

Book review

Catchup Chemistry For the Life and Medical Sciences

By Mitch Fry and Elizabeth Page

200 pp., Scion Publishing Limited. August 2005, ISBN 1-904842-10-0, £14.99

The cover blurb shrieks 'Use the book: before you start your degree, as a course book, or as a quick reference and revision guide, but whatever you do – use it!' The implied utility of this textbook is indeed wide-ranging! But, whilst the publishers would advise us to use it - should we? Further, these commands are supplemented by an unattributed quote "there is no easier way to learn the chemistry you need for your degree". Really? More apposite perhaps is the statement that 'It's hard to believe, but the chemistry in this book is all presented in the most user-friendly manner possible to speed your understanding.' So is it hard to believe? In the authors' defence it is unlikely that they have any control over the cover text, and in their Preface they disassociate themselves from texts that attempt to 'package' information (primers I suppose). Rather they assert that their text is focussed on understanding principles in an 'easy to understand way'. So do these claims stand scrutiny? Does this text really help a student with little chemistry background to 'catchup'?

One difficulty in evaluating these claims is that there is no explicit statement of the target audience. The content, ranging from atoms and molecules, through bonding, carbon chemistry, isomerism, and water to bioenergetics, reactions and catalysis, would be adequate for introductory biology/biomedical courses but probably not for biochemistry programmes. So perhaps students of biological/biomedical programmes are the target, hence the book's subtitle – unfortunately we are not told. Certainly, the text covers mostly, and in greater detail the 'chemistry of life' sections of the weighty (in mass) biology textbooks imported from the USA. Typically, each Chapter consists of a basic concepts box, main text sectionalised, a summing up and a 'Test yourself' section with answers (and usually explanations) at the back of the book. Nearly every one of the eleven chapters has a 'Taking it further' section on more advanced aspects of the chapter topic. There are no 'Test yourself' sections for these. The structure of the text, and most importantly its layout, do make it easy to find information – certainly an important attribute in meeting the objectives listed in the Preface. The diagrams are mostly clear, uncluttered and well drawn so that the artwork complements the helpful text layout. There are 87 numbered Figures plus other diagrams, so there is much to help the visual learner. Generally, the prose is written in plain English. Very often considerable efforts are evident to provide clear explanations cross-referenced to relevant biological topics. But there is a problem with accuracy.

The text has rather too many errors of two kinds. The editing needs to be much, much better. For example, the text seems to perpetuate the myth that Hasselbach is one of Johann Sebastian's multi-talented family. It is Hasselbalch in Henderson-Hasselbalch. Even the clarity of the diagrams is marred by this type of error: N for H in DNA bases; cholesterol with no double bond; water molecules diagrammed with bond angles of less than 90° (but not all of them!); incorrect Fisher projection of amino acids that disguises isomers; and, sadly, there are other examples. In the text the errors of content are usually minor but crucial to understanding by the reader. For example, a section on uses of isotopes in medicine starts with radioactive decay and moves to ¹³C without explaining this is not a radioisotope; ΔG° makes a late

appearance long after explanation of free energy and its meaning is never adequately explained; energy released from glucose oxidation is given as 2875 kJ without the per mol; again, there are other examples. A more thorough review of the text should have spotted these.

There are two particular areas that biology students often find difficult – moles and pH. The authors do address the difficult topic of moles in a fairly innovative way and obviously recognise the conceptual difficulties this topic presents. There are some useful worked examples using Avogadro's constant, moles and molarity. But I am unconvinced that relative molecular mass, or indeed molar mass, are of relevance to biologists and both require extra, unwanted symbols. Molar mass has the additional drawback of being symbolised as M. As we are stuck (regrettably) with the symbol M for mole l^{-1} , the introduction of M is an unnecessary source of confusion in a topic that many students find particularly bewildering. A second example of the lack of relevance to biology concerns the treatment of pH and acid, bases and buffers. Although we must accept that Sorensen's unhelpful quantification of $[H^+]$ as the logarithm of the reciprocal of the concentration is here to stay, that shouldn't mean that recent advances in acid-base chemistry be neglected, especially as they are of direct relevance to biology, and particularly the medical sciences. It is 25 years since Peter Stewart demonstrated that $[H^+]$ is not an independent variable – that is, you can't add just 'hydrogen ions' to a solution. A modern treatment of the subject should at least refer to this.

My last problem with the book is that it is designed as a starter – 'catchup' – text; so if you don't get the authors' explanation of the topic, or want to know more, what do you do? There is no recommended reading – the reader really is left with nowhere to go!

So should a biology student use it? Certainly, the explanations are more understandable than some chemistry primers for biologists. And the treatment of all topics is fuller than in the chemistry sections of the common introductory biology texts. Also the black and white line drawings of the figures are preferable to the usual multicolour figures of such texts. So it would represent additional value for first year life sciences students, and a worthwhile investment as the price of £14.99 is competitive. But, publisher, do hurry up with the first revision!

Reviewed by Glenn K Baggott

School of Biological and Chemical Sciences Birkbeck
University of London
Malet Street
LONDON
WC1E 7HX
g.baggott@bbk.ac.uk