

a chemical nature. These topics, however, are covered at a rather superficial level. The only type of student who is likely to benefit from this workbook is a student whose high school mathematical training is virtually nonexistent. If the student really needs exposure to many of these topics, it is very doubtful that he will be able to compete successfully in a true college level general chemistry course.

Fundamentals of Chemistry by E. Kostiner and J. R. Rea, is designed for a one term, preprofessional introductory chemistry in a straightforward, easily readable style. The book is attractively designed in a two-colour black and red

format which makes it very easy to read. Major topics found in most full year texts which are not presented here include: kinetics, thermochemistry, nuclear chemistry, co-ordination compounds and a discussion of the transition elements. A reasonably large number of worked-out example problems are included in most of the chapters as well as a fair selection of end-of-chapter problems. Fairly extensive chapters on organic chemistry and biochemistry (about 13% of the text material covers organic and biochemistry) are attractive features of the book and should appeal to the audience for which the text is designed. Historical and relevant

sidelights are prominently displayed throughout the text and also add appeal. The book emphasises the basic concepts of chemistry, however, and is not of the 'cutesy' variety with cartoon-type drawings which has recently become popular for use in the abbreviated one term general chemistry course. This text is highly recommended for instructors who wish to present a one term course in general chemistry which emphasises the basics of chemistry. □

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Experimental organic chemistry

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Experimental Organic Chemistry. By David Todd. Pp.346. (Prentice-Hall: Englewood Cliffs, New Jersey, 1979.) \$13.95. *Techniques and Experiments for Organic Chemistry*. Third edition. By Addison Ault. Pp.442. (Allyn and Bacon: Boston, 1979.) \$16.95.

RECENTLY, there has been a flood of organic chemistry laboratory manuals from the book publishers. Among these books are revised editions of previous manuals and a few brand new manuals. On perusing the manuals it is sometimes difficult to avoid a sense of *déjà vu*, for there is a great deal of overlap in the experiments detailed. One new book that does not suffer in this way is *Experimental Organic Chemistry* by David Todd. Although there are a few familiar faces, this collection of fifty-eight experiments contains many new experiments for the undergraduate. With this large number to choose from, an instructor should have no difficulty in selecting enough interesting and instructive experiments to fill an introductory organic laboratory course. Examples of common organic preparations, Grignard reaction, Friedel-Crafts acylation and Fischer esterification to mention a few, are included, as well as some not so ordinary preparations such as the Peckmann coumarin synthesis and the Rothmund reaction for the preparation of tetraphenylporphyrin.

Unlike many laboratory manuals, which present laboratory techniques separate from the experiments, Todd introduces the techniques as an integral part of a specific experiment. For example, column chromatography is explained and

demonstrated in an experiment on extracting pigments from spinach. As a consequence of this approach, one could be locked into doing a certain core of experiments in order to introduce the basic techniques. The experiments are detailed enough to be carried out by the inexperienced undergraduate student. The discussions of the techniques are concise and give enough information for the student to understand the how and the why of the techniques. The section on NMR and IR spectroscopy is very short (7 pages) and just covers the basics. This would not be the book for a laboratory course that is heavy on instrumentation.

Among the good points of the manual are the detailed instructions conveyed in a very conversational style. This, coupled with a section entitled "Most Common Errors", which appears after each set of instructions, should lead to good results for most students. Another favourable point is that many of the experiments and compounds encountered in the experiments can be related to familiar, naturally occurring materials. The NMR and IR spectra of thirty-five compounds are illustrated, but they appear to be retracings of spectra as opposed to reproductions of actual spectra (the coupling in the methyl triplet of the ethanol spectrum on page 97 does not appear to be symmetric as it should be). Also, the solvents used to prepare the NMR samples are not noted on the spectra.

There is some inconsistency in the warnings regarding hazardous properties of the chemicals. For example, the toxicity of benzene is noted in Experiments 25 and 33, but no mention of it is made in an earlier one — Experiment 13, the Grignard synthesis of monodeuterated benzene. Also in Experiment 13, 1,2-dibromoethane is suggested as a reagent for starting reluctant Grignard reactions and no warning is given regarding its toxicity. This compound is on the OSHA tentative Category 1 carcinogen list, as is benzene. Thus, any instructor using this book, or any other laboratory manual for that

matter, should check to see if the hazard warnings included need to be supplemented or updated.

Among the revised editions of organic chemistry manuals is *Techniques and Experiments for Organic Chemistry* by Addison Ault. This is an updated and expanded version of a good laboratory manual. Better than one-half of the book is devoted to describing techniques and apparatus for the organic chemistry laboratory. This is done thoroughly and clearly and is illustrated with large, accurate drawings. Modern spectroscopic techniques, NMR, IR, UV and mass spectrometry, are dealt with extensively.

The second half of the book is a compendium of experiments demonstrating the techniques and the characteristic reactions of organic compounds. The experiments are divided into four groups: separations, transformations (one-step procedures), synthetic sequences and projects. The separations, transformations and synthetic sequences are all well worked out, carefully detailed experiments which provide good working experience with organic chemistry.

For the more adventurous and skilled, there are the projects. These are procedures excerpted directly from the primary sources in the chemical literature. The compounds included are natural products, are theoretically interesting, or have unusual physical properties. The ability to reproduce procedures directly from the chemical literature is very important to the organic chemist.

In summary, Ault's book is a well written modern, informative manual that should be looked at seriously by anybody who is considering using laboratory manuals. □

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