assay systems'. Note the inconsistent words. The concept of 'lead' is badly explained. Factually incorrect statements include Ehrhardt (1949) on p. 3, Meyer and Hemmi on p. 15, discovering of pethidine as rational development (p. 3), distance between the two OH-groups in structure D1 on p. 9 should be 12.1 Å and not 14.5 Å. Other not verifiable statements in the book are 'Configurationally every half molecule of tubocurarine is identical to atropine.... double rows of O–N attachment in d-TC and single row of O–N in atropine. . . . as a possible explanation of the specific action of d-TC on the neuromuscular junction. . . . . On p. 177 cardiotonic actions have been attributed to digoxigenin. The sequence of sub-classes and drugs included do not reflect the development sequence. For example the thiazides are treated first and then the aromatic sulphonamides and still later the earliest osmotics and acidotics, in the chapter on diuretics. The inclusion of bile acids and sapogenins in the chapter on steroids is superfluous, unless they were related by citing them as useful raw materials for the synthesis of hormonal steroids. No such reference is found. On the other hand a curious statement appears on p. 452: 'They (saponins) have been used extensively in medicine (?) as foaming agents in fire extinguishers and as fish poisons'!.

The book suffers from too many omissions: Under steroids corticosteroids and oral contraceptives are major omissions. Methyl testosterone, ethynyloestradiol and ethisterone are not even mentioned. Under cardio-vascular drugs coagulants and anticoagulants are not dealt with. Important drugs missing are: Nitrite and Nitrate vasodilators (anti-angina); Nifedipine, Atenolol, ACE inhibitors Captopril and enalapril, reserpine, lignocaine and phenytoin. Another major class of drugs not finding place in the book: Anti-psychotics including anti-depressants, tranquillizers and anti-anxiety drugs. Amphetamine group is also missing in the chapter on CNS stimulants. The chapter on narcotic analgesics omits even a mention of etheno-morphines, endorphins and en-kephalins. Anti-diabetic drugs, anti-thyroids and diagnostic agents are all part of medicinal chemistry curriculum, but do not find place in this book. A very large group of chemotherapeutic agents like anti-bacterials, tuberculo- and leprostatics, anthelmintics, anti-protozoals (other than anti-malarials), anti-cancer agents, anti-viral drugs are totally abandoned. These are very much relevant to the tropical countries. Even among the antibiotics, cephalosporins, macrolides, antifungal and anti-cancer antibiotics and quinolones are glaringly missing. In contrast to this, many drugs not included in any Pharmacopoeia (many obsolete and some still to be accepted) are found in all chapters, including their syntheses. While the author has included INN, USAN and BAN designations (not very useful information!), the information about official status in the Indian Pharmacopoeia is extremely unreliable. Many Indian Pharmacopoeia drugs are not included or designated as such and several drugs which are not official in Indian Pharmacopoeia are actually shown as Indian Pharmacopoeia drugs. For a book on medicinal chemistry omission of properties like crystalline nature, mol. wt., solubility, pharmacopoeial forms (e.g. different salts official), limits for specific impurities present due to synthetic routes, basis of assays, etc., is not desirable. Students and teachers depend on textbooks for authentic and collated information on a given drug or topic. There is also no mention made of the importance and relative activities of isomers (stereo-chemical, optical, geometrical, etc.), even when these are very relevant. The literature cited is inadequate and repetitive. The index is cursory and inadequate.

The price is rather high for the Indian scene. The Indian editions of 'Foye', 'Wilson & Gisvold' and 'Atherden' are much cheaper and very superior. It is surprising that a reputed publisher like Wiley Eastern should have paid little attention to the quality of the subject as also to the production. In its present form the *Medicinal Chemistry* by Ashutosh Kar is not useful to students and teachers of medicinal chemistry, much less to practising/manufacturing pharmacists. I am afraid I cannot recommend it to any library also for fear that the errors in the book might get into class rooms through inexperienced teachers and become part of the disinformation a student may acquire.

P. GUNDU RAO
College of Pharmaceutical Sciences
Manipal 576 119, India

The Business of Living: An Acquaintance with Biology. Sandhya Mitra. Wiley Eastern Ltd., 4835/24, Ansari Road, Daryaganj, New Delhi 110 002. 1992. 356 pp.

Though the phenomenon of life remains one of the most challenging enigmas of nature, teaching biology in schools and colleges in India remains less exciting than a peep into the port or starboard deck of Noah's Ark. Rather than presenting the thrill and excitement of the intricacies of the life process, in most cases, biology curriculum in the country remains merely a catalogue of life-forms. Any effort to rectify the situation will involve the availability of good textbooks, particularly indigenous, which can serve as the link between the lab bench and the classroom. But most of the textbooks currently available hardly ever deviate from the standard approach of presenting the 'Parade of Life-forms'. Even the pictures are so stereotyped, many books even use the same printing blocks! In this context, Sandhya Mitra's efforts to present an integrated view of biology to cover the entire spectrum of biological research is commendable. In writing the book *The Business of Living: An Acquaintance with Biology*, she attempts to present a good textbook which can serve as a backdrop for an introductory biology course. Though the effort is laudable, the final product falls short of expectation. The book could do with a lot of improvements particularly the early and late chapters.

The major stumbling block is lucidity. In many sections, though the title is appealing, it fail to convey what the author intends. A good example is the first chapter itself which is supposed to give a historical survey of the evolution of major concepts in biology. Most of the chapter is irrelevant to biology. At the same time, the history of emergence of major concepts such as heredity is not given sufficient attention.

In an attempt to be dramatic, Mitra makes innumerable factual errors. In her introduction to Dalton's atomic theory, she states 'Atoms were proposed to be the ultimate discrete units of matter that could be interconverted to energy and vice versa' (page 19). Dalton has apparently preempted Einstein! To state that 'This knowledge became the founda-

tion of all physical and biological science' is taking reductionism to the limits. In the same style, she writes: 'The individual is a reflection of the blueprint which encodes the information for its development. The more complex the individual, greater the information content in the DNA.... (page 31). This rather simplistic interpretation of development and complexity of living organisms is misleading. Unfortunately, statements such as these are not isolated incidences. In the same chapter, the theme is stressed again: 'As the DNA embodies all information about structure and development of an organism, the DNA in a eukaryote has myriad more subtle features that are absent in prokaryotes'. Without being explicit about what these 'myriad subtle features' are, the statement contradicts recent observations which show that basic molecular mechanisms are conserved to a considerable degree among prokaryotes and eukaryotes. Since these are introductory chapters that set the trend of the book, it is essential to maintain factual accuracy.

The strongest chapters are the middle chapters that deal with the real business of life. Mitra has done a commendable job of presenting the salient features of life starting from thermodynamic principles to behaviour. The presentation is a far cry from the conventional textbooks. A new-comer is introduced to major concepts such as basic biochemistry, molecular genetics, immunology and oncology, neurophysiology and behaviour. The chapters can also act as a guideline to a basic biology course.

The shortcomings of the early chapters seem to make a come-back towards the end of the book. Biology is essentially an experimental science. Major breakthroughs in biology have come from asking a fundamental question and trying to find the answer by making crucial observations and by designing simple but elegant experiments. The discovery of the principle of heredity, the laws controlling the development of a fertilized egg, the theory of evolution, and more recently, the discovery of the chemical nature of the gene all fit into this simple pattern. Mitra's writings leave one with the impression that most of the excitements in modern biology stem from growth in physical, sciences and technology, particularly electronics. Though this can be said about some aspects of biological analysis, the conceptual framework of biology still depends on simple and direct experiments. Even in the overempnasized field of 'recombinant DNA research', a lot can be achieved in the absence of any fancy equipment or electronic technology. Statements such as 'Physicists are turning to the living system to decipher how complex reactions are carried out....' and 'there will come a day when biology might subsume physics itself' are uncalled for. To give the impression that a conflict exists between physicists and biologists for intellectual supremacy is as unwarranted as statements such as 'Homosapiens — the monarch of all he surveys'. In the concluding chapters, one also gets the feeling that most of biology is designed for the betterment of life on earth. Any technological breakthrough that assists life is a bonus. But the biggest prize, at least as far as learning biology in schools and colleges, is knowledge itself about us and the world around us.

S. MAHADEVAN

Developmental Biology and Genetics Laboratory
Indian Institute of Science
Bangalore 560 012, India

Edited and published by Prof. S. Ramaseshan, Current Science Association, Bangalore 560 080.
Typeset by Book Makers (I) Pvt. Ltd., Bangalore 560 009, Printed at Printek Printers, Bangalore 560 079.