments in these areas with links to online sources that can be useful for various problem solving exercises. This nicely rounds off the book and clearly allows the reader to continue their study if they so wish.

The chapters within each specific section cover a unique topic with helpful 'tip' and 'remember' sections. I particularly liked the examples of the principals being used in the real world. There are, obviously, extensive equations and calculations used throughout the book with worked examples of most. There is no space for the reader to test that they can apply these equations in a correct manner. There are some additional resources available from the Dummies website but again no opportunity to test the reader's knowledge. With practice using these equations being essential for understanding I feel that some tasks for the reader may be beneficial.
The layout is perhaps less useful for a teacher/lecturer as the book is not designed to act as a textbook for a specific course. However the topics covered are clearly identified on the cover and should easily attract students who identify a need to explore these areas further.

There is very little else to say - this book does exactly what it says on the cover. The text is well presented with informative illustrations, examples and guiding points for the reader. The information was informative and understandable for the reviewer who has not encountered these topics in this depth for several years.

Physics of Sailing

Subject area
Physics

Description
A book covering the basic physics of sailing a small boat.

Author
John Kimball

Publisher/Supplier
CRC Press (Taylor & Francis Group)
<www.crcpress.com>

Date/Edition
2010/1st edition

ISBN
978-1-4200-7376-8

Level
Layman, undergraduate, sailor

Price
£31.99

Summary Review

range: * poor to ***** good

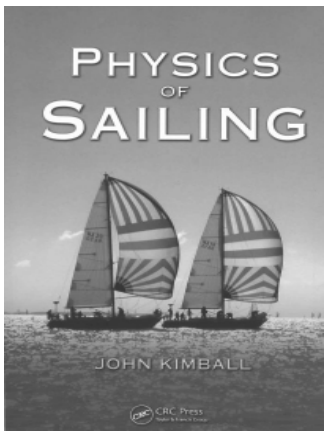
Academic content	****
Usefulness to student	****
Usefulness to teacher	***
Meets objectives	****
Accuracy	****

This book will appeal to the scientists and non-scientists alike who have ever wondered exactly how a sail-boat can sail into the wind. Written by a keen sailor from University of Albany, New York, **Physics of Sailing** attempts to explain the basic principles of fluid mechanics and how they conspire to push a modern sailboat through the water. The author attempts to avoid much of gory detail of the mathematical formalism (although not always succeeding) and highlights the underlying physics. Overall the book largely succeeds in its goals, making a perfect text for a first year university course and providing sailors with plenty of stories and explanations to keep fellow crew members entertained during days at sea. The style is informal and engages the reader throughout.

The challenge of a book like this is how to explain the large array of physical principles that contribute to sailing, while keeping the attention of the less-prepared reader and still satisfying the reader with a background in the physical sciences. The mix of equations and an appropriately chatty text does a good job of satisfying these diverse audiences and only seldom will the physicist-sailors find themselves craving just a little more detail.

The book opens with a fascinating history of sailing, before several chapters explain the physical principles of sailing up and down wind. These early chapters are a mix of basic physics and sailing terminology and there is plenty of material to satisfy the very curious. Later chapters cover topics like wind, wakes and waves, together with a more in-depth chapter on fluid dynamics. In some sense this is the least satisfying chapter of the book, with a (understandably) fairly brief explanation of some of the more sophisticated topics. Finally, the book ends with a chapter on sailing strategy. Overall the text is well written and entertains the reader, but in some places the technicality of the physical ideas, threaten to overwhelm the less prepared reader.

Overall, this attempt to explain the physical principles behind sailing a small boat is a pleasure to read and helps to demystify this complex area. It's not perfect, but given there are very few books on this topic around, this book is very welcome.



Robert Appleby
School of Physics and Astronomy
The University of Manchester
Oxford Road
Manchester M13 9PL
October 2010

Physics of the Piano

Subject area
Physics

Description
A description of the factors involved in making music with a piano. Although the book takes physics as a main theme but it also deals with how physics impinged on the evolution of the piano, developments in piano technology and construction and how it results in how we perceive musical tones. Throughout Steinway is taken as the benchmark for piano construction.

Author
Nicholas J Giordano, Sr

Publisher/Supplier
Oxford University Press
<ukcatalogue.oup.com>

Date/Edition
2010/1st edition

ISBN
978-0-19-954602-2

Level
General reader

Price
£35.00

Stephen H Ashworth
School of Chemistry
University of East Anglia
Norwich NR4 7TJ
November 2010

Musical instruments each produce a characteristic tone over a characteristic range. Whereas new technologies, especially in sound recording and reproduction, have had an influence on music making we have developed over time a range of instruments which have evolved into more or less standard forms.

Summary Review

range: * poor to ***** good

Academic content	***
Usefulness to student	***
Usefulness to teacher	****
Meets objectives	****
Accuracy	*****

Physics of the Piano is an exposition of the whys and wherefores of the piano: how it evolved to look the way it does today, both internally and externally. Along the way Nicholas Giordiano tackles a wide range of subjects including; who invented the piano (and why), why the standard piano has 88 keys, how the individual components interact to make the piano sound the way it does and why the Steinway is taken to be the benchmark of excellence in piano construction.

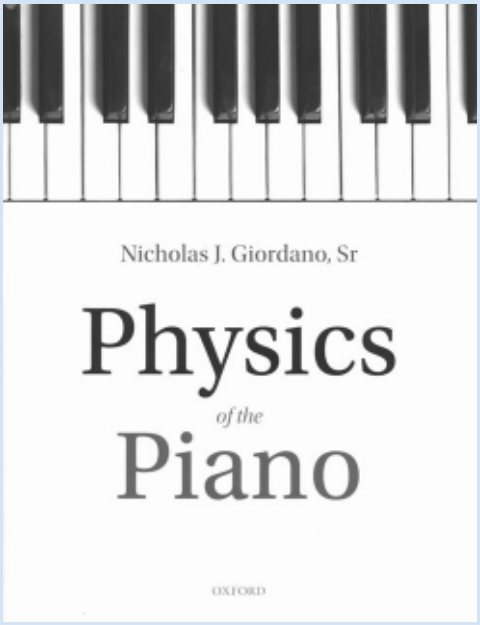
The avowed intent of the book is to tackle these subjects in 'terms that are understandable by a non-scientist and at the same time satisfying for a physicist'. To do this the book is divided into twelve chapters, the first few of which introduce waves and sound, musical scales and a little history of the piano. Subsequent chapters deal with individual components of the piano and the final few chapters deal with some more history, especially of the firm of Steinway and Sons, and the human perception of musical tones. The final short chapter is a summary of what physics can do to teach us about pianos and the sound we perceive from them. We learn finally that physics is not the be all and end all in terms of choosing a piano. To quote the author 'Searching for your ideal piano involves finding the instrument that suits your taste best'.

That quote, however, already shows that the book is not simply about the physics of the piano. There is a complex mixture of interrelated subjects covered and it may be that a somewhat more representative title might have been chosen. An example which springs to mind is the more general book 'Measured Tones: the interplay of physics and music' by Ian Johnston.

At the end of the book are included a glossary, bibliography and index. The index is short but sufficient to help the reader navigate the 170 page book. The bibliography appears to be extensive. The glossary of terms blends musical with physical terms. It is probably the only time one will find an entry for 'Whole tone' followed by one for 'Young's modulus'. Having said that, however, I feel that there are additional terms that merit inclusion, especially one or two which do not appear in the index.

The book is densely illustrated, as one would expect. Most pages have an explanatory diagram or photograph. The diagrams and graphs are all high quality and very useful. However, the photographs, although they are generally of high quality, suffer a little from the choice of greyscale reproduction, especially those that are intended to help explain the detailed mechanisms in a piano. The complexity of the mechanisms being explained, even with explanatory arrows and comments, meant that details are occasionally somewhat difficult to make out.

Physics of the Piano



From the publisher...

Physics of the Piano

By Nicolas J Giodano Sn

Why does a piano sound like a piano? A similar question can be asked of virtually all musical instruments. A particular note - such as middle C - can be produced by a piano, a violin, a clarinet, and many other instruments, yet it is easy for even a musically untrained listener to distinguish between these different instruments. A central quest in the study of musical instruments is to understand why the sound of the "same" note depends greatly on the instrument, and to elucidate which aspects of an instrument are most critical in producing the musical tones characteristic of the instrument. The primary goal of Physics of the Piano is to investigate these questions for the piano. The explanations in this book use a minimum of mathematics, and are intended for anyone who is interested in music and musical instruments.

978-0-19-954602-2 180pp 2010 £35.00

Reading this book in a few concentrated sessions I began to be irritated by the necessity that the author found to repeat passages, state the obvious and tell me 'as we shall see in more detail in Chapter ?' I can, however, appreciate that these signposts may be useful for a reader who is merely dipping into the book. That said I felt the book was not written to be used as a textbook but could be read more as a narrative.

The relevant physics is covered in a very accessible manner and the focus on the piano means that there is the opportunity to go into greater depth here than more general books which treat a range of musical instruments. As an instructor on a physics of music course I found this a very useful and interesting read. The breadth of material covered would make useful background or supplementary (but not core) material for physics students at undergraduate level but as this is aimed at the general reader there is little detailed physics. An undergraduate student may also baulk at the recommended price tag for what is a rather slim, albeit hardback, volume. It is most likely to be useful to a general reader, who has been catered to very well; I only spotted a couple of examples when the style slipped into technicalities that might not have been immediately appreciated by a non-specialist.

Planetary Atmospheres

Subject area
Astronomy, Physics

Description
A comparative survey of planetary atmospheres with emphasis given to: (a) evolutionary processes; (b) properties of atmospheres and their influence on climate; (c) measurement techniques and models.

Author
Fredric W Taylor

Publisher/supplier
Oxford University Press
<ukcatalogue.oup.com>

Date/Edition
2010/1st edition

ISBN
978-0-19-954741-8

Level
Advanced undergraduate and starting postgraduate

Cost
£24.95

James L Collett
STRI
School of Physics, Astronomy & Mathematics
University of Hertfordshire
Hatfield AL10 9AB
November 2010

The stars look very cold about the sky,
And I have many miles on foot to fare.
Yet feel I little of the cool bleak air...

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	***
Usefulness to teacher	*****
Meets objectives	****
Accuracy	*****

Keats may be the poet nonpareil in fusing, with words, the sun and stars above to air and wind below- distant influences felt as 'keen fitful gusts'. What would Keats have made of the figure on page 146 of Fredric Taylor's **Planetary Atmospheres**: a rare overcast day on Mars, with the not so bright star of Earth eclipsed by banks of feathery ice clouds? I don't know; but we learn here that even the Martian winter isn't long enough to freeze all the cool bleak air above the poles. Insights like this are the highlight of this companion to the author's previous Elementary Climate Physics. Indeed the scientific study of planetary atmospheres predates Keats. In the words of his biographer, Aileen Ward, when Keats saw Venus from his window:
doubt and distraction left him; it was only beauty, Fanny's and the star's, that mattered.

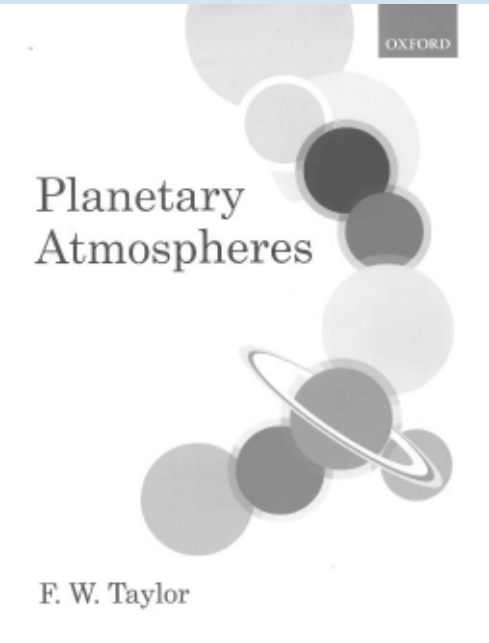
Yet, half a century earlier, Mikhail Lomonosov had seen the disc of the transiting Venus rounded with a bright halo and was credited with the discovery of its atmosphere. Still there is something about Hesperus and poetry: even the polymath Lomonosov was not averse to penning odes including an Evening Meditation on the Grandeur of God.

I grew up inspired by the sight of Saturn, low on the horizon of Titan's azure sky, in Chesley Bonestell's famous painting, falling asleep imagining what it would be like to scramble over those jagged rocks. Reading this very up-to-date survey that vision dissolves away: the ringed planet would not appear crisp through Titan's photochemical smog and the ice-stones on this cold world would have the rigidity of steel. Nevertheless, It is still a wonder, as Taylor points out, that as the Huygens probe descended to Titan's surface in 2005, its thermistors measured the ambient temperature to better than 1K.

This book arose out of an elective course at Oxford and is aimed at advanced undergraduates and starting graduate students in planetary science. It is a first edition and the earlier climate volume physics is essential preliminary reading. Neither book is comprehensive in mathematical detail - a good but not isolated example would be the derivation of the cyclostrophic flow equations - so you will need to keep hold of your Houghton and Chamberlain & Hunten.

There are typos of course (even in the home of the OED): 'radious', 'discernable'. But more serious is the interchange of the physical quantities g and G not once but twice, and in the derivation of the pressure scale height in a disk, the vertical height has become a superscript rather than a variable. Let me get all my moans out of the way. The equations are unnumbered and the references at the end each chapter not signposted in the text - a sin we would penalise our students for. Many of the images are little bigger than stamps, an aggravation compounded by OUP's page layout that leaves one third of each page blank! I found the problem sets better, in the sense of being less general, than those in Elementary Climate Physics but again, there are possible confusions - I would expect something defined as the energy liberated in

Planetary Atmospheres



From the publisher...

Planetary Atmospheres

By Frederic W Taylor

The emphasis of this book is on comparative aspects of planetary atmospheres, generally meaning comparison with the Earth, including atmospheric composition, thermal structure, cloud properties, dynamics, weather and climate, and aeronomy. The goal is to look for common processes at work under different boundary conditions in order to reach a fundamental understanding of the physics of atmospheres. As part of a general Physics course, the material is chosen to emphasise certain aspects that will be of broad topical interest.

978-0-19-954741-8 296pp 2010 £24.95

gravitational contraction to be positive. We need to see absolute values for the physical properties of the Earth next to a table that reports other solar system bodies in relative units and the relative eccentricity is of questionable value when the pure (dimensionless) number can simply be given. In figure captions relative radii of the planets are given to one significant figure but masses (sometimes) to three - why? The student is expected to be familiar with some terms not in the glossary e.g. regolith; and others that are in the glossary (e.g. gravity waves) are introduced before we are told what they are (in the later chapter on atmospheric dynamics).

It is a shame that this authoritative guide has been so carelessly treated by his editor because there is much to value in this book. In the introductory review, I enjoyed the discussion of water ice secreted in Mercury's polar hollows. Interestingly the evidence for this comes from ground-based (radio) observations which are otherwise in the shadow of space missions in this book. The challenge is to get a water supply, perhaps from cometesimals, in a cold dark place that will not be eroded away by micrometeorite impact on timescales comparable to the age of the solar system. I had also not realised, but am happy now to know, that Earth and Venus have approximately equal quantities of nitrogen in their atmospheres.

The second chapter covers the formation of the solar system as a background to a discussion of the escape and reformation of atmospheres. I enjoyed following the fate of carbon dioxide as it becomes part of the White Cliffs of Dover.

The next chapter covers space missions, many of which have benefitted from the author's expertise, and there is probably enough detail given for a student to later interrogate an instrument specification on a mission website - this is also a suggested exercise and would make a nice group assignment.
Energy balance and entropy are covered next: I think most student readers will find it hard to make the connection between the entropy change in spilling water and 'degrading' radiation - there's just no need for vagueness here on a topic that most students already find difficult. The box models separating polar and tropical regions and thus simplifying the flux transfer between the two are insightful teaching tools.

The factors affecting the vertical temperature gradient are described in detail from condensation (e.g. in terrestrial clouds) to dust loading (on Mars). From a lecturer's point of view, there are many interesting temperature maps gathered here that would otherwise take many hours to find.
Key chemical cycles are again nicely summarised alongside puzzles such as the steady supply of

Continued on page 36

Planetary Atmospheres

Continued from page 35

methane to the atmosphere of Titan and the asymmetry in the sublimation of water vapour from the Martian poles. Electrical effects in planetary atmospheres are a fascinating topic - the recent Icelandic eruption threw up some interesting conundrums in this area so it is not surprising that little is known about lightning on other planets. The physical signatures of dust are easier to explain and anyone who hasn't seen the movies of Martian dust devils should head straight to the rover websites. Taylor gives a useful introduction to getting dust airborne as part of a larger treatment of aerosols etc. It can surely not be long before the Cloud Appreciation Society has an interplanetary chapter and the figure depicting a time-sequence of methane clouds near Titan's south pole should get them started.

In my lectures, I've long wanted to be a bit more precise about circulation cell patterns - Hadley cells, Coriolis and all that - but the chapter on dynamics didn't really help. However, that may be unfair because there is a lot to enjoy here from Venusian polar vortices to the fascinating figure comparing the latitudinal variation of wind speeds on the outer planets. The book concludes with a less parochial view of global climate models and climate change, from the weeping gullies of Mars to the resurfacing of Venus. And to finish, and to borrow from Keats again, the excitement of the spectroscopist:
When a new planet swims into his Ken,
- exoplanet atmosphere discoveries that should inspire technological innovation over the coming years and mean future editions of this useful compendium have a wide audience.

Practical Skills in Forensic Science

Subject area
Forensic science

Description
A general textbook for undergraduate forensic science students covering study skills and practical laboratory skills

Authors
Alan Langford, John Dean, Rob Reed, David Holmes, Jonathan Weyers, and Allan Jones

Publisher/Supplier
Pearson Education
<www.pearsoned.co.uk>

Date/Edition
2010/2nd edition

ISBN
978-0-13-239143-6

Level
Undergraduate students

Price
£31.99

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

Practical Skills in Forensic Science is aimed at students who are completing degree programmes in forensic science related disciplines. It guides the reader through a range of valuable techniques required by university students, from general study skills and use of available resources, the scientific method and development and design of experiments, through to specific practical analysis related to various areas of forensic science and the use of statistics in presentation of data.

The book is set out is an easy-to-read format; there is a section at the beginning explaining the layout of the pages. Descriptions, key terms and tips are highlighted in the margins of the text, whilst key points are clearly highlighted within the text in a different colour and format with a keyhole design icon, drawing the eye to these specific areas. There are worked examples and 'How to' boxes, and study exercises provided in every chapter.

The authors state that this book is aimed at undergraduate students, specifically those new to the university programme. I would agree with this statement and I feel this book should be recommended to new undergraduate students as a staple in their core reading lists for year 1 of a forensic science undergraduate programme. Students in the later stages of a degree course may use the information to assist with experimental design and use of statistics for independent research projects.

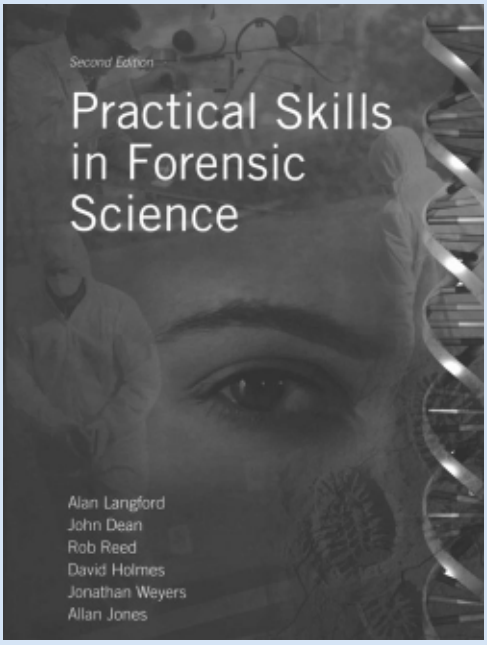
Chapters 1 - 7 cover study and examination skills that would be of use to any new student. Despite the content of these chapters being applicable to any area of science, the authors have tailored descriptions so that they are specific to the area of forensic science, including a section on transferable skills identified as important in forensic science. This section may be a little pedestrian, but is of vital importance to students moving from further education to higher education, where students are expected to be more independent and take control of their own learning experience.

The next section of the book covers the use of resources and how to use these resources to the students' advantage. It also covers preparation of reports that may be required throughout a scientific degree course, as well as advice specific to a forensic science degree programme. Chapter 10 concentrates on the use of the Internet which students may find a little patronising as most people entering a degree course have the experience of the use of this type of resource. I found that the chapters covering the different skills required for the communication of information were very useful and would be of interest to undergraduate students who may not have had much experience of organising posters or presenting to an audience. These skills can be used in the future by the students if they continue in the scientific area, as posters are often used at conferences, and oral communication skills are vitally important to forensic scientists.

Hannah Willson
Department of Applied Science
London South Bank University
Borough Road
London SE1 0AA
November 2010

Continued on page 38

Practical Skills in Forensic Science



From the publisher...

Practical Skills in Forensic Science

By Alan Langford, John Dean, Rob Reed, David Holmes, Jonathan Weyers, and Allan Jones

If you are studying forensic science, or a related course such as forensic chemistry or biology, then this book will be an indispensable companion throughout your entire degree programme. This 'one-stop' text will guide you through the wide range of practical, analytical and data handling skills that you will need during your studies. It will also give you a solid grounding in the wider transferable skills such as teamwork and study skills.

978-0-13-239143-6 624pp 2010 £31.99

Continued from page 37

The last chapter in this section relates directly to the preparation of a written statement and presentation of evidence in court. It covers the similarities and differences between the statements written by various forensic science personnel and gives a broad overview about what should be included in a forensic scientist's statement and how this should be reviewed, which I thought was of great use to concentrate the students thoughts into producing a clear and concise statement, with no unnecessary information.

Chapters 19 - 46 cover a wide range of practical skills; this section starts with basic background to practical science, including accuracy and precision of measurements and how to record data, observational skills and how to design experiments and compile findings. The book then delves more into the forensic science arena, by covering crime scene investigation and how to collect and investigate various evidence types. General background information is provided for each chapter so that the practical elements can be interpreted in the context of an investigation, covering the importance of recording various details and how to do this effectively.

Fundamental laboratory techniques are covered in Chapters 28 - 35. This starts with discussing the principles of laboratory work and general health and safety, before covering the vital elements needed to work efficiently and safely in a laboratory. This section takes the student step-by-step through some basic laboratory procedures e.g. preparing solutions and dilutions, controlling conditions, use of buffers and an introduction to microscopy. These techniques are essential for any student studying a science discipline and instil the basic information, which the student can then build on and use in more complex scientific investigations, including in their own research projects in the final year of their degree.

Chapters 36 - 46 then progress into more complex analytical techniques which a student may use throughout the degree course e.g. immunoassays, electrophoresis, chromatography, spectroscopy and mass spectrometry. Each of these chapters relates the techniques described to how it may be used in a forensic science context.

Practical Skills in Forensic Science

Chapters 47 - 65 cover the major sub-disciplines within forensic chemistry and forensic biology. This section relates specific analytical techniques to their use in a forensic laboratory and how the results can be interpreted by a forensic scientist for the purposes of court. The chapters are clear, easy-to-follow and give background information on the various areas before describing the techniques used for analysis of specific types of evidence. Some of the techniques described are outdated and no longer used in forensic science laboratories but may be used to demonstrate techniques in a university which may not have the automated instrumentation found in a working laboratory.

The last section of the book covers presentation of data and the use of statistics. This would be of most use to final year students preparing an independent research project as it will give them the confidence to transform their data appropriately and how to use statistics correctly.

To conclude, I would recommend this book as a core textbook for any forensic science undergraduate degree programme. The layout of the book, key points and exercises, produce a text which is suitable for undergraduate students as it is easy to read and contains valuable information.

Principles of X-ray Crystallography

Subject area
X-ray crystallography

Description
Introductory x-ray crystallography text designed for the undergraduate or beginner postgraduate student

Author
Li-ling Ooi

Publisher/Supplier
Oxford University Press
<ukcatalogue.oup.com>

Date/Edition
2009/1st edition

ISBN
978-0-19-956904-5

Level
Undergraduate

Price
£21.99

Summary Review	
range: * poor to ***** good	
Academic content	*****
Usefulness to student	***
Usefulness to teacher	****
Meets objectives	*****
Accuracy	*****

Principles of X-ray Crystallography begins with an introduction to the method right through to how to publish crystallographic data. The text is clear, well laid out and contains many figures to exemplify and guide the reader through the concepts discussed. The book has clearly been written with the student in mind; learning objectives are stipulated at the beginning of each chapter (and for each section therein) and self-test questions are found throughout the text to encourage the student to test their understanding on a concept recently introduced. Answers for the self-test questions are included. Each chapter is comprehensively summarised and references to external work for further reading is provided. In addition, there is a list of links to online learning tools which relate to the material discussed within the chapter. An online resource centre accompanies the book (www.oxfordtextbooks.co.uk/orc/ooi/) which provides students a library of annotated web links and datasets related to topics discussed in the book. For registered adopters of the book it provides figures from the book in electronic format and PowerPoint slide sets for each chapter.

It is important to state that this text is meant to provide an introduction to X-ray crystallography and not be the definitive text on the subject. It is designed with the undergraduate student in mind and in particular deals not only with the concepts behind the technique but also one of the more challenging aspects of X-ray crystallography; being able to 'see' in 3D. Useful hints and tips are provided throughout the text in order to meet this aim.

Chapter 1, 'An Introduction to the Method' deals with what the method actually is and what it can be used for, before expanding to lattice types and the definition of the unit cell. Examples of 2D and 3D packing are discussed, the diagrams for which are very clear by the use of different shades of colour to differentiate between lattices.

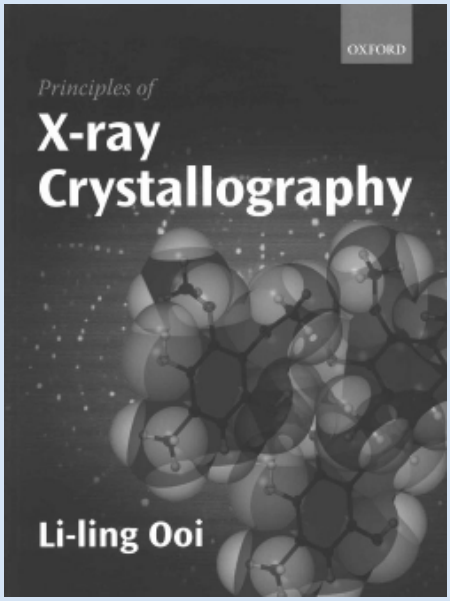
Chapter 2 explains the crystal construct and most importantly its interaction with X-rays. Weiss and Miller indices are also presented. Diagram and diagrammatic questions are used to explain these concepts which reinforce the text aptly.

Chapter 3, 'Symmetry Elements', contains a good discussion on symmetry elements. The figures used within the chapter are clear and illustrate the symmetry operations being discussed. The text takes the reader through each type of operation stepwise, so that the reader can visualise for themselves and understand how each operation works. At the end of the chapter, there is a group learning activity for modelling the symmetry operations which aids with the visualisation and understanding of the symmetry operations.

In Chapter 4, space groups are introduced. Special positions in space groups are also discussed, the use of clear diagrams reinforcing the text. This is followed by 'Systematic Absences in Crystal Data', which is probably the least diagrammatic chapter of the text. This chapters' main emphasis is on the mathematical derivation and understanding of systematic absences. This it does very well; the use of a worked example significantly aiding the readers understanding.

Ryan Mewis
Department of Chemistry
University of York
Heslington
York YO10 5DD
November 2010

Principles of X-ray Crystallography



From the publisher...

Principles of X-ray Crystallography

By Li-ling Ooi

Principles of X-ray Crystallography provides a clear, succinct guide to the three-dimensional world of molecules, which is perfect for anyone encountering the technique for the first time. Using a direct and simple writing voice, and enriching the text with real examples, diagrams, exercises, and activities, it seeks to engage the reader in the challenge of visualizing three-dimensional structures, rather than daunting them with excessive theoretical detail.

With an understanding of three-dimensional structure being so central to the understanding of molecular function, Principles of X-ray Crystallography is the perfect guide for anyone needing to gain a working insight into x-ray crystallography

978-0-19-956904-5 176pp 2009 £21.99

Chapter 6, 'Structure solution', introduces the phase problem associated with X-ray crystallography from a visual perspective, as well as the different structural solution methods for both small and macromolecular molecules. Each method is treated separately and discussed in terms of what types of structures it can be used to solve and how it deals with the phase problem.

Chapter 7, 'Refining Crystal data', introduces the least square refinement process, before moving on to challenges frequently encountered during crystallographic refinement. The chapter concludes by focusing on the information that can be garnered from the final structural solution.

Chapter 8 explains the crystallographic experiment from the growing of good quality crystals to the mounting of the sample within the diffractometer and collection of data. X-ray diffractometers are discussed with particular focus on the type of X-ray source and detection methods. The inclusion of a flow chart in this chapter really helps to draw in all the different elements discussed within the text. This acts as a good prelude to Chapter 9 which is concerned with the publishing of crystallographic data. This chapter focuses on the key parameters used to validate a crystal structure and to explain how crystallographic data may be communicated worldwide.

To summarise, **Principles of X-ray Crystallography** would be an extremely useful text to use alongside an undergraduate course. It is reasonably priced, so would be an excellent primer to the subject for beginner postgraduate students too. It would probably not be as useful for those seeking a more advanced and in depth text on the subject. The conveyance of ideas and principles throughout the text is such that they can be easily grasped and understood, thus enabling the student to progress with more complex concepts.

Shriver and Atkins' Inorganic Chemistry

Subject Area
Inorganic chemistry

Description
This book presents Inorganic Chemistry from its fundamentals to its applications in a format well suited for undergraduates.

Authors
P W Atkins, T L Overton, J P Rourke, M T Weller and F Armstrong

Publisher/Supplier
Oxford University Press
<ukcatalogue.oup.com>

Date/Edition
2010/5th edition

ISBN
978-0-19-923617-6

Level
Undergraduate

Price
£41.99

Summary Review	
range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	****
Meets objectives	*****
Accuracy	*****

The latest edition of **Inorganic Chemistry** is as accessible and enjoyable to read as the four preceding issues. The book presents inorganic chemistry in a format that will make it of use to all undergraduate chemists and teachers of the subject.

The organisation of the book is one of its strongest points. The key aspects of inorganic chemistry are presented in the first section 'Foundations' which consists of eight chapters. The second section, 'The elements and their compounds' takes the reader on a tour of the chemistry of the periodic table in thirteen chapters. This section has been restructured for this edition with most chapters separated into 'essentials' and 'the details' sub-chapters. A useful new chapter on periodic trends has also been added in to this section. The book is closed by an excellent 'Frontiers' section which presents four areas of particular interest in current research (nanomaterials, catalysis, biological inorganic chemistry and solid-state and material chemistry). The authors have done an excellent job in ensuring that the content remains relevant to some of 'hot' areas of current research in the subject. As well as being directly relevant to later year modules and research projects, this section gives students a chance to see how some of the concepts they were introduced to in earlier chapters are applied in research.

The level of presentation in this textbook is excellent, and beyond the obvious aesthetic advantage this has clear pedagogical advantages. An excellent selection of well drawn, full colour diagrams clearly illustrates many of the key points raised in the text. The chapters are well divided and the key themes of each section are summarised in 'key points' sections at the start of each sub-chapter. Throughout the text there is also a series of 'content boxes' which contextualise the chemistry that is introduced in each chapter with interesting and relevant examples.

Students are given plenty of opportunities to test their understanding of the subject thanks to a series of worked examples which are accompanied by a number of 'self-test' questions which give the reader an opportunity to work through a number of problems similar to the worked example. At the end of each chapter there are a series of short questions (exercises) which allow the student to reflect on the content covered in the chapter. Also at the end of each chapter is a 'problems' section, this is a very useful to test the conceptual understanding of the reader. The 'problems' tend to be more demanding than the 'exercises' as they are more open ended in nature and require a considerable level of discussion in order to respond to the issues raised by the problem.

In summary, **Shriver and Atkins' Inorganic Chemistry** is an excellent undergraduate textbook which allows students to develop their understanding of the principles or inorganic chemistry and their applications in modern research as they work through the book. The layout of the book, the excellent standard of presentation and the use well chosen worked examples and very useful open ended problems make this an extremely accessible text.

Dylan Powell Williams
Department of Chemistry
University of Leicester
University Road
Leicester LE1 7RH
October 2010

Sustainable Event Management: a practical guide

Subject area
Event organisation, Sustainability

Description
Text on how to run an event for beginners and the more experienced

Author
Meegan Jones

Publisher/Supplier
Earthscan

Date/Edition
2009/1st edition

ISBN
978-1-84407-739-7

Level
Beginner to experienced

Price
£29.99

Andrew Mathieson
University of the West of England
Frenchay Campus
Cold Harbour Lane
Bristol BS16 1QY
November 2010

Summary Review

range: * poor to ***** good	
Academic content	***
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

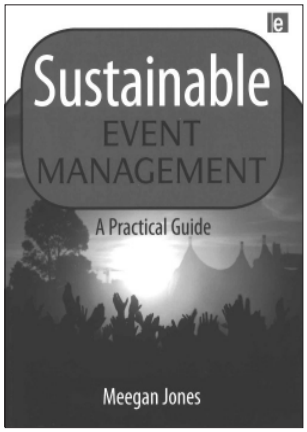
The area of event management is growing and a number of texts have been produced in recent years, covering some of the same material in this text. Where this text has the advantage is in its approach, analysis and user friendliness. This text can be read as a classic manual for an event organiser, it can be used as a how to improve a festival for the more established managers and also as a bench mark for the regulators who have to police these events. In other words, it's got something for everyone.

Each chapter has useful evidence of good practice and you can read the lessons learnt from descriptions of where things went wrong in the past. The extensive list of checklists is especially useful for the event organiser and regulator alike. I would have liked to see a companion CD of the checklists but this is possibly something for the future.

The use of black and white images is appropriate and the extensive use of images serve well to illustrate the points made and ensures the reader is kept informed and encouraged to keep reading to the end. Students and the typical event goer will enjoy reading this text as a reminder of how festivals can and should be run. This should allow the academic plenty of scope to develop research questions that this text will support.

This is a very different book from the normal text book students' use. This is its unique selling point. Students will like the layout and style, organisers can see its appeal as a 'how to' guide and 'could I do it better' guide. As academics we could usefully use it in class as a text to help students achieve deeper understanding of the complexity that is sustainable event management.

I fully support this text and recommend it for purchase. I would rate this text as the best I have read on this topic to date and comment it to organisers, academics and regulators alike.



Techniques in Inorganic Chemistry

Subject area
Inorganic chemistry

Description
Collection of revised articles on modern techniques used by practising inorganic chemists, previously submitted to Comments on Inorganic Chemistry

Authors
Edited by John P Fackler Jr and Larry Falvello

Publisher/Supplier
CRC Press (Taylor & Francis Group)
<www.crcpress.com>

Date/Edition
2010/1st edition

ISBN
978-1-4398-1514-4

Level
Graduate

Price
£80.00

Marie Walsh
Department of Applied Science
Limerick Institute of Technology
Limerick
ROI
November 2010

Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	*****
Accuracy	*****

This A5-sized textbook comprises six chapters produced as a result of revision of articles originally submitted to *Comments on Inorganic Chemistry* by a number of international experts and collaborations. The original articles dated from as early as 2003 but have been significantly updated to describe modern methods used by research students and chemists for studying the properties and structures of inorganic chemicals. This branch of chemistry plays an increasingly significant role in modern science, from the development of new materials to applications in biology and medicine.

The editors have assembled the articles to inform students and researchers of inorganic chemistry about the scope and limitations of the techniques currently used in this branch of chemistry. The contributing authors are from the UK, Italy, Greece, the US and Canada.

The six chapters have a standard layout, reflecting their origins as journal articles. Each has an introduction to the topic, some background information, development of the technique with significant amounts of detail, predictions for the future, acknowledgements, and a comprehensive list of references. The dates on the references show that the authors respect the development of the techniques from their origins to current uses.

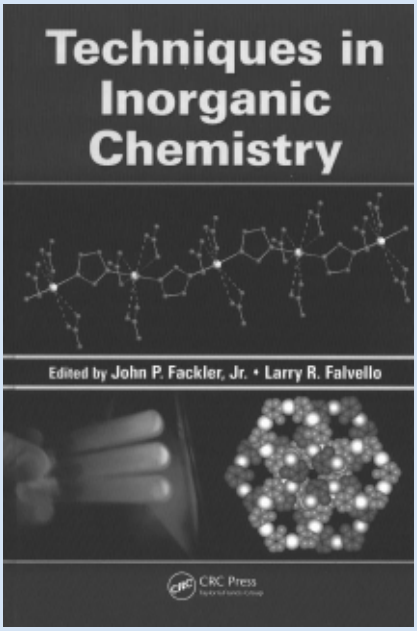
The text covers the following broad topic areas:
- Crystallography and diffraction methods
- Quantum Chemistry
- Spectroscopy

It is divided into six chapters of varying length, with varying amounts of illustration. Black and white illustrations are in sequence with the text but coloured illustrations are collected in sixteen glossy pages inserted into one section of the book. This is no doubt done for the purpose of coloured printing but it seems strange to have to have them grouped just after the start of Chapter four, disrupting the text in that chapter and also necessitating referencing back and forward to link the illustrations with the relevant text.

The six chapters are:
1. Current developments in Small Molecule X-ray Crystallography
2. X-ray Powder Diffraction Characterization of Polymeric Metal Diazolates
3. Single Crystal Neutron Diffraction for the Inorganic Chemist - A Practical Guide
4. Adventures of Quantum Chemistry in the Realm of Inorganic Chemistry
5. NMR Techniques for Investigating the Supramolecular Structure of Co-ordination Compounds in Solution
6. Pressure-Induced Change of d-d Luminescence Energies, Vibronic Structures, and Band Intensities in Transition Metal Complexes

The titles of each chapter alone demonstrate that this text is not dealing with standard undergraduate laboratory techniques, as the editors even acknowledge when they comment on the limited availability of neutron sources to allow researchers access to neutron diffraction techniques. However, it is a superb information source for anyone interested in

Techniques in Inorganic Chemistry



From the publisher...

Techniques in Inorganic Chemistry

Edited by John P Fackler Jr and Larry Falvello

Inorganic chemistry continues to generate much current interest due to its array of applications, ranging from materials to biology and medicine. Techniques in Inorganic Chemistry assembles a collection of articles from international experts who describe modern methods used by research students and chemists for studying the properties and structures of inorganic chemicals.

Derived from select articles in *Comments on Inorganic Chemistry,* this volume provides a solid background in the array of techniques available in the researcher's toolkit.

978-14398-1514-4 219pp 2010 £80.00

current sophisticated techniques in inorganic chemistry, showing the application of state of the art characterization techniques, as well as the impact of computation in this area, with real-life examples where relevant. It also looks at developments in spectroscopy, including intermolecular nuclear Overhauser effect (NOE) NMR experiments and diffusion experiments, offering examples that demonstrate theoretical aspects of the methodology. It ends with a summary of recent experimental and theoretical work on pressure effects on the d-d and luminescence spectra of transition metal complexes.

This book is recommended as a reference text for researchers in inorganic chemistry, but is too advanced for typical undergraduate courses - except, perhaps, for the more senior project students. Having said that, it will appeal to experts in the field who continuously update their knowledge to state of the art standards.

The Chemist's Companion Guide to Patent Law

Subject area
Pharmacy, Industrial pharmacy, chemistry, Materials sciences, Biotechnology, Physics, Chemical engineering, Engineering, Business studies (with science).

Description
Overview, specialist and general text for pharmaceutical and chemical sciences product patenting and intellectual property law.

Authors
Chris P Miller and Mark J Evans

Publisher/Supplier
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2010/1st edition

ISBN
978-0-471-78243-8

Level
Late-stage bachelor and master of science or business-related courses; early stage PhD/post-doc level needing top-up information on intellectual property practice/law for their research.

Price
£66.95

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

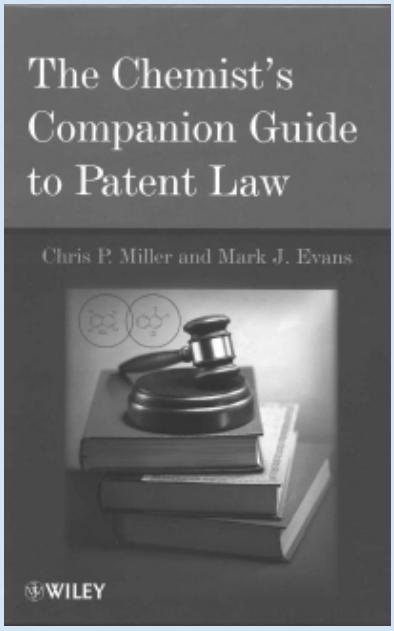
It is immediately satisfying to see a book unashamedly targeted at industrial pharmacy and chemistry. The book is commendable in its range of topics covered. The presentational style is nimble, designed to target the chemically-minded and not at all intimidating despite some extremely specialised content. This level 6 or 7 degree stage text has substantive coverage across the topics that comprise the subject in terms of the core areas of any patent and legal concept course in a manner that is full-bodied and fresh within nine chapters and 326 pages. Most students will find the volume easy to lug around between lectures, seminars and workshops. However, as befitting its purpose, the book is suitably encyclopaedic and covers a substantial fraction of the patent process. A compromise is struck between suitable content and use as a student referral aid and the book seems to get this exactly right. There are very few[1-3] easy-to-read yet non-pedantic universal guides as alternative for students to refer to. Those that do exist probably account for more reading, more weight (1000 pages or more) and more cost (~£200).

This textbook depends on the reader's background and experience-base, but even if extensive, cannot be considered to be particularly easy reading even for ambitious students. The chemistry content relies on considerable awareness of the commercial world and a cursory grasp of business, business competition, entrepreneurship tools and some understanding of law. However, given this platform, the text is a very comfortable text reference and aid.

Formation and staggering of chapters is also cleverly considered and moves flowingly in a clear and crisp direction via the pleasant insertion of issues of expanding contemporary interest, such as prior art (chapter 3), inventorship (chapter 4) and 'novelty' (chapter 7). This incredibly good book combines items of theory and practice or test cases, neatly in the *cadre* that is modern-day intellectual property rights (IPR; IP) law[1] from a novice's perspective. The ease of use for a lecturer, business person and transitional (e.g. PhD) or advanced researcher is without need for justification. Given an undergraduate's perspective, it is nice to see a science textbook that is written from a business topic perspective (and from a IPR business-science specialist pair) in an area customarily frequented more by IP lawyers and MBAs[1-4] and their matter-of-fact yet 'over-our-scientists-heads' style of communicating. This does not often help to convey themes of complexity with *gusto* to the type of audience obvious in the text title. It is certainly clear (via contextualised examples) that the authors are very experienced IP, medicinal chemistry and biotechnology businessmen and PhDs, and highly active in the field of IPR research, which helps to invigorate the book with a sense of passion and integrity. The authors do a phenomenal job of putting into context the field itself, which will be difficult for pure chemists; yet reading is made ever-more enthralling and tantalising by the intelligent use of illuminating unambiguous graphs, flow charts (Fig 2.8), tables (Table 7.1) and simple schematics (Fig 6.1). This could be one criticism levelled at the pair of authors from the student since there are many Markush-type structures and chemical formulae details but often little else (and science students like diagrams).

Dipak K Sarker
School of Pharmacy and Biomolecular Sciences
University of Brighton
Lewes Road
Brighton BN2 4GJ
November 2010

The Chemist's Companion Guide to Patent Law



From the publisher...

The Chemist's Companion Guide to Patent Law

By Chris P Miller and Mark J Evans

Written by an individual with experience as both a chemist and a patent attorney, The Chemist's Companion Guide to Patent Law covers everything the student or working chemist needs to know about patentability, explaining important concepts of patent law (such as novelty, non-obviousness, and freedom-to-operate) in easy-to-understand terms. Through abundant examples from case law as well as real-world situations with which a researcher might be faced, this book provides readers with a better understanding of how to put that knowledge into practice.

978-0-471-78243-8 329pp 2010 £66.95

The technological landscape illustrated via the worlds of macroeconomic and microeconomic business science (and thus indirectly, societal value of IP which is secreted without much ruckus into the book) means both the novice and business savvy advanced research readers will see its wider merits and thoroughly enjoy the text. Unfortunately, there is limited *divertissement* from standard routine legal practice methodologies and the relevance of wider aspects of business drivers to hint at usefulness for state-of-the-art 'techno-vation' and the scope for patentee's involvement in for example, production of new designer-engineered materials[3,5,6]. This is a little disappointing in modern-day terms of inspirational nano-materials and aspects of physics-pharmaceutical-biotechnological science (chemistry), such as facets of graphene chemistry.

There is no obvious presence of what might be an interesting use of informative images (black and white or colour) of past patent 'devices.' This seems particularly relevant to certain topics such as new engineered pharmaceuticals and prodrug-moieties (Fig 1.6, p18; Fig 2.2, p20, respectively) e.g. non-steroidal and inflammatory drugs (NSAIDs) on p272 and prior art or genus (Fig 8.21) covered in chapter 8. These feature regularly and consistently at depth in alternative books in this area[1,3]. However, in stark contrast to an immediately obvious absence of captivating images, this book, quite rightly and in unapologetic fashion, deals with crux explanation of concepts, rules and postulates in textual and graphical means, and with superlative quality. The text deals very consistently with standard topics in IP practice such as patentability, salient patent information, specialised jargon, legal concepts, US Federal Court opinions and rulings, non-obviousness and newness. In doing so, the text supports biology, physics and chemical sciences at undergraduate levels 4-6 (BA, BSc) and masters degree level 7 (MPharm, MSc, MA, MChem, MRes, etc.) or above (e.g. PhD, DPharm, etc), establishing itself as a universal reference.

A very limited number of alternative IPR books exist on the market[1-3] and the content is dissimilar. Consequently, this chemistry text is particularly suitable for scientists by virtue of covering materials and theories either covered in little-by-little form elsewhere or not at all[3-10]. One plus point of this book is that it contains much of the taught or desirable elements that are not presented under a single cover anywhere else. This book is a stomping good read because of its mindfully selected topics, précis-style, explanatory text, and non-fluffy diagrams (e.g. Figs 2.5, 2.8, 2.12, 6.1, 7.6 and 8.24, etc). The book is also valuable in that well-judged depth is given to most themes, and both hard-core chemistry content and

Continued on page 48

The Chemist's Companion Guide to Patent Law

Continued from page 47

legal explanation and background are not over-the-top. The nine chapters are pulled together craftfully and themes covered seem of real value at the beginning of the new age of purposeful synthetic chemical (pharmaceutical) and biotechnological science[3,5-7,11]. The prerequisite medicinal and pharmaceutical chemistry and business knowledge required by the reader is not for the pusillanimous. Non-chemists may find the text somewhat intimidating since this is the part that is not easily reasoned by common-sense thinking, but this content is both expected and desired by teachers of students of a 'degree-competent' upper-end university student of 'chemistry with business' or 'chemistry for business' (or the equivalent background in a non-academic environment). The text makes use of extensive (i.e. in virtually all sections within all chapters), but entirely indispensible descriptive, facilitating[8] and explanatory legal test cases (case studies) and framework models, and yet discusses concepts that are not in any manner deemed frivolous by this treatment. Consequently, the book is only probably of real value to later-stage degree (level 6) and level 7 of higher education.

The book bounds between subjects ranging from what a company would like to know e.g. re-issue application (p49) to Markush claims (section 5.5) through claimed genus and species (Chapter 7 and p170-192), the Graham Factor (p203-206), isomers and homologues (section 8.9) and passing through enantiomers (p238-249). In doing so the text conveniently traverses topics as wide-ranging as 'difference in kind' (section 8.8) and moves on to 'obviousness of ranges and substitution of equivalent' (p259; p272-273, respectively) in a uniform treatment. The book is very appealing and with appropriate elements of hypothesising it also raises notions of the 'prior art and genus' (throughout the text) and the properties of IPR laws[2,8,9]. Superb topic coverage is provided by helpful descriptions of a score of theories that will help students with problematic concepts, such as 'first-to-file' principle (p23, p83), Markush hearing (p149, p168), *ex parte* re-examination rules (p54-60) and due diligence (p16, p87, p109)[8-10].

The range of headings covered by Miller and Evans mean its use for post-grad courses is the expected norm and thus the conventional uptake of the text is almost certainly likely to be for commercialisation of research or for 'science and business' teaching. The book covers areas of the US Court of Appeal (p73), double patenting (p103) and an entire section on the basic requirements of patentability (chapter 9) that are fundamental to this type of expertise. A very insightful thematic coverage is the one dealing with problems posed and the legal solutions provided (ubiquitous within the book e.g. p285 footnotes and p272 and p273) that are specific to each sectional theme and the related guidance from the authors.

Singling out one brief section within a chapter, such as 'substituting equivalents for known purpose' (section 8.14), the section is written so that it presents clear details of a range of ideas in light of continual new legal, litigation and protectionist disclosures[8] and revelations. Themes such as photographic films (p273) and chemical composites (p274) are written with both clarity and *panache*. The section on obviousness (p278) and the example (p108-116) is dosed with opportune amounts of background and description and illustration in-line with the guiding hand needed for the reader. A textbook covering patent practice would be incomplete without a section on the expounding of 'patent rights are rights to exclude' (p2-3) and the inclusion of treatment on 'contrasting freedom to operate with patentability' (p5), which now feature in a surfeit of diverse technological areas, such as polymer-based materials, nanomedicine, drug therapy and vast numbers of other technologies[3,5-7]. The book is avidly student-minded as it also navigates through some awkward notions, such as prior art (see section on '102', p83-116), claim construction (p148-155), the six requirements of patentability (p156-157) and statutory subject matter in the utility requirement (p158-160), without being too heavy.

There are no apparent errors on sifting through the book. The accuracy of description and the content are excellent with no shortfalls in terms of providing case study examples for students (this is really mandatory for core teaching texts nowadays).

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The Many Worlds of Hugh Everett III

Subject area
Physics, Astronomy

Description
A biography of the life, times and work, both academic and secret, of Hugh Everett III

Author
Peter Byrne

Publisher/Supplier
Oxford University Press
<ukcatalogue.oup.com>

Date/Edition
2010/1st edition

ISBN
978-0-19-955227-6

Level
General reader

Price
£25.00

Summary Review	
range: * poor to ***** good	
Academic content	***
Usefulness to student	***
Usefulness to teacher	*
Meets objectives	***
Accuracy	****

This has been a most difficult book to review. I have found it difficult not because of the content or the skill of the writer but because it, in my view, is attempting to do two things at once. It is a biography of Hugh Everett III, covering his life and times. To this end it is well written, well structured and draws on unique source material. The book also gives an outline of Everett's covering, inevitably, multiple universes and the measurement problem in quantum mechanics.

This brave attempt to tackle both of these issues by the author, an investigative reporter, Peter Byrne, to me, falls short on both counts. Having grown up with, literally as I was born the year Everett proposed his multiple universe theory, Everett's work I found nothing insightful in the sections dealing with his work or the reaction of the physics community to it. The more biographical sections also failed to engage. This may be that I found nothing engaging about Hugh Everett III, he can't be judged against a Feynman or a Schrödinger in terms of character or a Nash in terms of endearing nature but it is this engagement that is needed to keep the reader reading! He emerges as a somewhat depressive man who, if not actually, sailed close to alcoholism.

When exploring Everett's work after leaving academia I was left feeling that the author was wearing his journalistic hat. Some of the interpretations of the American nuclear strategy, at the time, may be a little over simplistic.

Having said all of that it isn't a 'bad book'. However I would find it difficult to place it in the hands of an audience. On the one hand physics students with a knowledge of quantum mechanics will, I feel, find the text too general and not able to answer the physics questions. Whilst the many worlds or multiverse theories may be back in vogue all the history a student wants is generally dealt with in a standard text. On the other hand a non-physics student, without a knowledge of quantum mechanics, will, I feel, find the use of scientific language difficult to decode. Somewhere between the two perhaps philosophy students could be drawn the questions raised by both the measurement problem and the notion of multiple universes. Unfortunately the philosophy is not explored to a depth that would engage their thinking. So who is the book for? I found it well written but was not engaged by either of the two parallel tracks, of physics and biography, or the philosophical questions raised. Should Everett be recognised for his work? I would argue yes, most certainly, but is this not being done via the rediscovery of his work?

Or it simply that Everett was too far ahead of his time and his contributions to both physics and philosophy need longer for us to come to grips with?

Gren Ireson
George Eliot Building
Nottingham Trent University
Clifton Campus
Clifton
Nottingham NG11 8NS
November 2010

Understanding Voltammetry

Subject area
Electrochemistry

Description
Specialist text in electrochemistry

Authors
Richard G Compton and
Craig E Banks

Publisher/Supplier
World Scientific
<www.worldscientific.com/index.html>

Date/Edition:
2007/1st edition

ISBN
978-981-270-625-6

Level
Undergraduate, Postgraduate

Price
£76.00

Summary Review	
range: * poor to ***** good	
Academic content	****
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	****
Accuracy	****

Only a highly confident electrochemist would set out to write a one-volume account of voltammetry. And only a highly accomplished one could produce a book that manages to be distinctive whilst covering a plethora of important topics, but not cramped by detail, giving due weight to the physical, molecular and analytical aspects of voltammetry, as well as to some of the extraordinary personalities behind some of the discoveries in voltammetry.

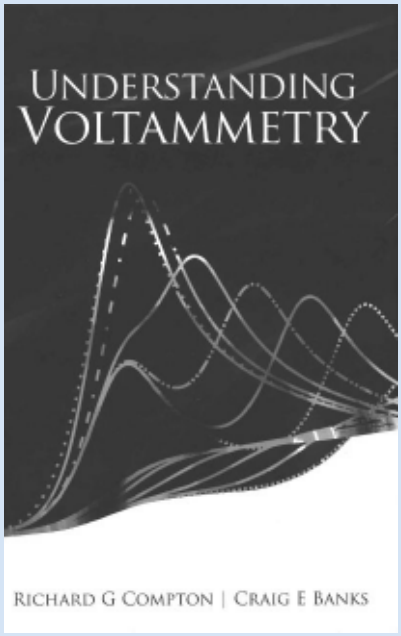
Professor Compton and Dr Banks certainly do not lack confidence, and their talents are well-suited to the task. Their speciality is, amidst the mastering of hard facts via *a posteriori* methods, in the telling of anecdotes either to support conclusions, or to instigate further investigation. However, it is not immediately obvious as to why the world would want another single book on voltammetry, given Professor Savéant's 2006 text. Thankfully, Claude Allègre (a former minister of National Education, Research and Technology of the French Government) rescues us by noting that '*pendant trop longtemps, parce que la science est parfois difficile à assimiler, les scientifiques ont cru qu'ils appartenaient à une caste supérieure, qu'ils étaient en quelque sorte les brahmanes de la société moderne. Ils ont aujourd'hui compris qu'ils fallait impérativement sortir de leur tour d'ivoire. La société le leur demande, plus même, elle l'exige.*' The authors' approach thus becomes understood, and, coupled with the absence of Laplace transformations, whilst retaining a reasonably healthy degree of mathematics, translates into a highly marketable, learner-centred text, which conveys to the reader the authors' joy of understanding how and why materials react at electrodes.

As with most first courses in electrochemistry, this book starts with a discussion on equilibrium electrochemistry followed by electrode kinetics, diffusion, cyclic voltammetry first at large electrodes then at smaller ones. The sixth chapter deals with partially blocked electrodes and other composite surfaces, followed by chapters on homogeneous molecular chemistry (which is correctly mixed with adsorption, and also microparticle and droplet voltammetry – two new areas which Professor Bockris recently described as 'fascinating'), hydrodynamic voltammetry followed by a chapter on analytical voltammetry. An appendix details the rudimentary basics of the numerical simulation of voltammetry. Each chapter builds on principles, and demonstrates some highly elegant research work undertaken within Professor Compton's laboratory, highlighting the true nature of this book – it is not a textbook *per se*, but rather it is the sketch of a personal journey, albeit one which continually enlightens the reader.

The authors' respect for, and appreciation of, Professor Savéant's and Professor Laviron's work is very well noted throughout the book, especially in the seventh chapter, which also builds on elements of Professor Compton's *Chemistry in Britain* article co-authored by ISE Professor President Hillman.

Jay Wadahwan
Department of Chemistry
University of Hull
Hull HU6 7RX
November 2010

Understanding Voltammetry



From the publisher...

Understanding Voltammetry

By Richard G Compton and Craig E Banks

The book gives clear introductions to the theories of electron transfer and of diffusion in its early chapters. These are developed to interpret voltammetric experiments at macro-electrodes before considering microelectrode behavior. A subsequent chapter introduces convection and describes hydrodynamic electrodes. Later chapters describe the voltammetric measurement of homogeneous kinetics, the study of adsorption on electrodes and the use of voltammetry for electroanalysis.

978-981-270-625-6 384pp 2007 £76.00

In summary, this is an excellent, insightful, cost-effective, and pedagogically structured book, written by a master and his apprentice for a wide audience of industrialists and academics (students and professors) in a range of disciplines such as chemistry, engineering, physics, ecology, *et hoc genus omne.* It is the only book I know which my students commend highly in terms of being very useful for their learning. Moreover, on my last two visits to Paris in April and June, I observed that it is one of only a handful of books that are in immediate reach of Professor Amatore's office desk....

When the Universe Took a U-turn

Subject area
Physics

Description
A book for those interested in theoretical physics and the history of science

Author
B G Sidharth

Publisher/supplier
World Scientific
<www.worldscientific.com/index.html>

Date/Edition
2009/1st edition

ISBN
978-981-4277-81-9

Level
Graduate and research

Price
£45.00

Summary Review	
range: * poor to ***** good	
Academic content	***
Usefulness to student	***
Usefulness to teacher	***
Meets objectives	***
Accuracy	***

'There are two stages of sanctity,the first faith,the next delusion; the one for the vulgar, the second for the sage.' This is what Arbaces, the Egyptian, said to Calenus, the priest (P.54). Notwithstanding the theological underpinning of this view, Sidharth is perhaps the new age sage who in his book, **When the Universe Took a U-Turn**, appears to have transcended faith. Nevertheless, history is the witness that the 'market share' of delusion has always been much less than that of the faith. Moreover, the former is only a highly incensed transitory phenomenon, while faith has universally exhibited resilience and hardiness, the paradoxical characteristics, to help pass the test of time. That said, delusion sometimes is the harbinger of a new faith which initially converts either the enlightened sceptics or the opportunists who are later followed by the herd. This is what still remains to be seen of many of the delusions underscored by this work which largely cuts across physics and astronomy.

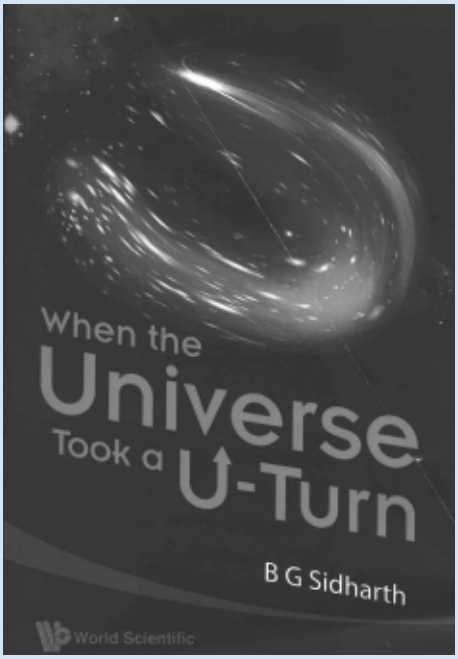
While considering its physical mass, this title is a short book containing one hundred and seventy five pages of body text including some basic illustrations. Nonetheless, highly entangled descriptions, structured round seven chapters, provide abundant ostentation of both intensity and subtlety. Chapter 1 begins by reflecting on the state of human society in the early Neolithic era and briefly describes the philosophising efforts of Homo S. Sapiens that helped make the positive laws, many of which still remain the bases for social organisation and production technologies. From that relatively simple beginning, the reader is acquainted with the scientific methods of the advanced stage of the Neolithic era illuminated by Greek philosophy; though the author would like to credit the insights of Vedas more than the duly documented scientific contributions of early philosophers. The chapter proceeds to successively bring into the loop scientists of late Neolithic era and ends by briefly flirting with Newtonian mechanics.

Chapter 2 begins with the most ambitious quote from Einstein and advances to challenge the truth of Newton's laws, to the extent of labelling his ideas of space and time as baggage; though finally accepting the inevitable conclusion that science is a unifier. The largely erratic and extensive description in this chapter ends by highlighting the controversies on the relationship between time and space and how it affects terrestrial objects including humans.

The headings of the next two chapters, 3 and 4, are adorned with the metaphor and connotation borrowed from Einstein and a famous Hollywood movie respectively; apparently, the latter also furnished perspective for heading of Chapter 2. One of the oldest and most commonplace dispositions of humankind is used as a quote beneath the heading of Chapter 3, property identified by the author as an ancient Indian saying. This chapter is largely an effort to underscore the conflict between classical and modern physics. While raising objections to what he calls the unambiguous stance of classical physics, the author appears to be denying the fact that faith in science as much relies on the universal principles of efficiency and effectiveness as faith in any other phenomenon. However, the efficiency and effectiveness of scientific enquiry ought to be appreciated with reference to both its static and

Zia Khan
CA/151,9/A,Modeltown A
Bahawalpur
Pakistan
November 2010

When the Universe Took a U-turn



From the publisher...

When the Universe Took a U-turn

By B G Sidharth

This book addresses some of the baffling questions encountered at the final frontier of space and time related to particle physics and cosmology in the context of recent iconoclastic observations and developments. When particle physics stagnated in the early seventies, a new development emerged — String Theory.

For the past 25 years, String Theory, popularly called the "Theory of Everything", has mesmerized not just scientists, but also the general public. Yet a closer scrutiny today reveals that it is no more than a mathematical marvel. It has neither predicted anything nor has it been anywhere near verification. We are essentially where we were in the early seventies.

978-981-4277-81-9 200pp 2009 £45.00

dynamic constructs. Unfortunately, while writing what largely is the history of advancements in corresponding scientific phenomena, the author's histrionic impulses have blatantly sacrificed the Newtonian landmark contributions on the altar of modern physics. The upshot is that when comparing the classical physics and quantum theory as ramp and staircase respectively, what must not be overlooked is that one can never run without first learning to walk. That said, Chapter 3 provides useful perspectives on the two evolutionary phases of quantum theory.

The opening quote of Chapter 4 happens to have its origins in Hindu theology, though a belief not uncommonly subscribed by the faithful of many creeds regardless of space and time. The author, however, appears to be only inches away from suggesting the Indian origins of the 2nd Law of Thermodynamics; namely, the law of entropy increase. In its essence, this chapter is largely a tribute to relativity theory and quantum theory.

The obvious rewording, with addition of contemporary scientific language, of the so called observation of an undocumented seventh century B.C. Indian thinker should not have appeared with quotation marks under the heading of Chapter 5. Indeed, the instinctive ethnocentric traits of humankind sometimes tend to compromise the glorious tradition of independent inquiry by an unconscious effort to claim rights to the universal legacy of intellectual property. Interestingly, this is a paradoxical intellectual pitfall and the author appears to exhibit a poor resolution almost throughout the body text of this title. Chapter 5 is largely devoted to atomic theory, and its major highlights include Newton finally credited as the first great unifier, and atomic science having its first origins in ancient India, if the inference from an undocumented and anecdotal reference is accepted.

The paradoxical heading of Chapter 6, Law without law, attracts and tantalises commonplace curiosity and intellectual appetite respectively. The phrase, borrowed from Wheeler, underscores the eternal truth defying Einstein's ambition to know how God created this world and to know His thoughts. Hence the author's successive descriptions of a perfect universe and the lawless universe.

The heading of the last chapter duplicates the title of the book and, understandably, the source of opening quote is Bhagawad Gita, the major surviving scripture of Hindu religion. The argument successively follows the footprints of the Big Bang theory, Steady State theory and the quasi Steady State model. The description of the infant universe immediately after the Big Bang offers food for thought to appreciate the

Continued on page 54

When the Universe Took a U-turn

Continued from page 53

omnipotent paradox in the two paradoxical universes of objects and ideas. The divine challenge in each case essentially remains finding the optimal resolution. Hence the ceaseless effort of the philosophers of all times and all shades of knowledge to successively unravel the marvels of nature.

This title is to be shelved in the reference category. However, it may as well be included in the suggested reading list of the higher degree students carrying out research in natural philosophy, though they are advised not to cite the source for underscoring cognitive phenomena. That said, the author's descriptions of various theses, anti-theses and syntheses, relating to both terrestrial and celestial objects, provide useful perspectives for analysing the variable relationships in both physics and astronomy.

The literary rhythm in this interesting and useful title appears to be conspicuous by its absence. Notwithstanding the author's effort to adorn the chapter and section headings with adopted or adapted phrases, the frequent encounters with intransitive and erratic descriptions of inherently consistent scientific phenomena are taxing even for the experts, not to mention the layperson. One major source of interruption in the flow are the frequent quotes, both short and long, mostly from contemporary scientists, in the running text, distinguished by the quotation marks rather than using the italic font or indentation. The latter is specifically helpful for longer quotes. Additionally, separating the endnotes and bibliography always adds to the convenience of the reader. Finally, and most importantly, the dogmatic overtone of the book, as mentioned earlier, is certainly not cognisant with the secular tradition of scientific enquiry.

Workbook for Organic Synthesis...

Subject area
Synthetic organic chemistry

Description
Workbook designed to accommpany the textbook Organic Synthesis: the disconnection approach

Authors
Stuart Warren and Paul Wyatt

Publisher/Supplier
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2009/2nd edition

ISBN
978-0-470-71226-9

Level
Undergraduate and postgraduate

Price
£34.95

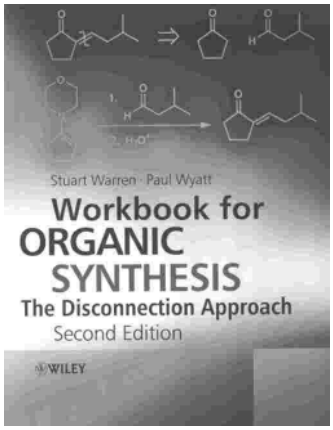
Summary Review	
range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

It is with a mix of great enthusiasm and fond memories that I decided to tackle the review of the second edition of the **Workbook for Organic Synthesis: the disconnection approach** by Warren and Wyatt. The discovery of the first edition of this book during an international undergraduate placement at the University of Sussex dramatically changed my approach to synthetic chemistry initially shaped by a rigid French Cartesian style where a heavy emphasis on rational content left little room for creativity.

As a lecturer, encouraging students to unify the information accumulated from various courses and to use their knowledge 'in context' is paramount and this aspiration is certainly facilitated by the numerous examples found in this book. It is ideally aimed at a course on Strategy in Synthesis for third-year students onwards (though it can be used for second-year students with some adaptation), and nicely complements other books by Warren and Wyatt, such as Organic Synthesis: Strategy and Control where the emphasis is shifted to the importance of the choice of reagents and their impact on the chosen strategy.

The necessity to rationalise and understand the principles behind a disconnective approach for a synthetic target has no doubt motivated the urge to compile the forty chapters of this book as a complement to the accompanying textbook. Strategic chapters (e.g. chemoselectivity, order of events, stereoselectivity, etc.) are interspersed with more 'classical' chapters based either on functionalities (alkenes, amines, etc.) or on two-group disconnections (1,3-difunctionalised compounds, etc.). The suggested problems are all very relevant and the answers provided insightful, highlighting a satisfying breadth of approaches (ionic, radicalar and photochemical). New more current references have been introduced and are conveniently placed at the end of each chapter.

In Summary, the book provides an excellent and pragmatic panorama of the various aspects of disconnective strategies, whilst keeping in mind the importance of protective strategies. Though the book could be out of reach for first- and possibly second-year students because of the complexity of the examples used, it does provide pertinent cases to complement any courses on Organic Synthesis and Strategy, where training to disconnect molecules is the key to mastering the art of synthetic planning.



Eddy Viseux
University of Sussex
Chemistry Department
Falmer
Brighton BN1 9QJ
November 2010

Zero Time Space: how quantum tunneling broke the light speed barrier

Subject area
Physics

Description
An account of the experiments that showed that tunnelling could take place at greater than the speed of light, and a full discussion of the physics behind this result

Authors
Gunter Nimtz and Astrid Haibel

Publisher/Supplier
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2008/1st edition

ISBN
978-3-527-40735-4

Level
General

Price
£24.50

Gunter Nimtz and his research assistant Astrid Haibel performed one of the most talked-about experiments of recent times. They showed that light could tunnel through a barrier at greater than the speed of light, effectively in zero time, apart from time losses outside the barrier.

Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	****
Accuracy	****

The second part of this book presents a clear and non-technical account of the physics behind this discovery. It describes the physics behind the tunnelling process. It explains why it is difficult to use electron tunnelling experiments to demonstrate this phenomenon, and why experiments with photons may be much more manageable. It then provides a fairly full account of the different types of photon tunnelling: double prisms, photonic lattices and undersized wave guides, and shows in some detail how the experiments were performed. In 1994, Mozart's symphony in G-minor was tunnelled on a microwave carrier through a hollow conductor at a speed 4.7 times that of light in vacuum.

Despite this result, the authors show that, contrary to many people's expectations, because the pulse has a certain width, it does not follow that causality is violated.

That, as said, is the second part of the book. The first part presents an account of some of the basic notions of physics that may be relevant to the tunnelling idea: time, space, velocity and so on. It must be said that this part of the book is a lot less satisfactory than the second. Much of the explanation seems rather perfunctory, most of the matter seems exceptionally elementary and not particular useful or necessary for understanding the second part of the book. When more tricky ideas emerge here, they are dealt with in a totally superficial way.

It must be said that there are some nice pictures in this part of the book, for example the Curies at work, Galileo studying the candelabrum at Pisa Cathedral, sixteen respectable citizens of Frankfurt putting their best feet forward to provide an average for the definition of the foot. There is also an unusual picture of Jagadish Chandra Bose, discover of evanescent modes, in the Royal Institution.

It must though also be said that, in the first part, the translation from German is very poor. 'The virtual photon has not an arrow indicating his non locality' from p. 80 is just one example.

Pictures apart, I would suggest that this book, like so many football matches, has two halves of rather distinct quality.

Andrew Whitaker
Department of Physics
Queen's University Belfast
Belfast BT7 1NN
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UK Physical Sciences Centre
Department of Chemistry
University of Hull
Hull HU6 7RX
Phone: 01482 465418/465453 Fax: 01482 465418
Email: psc@hull.ac.uk Web: www.heacademy.ac.uk/physsci