

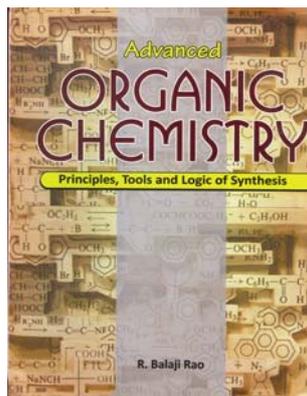
lower-dimensional counterparts. He liked to focus on the basic features of finite dimensional vector spaces and considered infinite dimensional versions of these. In the domain of mathematical physics, Poincaré would often consider restricting to small regions where linear laws hold and then consider extension of the idea to generate a linear partial differential equation. He, however, abandoned this method in the case of quantum theory which was essentially discontinuous.

In Poincaré we see an amazing blend of mathematical thinking and physical intuition. His journey in the world of mathematics and physics has continually changed course from the abstract to the concrete and the concrete to the abstract. His mathematical mind was attracted to larger structures, which brought about economy of thought. He did not have much patience with isolated facts. One of his significant mathematical contributions has been the proof of the uniformization theorem. An example of his far reaching mind is, for instance, the conjecture on the characterization of the three-sphere that he came up with, which was successfully resolved only in recent times (2002). As many of us know, Poincaré had contributed significantly to the conceptual foundation of the theory of special relativity, which is associated with the name of Einstein. What is perhaps less known, and what this book brings out is that, Poincaré was in fact, well ahead of Einstein in speculating about a relativistic theory of gravity. Another remarkable idea was his belief that at the fundamental level, space and time might be discrete (atomic). Such an idea indeed forms the core of one of the present-day approaches to the quantum theory of gravity (causal sets).

Overall, this is a superbly balanced account of a brilliant mind and certainly worth reading, especially for researchers in physics and mathematics. Such a book should be included in university libraries across the world.

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**Advanced Organic Chemistry: Principles, Tools and Logic of Synthesis.** R. Balaji Rao. Vishal Publishing Company, 2012. 856 pp. Price: Rs 570.

The book under review works on an 'all in one' principle and begins from the most fundamental concepts and works its way up to complex natural product syntheses. The usual arrangement of functional groups as seen in most textbooks does not occur. Interestingly, mechanisms and concepts of organic chemistry are explained together. One knows that a study of organic chemistry cannot be detached from functional group chemistry; nonetheless, it is a new shape to exam-oriented textbooks which gives the student a break from routinely organized textbooks.

The book is divided into 24 chapters, starting with basic nomenclature followed by stereochemistry and reaction intermediates and mechanisms. A typical arrangement of functional groups as seen in older textbooks does not occur. Therefore, it can be seen that a certain mechanism (e.g. the addition to a carbonyl group) can be applied to different functional groups. A dedicated chapter for protection and deprotection strategies is a welcome move. A large chunk of named reactions and reagents is covered, typically presented with a reaction scheme, one mechanism and a few variants of the same. This is concluded by a small number of well-chosen examples from the literature.

Having said this, the book is bulky and heavily loaded with information and may lead a student to stubborn memorization. The biggest drawback of the book is the lack of any format for chemical structures, especially stereo-descriptors, which may throw the reader into temporary confusion.

Although the book wants to make the readers to feel organic chemistry in a different way, it abruptly dives into an exhaustive listing of protecting group strategies and continues the thread into reactions and reagents. The highlight of the book is clearly the massive list of organic named reactions, arranged in alphabetical order, totalling 126 in number. The named reactions are discussed under a simple introduction followed by the mechanism and then closing the discussion with a few literature examples. The next section deals with a underdeveloped explanation of spectroscopic techniques and the book closes with examples of classic organic synthesis like reserpine, prostaglandins, steroids, etc.

The reviewers feel that the book is still very far from achieving its objective. In fact, it does not even define a clear target audience. One feels that the book is essentially meant for those who have already completed a course in functional group organic chemistry and are just looking at a physical repository of information which can be accessed when there is no internet connection.

The text is not explanatory and it is just a series of statements which are put in the right order such that the chapter looks organized. The content of the book does not concentrate on any specific audience; instead it tries to be a book for everyone, right from undergraduate or post-graduate students to lecturers. Due to the lack of any consistent style of explanation, the book, in our opinion, promotes only stubborn memorization. Unnecessary and undernourished explanations are in plenty, throwing the reader into the dilemma of sorting the valuable from the babble.

Any advanced book dealing with a few total syntheses is expected to have a rigorous treatment of disconnection approach, which is scanty in this book. The section on spectroscopy is equally bizarre. In a breathtaking pace and space, 30+ pages, the author finishes the discussion of NMR, starting from Larmor frequency and all the way up to a solved example of an oligopeptide using NOESY and ROESY!

There are several typographical errors in the book both with text as well as chemical diagrams, e.g. the author shows the ozonolysis of a terminal double bond and overlooks on converting the double bond into an aldehyde, and at a much later step shows a Wittig reaction of that

double bond! At another place, the author shows  $H^+$  as H. These occurrences are not rare and may be the result of poor editing or lack thereof. The book is appallingly typeset; with completely out-of-shape tetrahedral carbons and benzene rings. The diagrams manage to thoroughly confuse the reader between resonance and equilibrium structures. A copious number of disproportionate molecules, with a tertiary butyl group being smaller than H-atom or methyl group, are part of the book. The line structures add to some more confusion by not indicating the end-points as H-atoms, especially when the author discusses conformations and other important stereochemistry descriptions. On more than one occasion the alcohol groups are connected to the parent chain through a hydrogen atom and the oxygens become monovalent! Also, the author mixes up diastereomeric excesses with enantiomeric excesses.

The book costs Rs 570, which is almost similar to that of Indian editions of many standard organic chemistry books. The book definitely does not offer any price advantage for the reader nor does it make his organic chemistry concepts better. Also, there are no end-of-chapter questions. All said and done, the book is tailor-made to suit University and caters to the needs of an entrance exam for the students. The author is partially successful in his attempt of presenting a 'packaged' organic chemistry book, where it is convenient to find everything in one place. The indexing at the end of the book is exhaustive and well organized into sections, thereby making it easy for the readers to jump to the right page. With all these considerations in mind, the reviewers feel that this is just another book in the market and hope that subsequent 'editions' are indeed edited before publication.

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**Medicinal and Pharmaceutical Chemistry.** Harkishan Singh and V. K. Kapoor. Vallabh Prakashan, C-5, SMA Cooperative Industrial Estate, GT Karnal Road, Delhi 110 033. 2012. 1854 pp.

This book is now a well-accepted classic textbook for pharmacy students. Rapid scientific advances and continuous 'introduction' of new drugs are special feature of pharmaceutical sciences. It is creditable that the authors are regularly updating the text and this book is a thoroughly revised third edition (2012). Many important new advances in therapeutics are coming through biotechnology. It is an appropriate that the authors have added a chapter on 'biotechnologically derived drugs', introducing the students to the essentials of this fast-emerging new field of therapeutics. The other special features of the book include chapters on 'chemical naming and graphics of organic drugs' and 'International nonproprietary names (INN's)' (chapters 2 and 3). Knowledge of chemical naming is important, as it provides the key to the chemical structure and structural interconnectivity of drugs of different classes. This chapter also describes three-letter and one-letter symbols used for each amino acid in naming polypeptides which are not commonly available in chemistry books, but are much needed for pharmacy students. Similarly, the INNs are useful to know the 'medicinal' interconnectivity of drugs, and their therapeutic usage. These chapters would prove instructive and educative to the students. The next two chapters elaborate the basics of drug action, highlighting the physico-chemical features of drugs which determine their permeability across the membranes, and describe different types of chemical bonding which determines inter-molecular interactions in drug-receptor and enzyme-substrate interactions, and processes of pharmacokinetics and excretion of drugs, together abbreviated as ADME. With these basics of drug action well understood, the students will have a better comprehension of the action of various classes of drugs. The chapters that follow present a comprehensive overview of the design, structure-activity relationship studies and development of the different classes of drugs, with a focus on drugs official in Indian and the British Pharmacopoeia, also briefly describing the essentials of their commonly used syn-

thesis or methods of preparation and the pharmacopoeial specifications. The text ends with two appendices covering 'Glossary of medical terms' and 'glossary of terms used in medicinal chemistry'. This will be of great benefit not only to students, but general readers. With this coverage, the book will no doubt serve as an important resource for study of the subject.

There are a few omissions in the book, which if added would enhance its value: (a) A chapter on 'Drug design, QSAR and molecular modeling' should be included because these topics are now a part of the B Pharm and M Pharm syllabus throughout the country. (b) A chapter on 'traditional systems of medicine and medicinal chemistry', covering the contribution of 'natural products to medicinal chemistry'. One of India's important assets for healthcare has been the availability of the traditional systems of medicine, which are still largely practised. This chapter would provide the students with a good historical perspective, expose them to the science behind the traditional systems, and also help in integrating the use of modern and traditional systems of medicine, if necessary. (c) The coverage of 'synthetic antibacterials' should be largely expanded beyond the coverage in chapters on 'sulfonamides' and 'antimycobacterial agents'. India continues to be a big reservoir of infectious bacterial diseases, with the serious problem of drug resistance, and students must be fully exposed to these. It would be good to rename the chapter on 'quinolones and urinary tract antiseptics' to 'synthetic anti-bacterials'; the present title gives the wrong impression that quinolones are used mainly or only for urinary tract infections, while they have a much broader therapeutic coverage. This chapter must cover quinolones, oxazolidinones, nitrofurans and some less commonly used antibacterials like hexamine, and some more recently synthesized quinolone-oxazolidinone hybrids. Covering oxazolidinones is especially important as this is the only new class of antibacterials discovered and introduced in clinical use since the introduction of quinolones, with linezolid as a commonly used drug of this class. (d) The anti-tuberculosis drugs in chapter 37, 'antimycobacterial agents' are referred in the text as anti-tubercular drugs, which is not correct; tubercular pertains to tissue components resembling tubercles or nodules; the