Review of Patty's Industrial Hygiene and Toxicology Volume III: Theory and Rationale of Industrial Hygiene Practice
2nd Ed, 3A, The Work Environment, 822 pp. Hardcover, $95.00
3B, Biological Responses, 753 pp. Hardcover, $95.00
John Wiley and Sons, Chichester

This expanded and updated two-book second edition of Volume III of Patty's Industrial Hygiene and Toxicology replaces the single book Volume III first printed in 1979. Like the first edition, this second edition is a useful collection of survey articles written by experts on scientific topics relevant to the practice of industrial hygiene. The survey articles are generally written so that they can be understood by scientists in fields which are peripheral to industrial hygiene. Most of the articles describe or summarize the principles and methodologies currently used to identify, measure, interpret, and control occupational exposures to toxic substances and health hazards in the work environment. All of the articles include lengthy lists of references for the reader to obtain more detailed information if desired.

The editors have divided the potpourri of 28 articles into two categories for the purpose of a less cumbersome two-book volume. Book A of Volume III is designated 'The Work Environment' and Book B is designated 'Biological Responses'. The reader should be aware that the classification of the articles into these two categories is imprecise, and the reader is advised to look in the indexes of both books when searching for a subject. The 'Work Environment' book contains 14 articles written by 19 contributing authors: Health Promotion in the Workplace; Occupational Health Nursing; An Interdisciplinary Approach; Detecting Disease Produced by Occupational Exposure; Health Surveillance Programs in Industry; Occupational Exposure Limits, Pharmacokinetics, and Unusual Work Schedules; Data Automation; Statistical Design and Data Analysis Requirements; Analytical Measurements; The Emission Inventory; Measurement of Worker Exposure; Philosophy and Management of Engineering Control; Personal Protective Equipment; Job Safety and Health Law; and Compliance and Projection.

The 'Biological Responses' book also contains 14 articles written by 19 other contributing authors: Toxicologic Data in Chemical Safety Evaluation; Biological Indicators of Chemical Dosage and Burden; Body Defense Mechanisms to Toxicant Exposure; Biological Rhythms, Shiftwork, and Occupational Health; Work Costs and Work Measurements; Interpreting Exposure Levels to Chemical Agents; Applied Ergonomics; Abnormal Pressure; Biological Agents; Hot and Cold Environments; Ionizing Radiation; Noise; Non-ionizing Electromagnetic Energies; and Vibrations. A 25-page introductory article entitled Rationale written by the two editors is repeated in each of the two books.

While the editors have performed a creditable task of assembling a useful collection of survey articles to cover the many diverse subjects and issues faced by an industrial hygienist, the editing could have been better. This reviewer found some of the articles addressing much a broader area than indicated by the subject title, and this has resulted in unnecessary overlap and repetition between many of the articles. In addition, while topics like data automation, biological rhythms, and vibrations were given ample discourse by the contributing authors of Volume III, important subjects like industrial noise, occupational dermatitis, and wipe sampling received scant or insufficient treatment. Despite these flaws of the second edition Volume III of Patty's Industrial Hygiene and Toxicology, many readers will find the two-book volume a handy and useful reference set.

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Asbestiform Fibers: Non-occupational Health Risks? National Research Council Report. National Academy Press, Washington D.C., 1984. £25.85.

The presence and, if present, the size of the risks to public health caused by asbestos now present in the general environment as the consequence of its widespread use during the first three quarters of this century is very properly a matter of public concern. The nub of the problem is how to determine whether or not a risk exists. Direct epidemiological investigation has demonstrated cases of mesothelioma attributable to asbestos inhalation in domestic contacts of asbestos workers and in those living in the immediate vicinity of the S. African crocidolite mines and of factories in Barking and Hamburg processing asbestos from these mines. No similar cases have been identified in those living near the amosite or chrysotile mines in S. Africa or near to the chrysotile mines in Canada nor among those living within half a mile of a factory processing amosite asbestos in Paterson, New Jersey.

Similarly direct epidemiological investigation has demonstrated no convincing evidence of an excess of asbestos related disease, in particular of mesothelioma or lung cancer, attributable to urban asbestos pollution. But direct epidemiological investigations may be insufficiently sensitive to detect low orders of risk and the alternative approach taken has been to extrapolate from the risks experienced by those occupationally exposed to asbestos to estimate the risks likely to occur among those exposed at the much lower levels found in the general environment.

This is the approach used in this report from the National Research Council of the United States. Assuming a lifetime exposure to asbestos in the general environment of 0.0004 fibres/ml which is based on measured atmospheric concentrations of asbestos, they estimate the attributable risks of lung cancer and mesothelioma by linear extrapolation. They conclude that the risk of mesothelioma is 9 in a million (range 0 to 350 per million) and of lung cancer 64 in a million for male smokers (range 0 to 290) 23 in a million for female smokers (range 0 to 110) and 0 and 3 per million in male and female non-smokers, respectively.

The importance of these observations warrants a close inspection of the validity of the methods used in their assessment of risk. Extrapolation is notoriously unreliable but may have some validity where the exposure response relationship and in particular the point of intercept on the exposure axis is known and where the effect of other factors, such as cigarette smoking or fibrosis on this relationship, are understood.

A model of linear no threshold relationship has been used for the calculations in this report and the assumption made of no differences in biological effect between different fibres, in particular between chrysotile, the fibre most commonly used, and the amphiboles crocidolite, amosite and tremolite.

These assumptions, as the report recognizes, are open to several criticisms. The evidence for lung cancer is in keeping with a non-linear relationship with a possible threshold which may related to the fibrosis caused by asbestos. In addition the gradients of the exposure response relationships for lung cancer vary by as much as 100 fold between different occupational environments. Furthermore, uncertainty persists about the basis for conversion from mass (the measurement used in the majority of the studies) used in the calculations and fibre concentrations.

The difficulties in using this approach are even greater for mesothelioma than for lung cancer. The differences in biological effect of
different fibre types in lung cancer may be small and can probably be safely overlooked. This assumption cannot be made for mesothelioma where consistent evidence has been obtained that almost all peritoneal and the great majority of pleural mesotheliomas are caused by exposure to amphibole rather than chrysotile asbestos. A further difficulty in the use of extrapolation to estimate mesothelioma risk is the absence of dose–response data on which to base the extrapolation. The authors of this report faced a difficult task but I fear their conclusions have not been sufficiently informed by much relevant, albeit recently obtained, information. Their method of risk assessment seems likely to have over-estimated the level of risk for lung cancer; for mesothelioma in the absence of adequate concentrations of amphiboles and the possible risks posed by exposure to non-asbestos fibres remain uncertain and in need of data on which informed opinion can be based.

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L. O. NABORS and R. C. GELARDI (eds) Alternative Sweeteners
Marcel Dekker, New York, 1986. 355 pp. $64.75 Hard cover

This interesting book provides information on a wide variety of alternative sweeteners, ranging from those available today to those undergoing investigation for final approval and successful use. The volume is very well organized. The first chapter establishes the human’s innate desire for sweet taste and introduces the general procedure that sweetness of a given substance is evaluated in relation to sucrose. It describes the purposes of using alternative sweeteners and the requirements for an ideal sweetener; the regulatory demands for the evaluation of food additives associated with the control of additives and related health aspects. All these topics are directly relevant to the information presented later on specific sweeteners.

The remaining compilation deals with each alternative sweetener in separate chapters, commencing with the better-known saccharin, aspartame, and cyclamate, to the other less familiar alternative sweeteners. Each discussion usually begins with a historical view on how a sweetener was first discovered and used, and proceeds to discuss aspects such as physical and chemical properties, production/ manufacture, use, economics, safety evaluation—toxicology and metabolism, and regulatory status. The format is orderly and consistent throughout the volume. This makes it extremely easy for the reader to find selected subjects of interest pertaining to any specific alternative sweetener.

Although the editors declared that the various factors presented were discussed in depth and that the information provided was comprehensive, a reading of the text did not provide such an impression. Varying degrees of detail are given for the alternative sweeteners considered in the book. For example, the information on ‘Carcinogenicity and Toxicity’ for saccharin is afforded more than three pages of discussion, whereas the information on the same topic ‘Toxicology and Carcinogenicity’ for aspartame is only discussed in a 6-line paragraph, summarized from six studies. On the other hand, the coverage is adequate and the information is sufficient for an interdisciplinary reference book. The chapters are generously referenced so that the interested reader will be able to obtain more details on selected subjects of specific alternative sweeteners through the use of the extensive bibliographic references.

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THOMAS E. HAMM Jr. (ed.) Complications of Viral and Mycoplasmal Infections in Rodents to Toxicology Research and Testing (Chemistry Institute of Toxicology Series). Hemisphere Publishing, Washington 1986. 191 p. $49.95. Hard Cover.

The adverse effects of unrecognized infections in laboratory animals on the results and interpretations of experiments or studies being done can be serious, and should be anticipated by any researcher. This collection of nine brief review articles (each a chapter in the book), which were presented at the Sixth Chemical Industry Institute of Toxicology (CIIT) Conference in 1983, is a useful addition to the literature on this important subject. Although the book addresses only viral and mycoplasmal infections of rodents as they affect toxicology research and testing, the general principles and quality control recommendations have broader applicability.

Chapter 1 is a review of murine viruses and mycoplasma that are potential or actual problems, with a summary of antibody prevalence data from commercial breeding colonies over a two-decade period up to 1982, abstracted from the records of Microbiological Associates, Bethesda, Md. Chapter 2 is a similar review based on records from the National Cancer Institute Bioassay Program. Chapters 3–5 are more comprehensive summaries of the state of knowledge and significance of particularly important individual agents (Sendai virus, rodent coronaviruses, and murine mycoplasmas). Chapters 6 and 7 briefly cover serologic and virus isolation methods for detecting the presence of specific viruses and mycoplasma in laboratory rodents. The final two chapters review procedures for breeding and monitoring laboratory rodents free of these diseases, including the preventive program at CIIT.

This information is important for anyone involved with the use of laboratory rodents for research, from administrator to laboratory technician. The book is a good general review, not a detailed laboratory test procedure manual or comprehensive treatise on rodent diseases. Each chapter is documented by appropriate references, and the print and photographs are of reasonable quality. Unfortunately, the high price ($49.95) for a book of only 191 pages may limit its distribution to the many research institutions which should have and utilize this kind of information and advice.

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Toxic Susceptibility: Male/Female Differences
John Wiley & Sons, New York, 1986, 336pp. $59.95. Hardcover.

Owing to the changing gender in the workplace environment, occupational health workers have been scouring the literature for relevant information on the differences in toxic responses between the sexes. This book by Edward Calabrese should therefore be a boon to the researcher concerned with this topic because the author has already performed the preliminary literature search up through the late 1970s and early 1980s and condensed the information into this handy volume. While the information is somewhat dated, Chapter 2 on the biochemical and physiological differences between the sexes is particularly valuable. It provides a basic understanding of the etiology of these sex differences and therefore a mode of possibly predicting that there may be a sex difference for the compound under consideration. Known differences in gastro intestinal tract absorption, plasma binding, biliary excretion and enzyme activities, to mention a few, are topics that are discussed to the extent possible from the gleaned information.

Specific chemicals are used to illustrate these differences and the data on humans or animal species (usually the mouse or the rat) are presented. Chapters 3, 4 and 5 further elaborate on the biochemical and physiological changes that occur during pregnancy; the reported inherent difference in the activity of liver toxins and the reported inherent difference in nephrotoxins. The next five chapters discuss the sex-related differences in toxicity for a variety of inorganic and organic contaminants, as well as drugs, oral contraceptives and endogenous substances (biochemistry and physiology of the hormones). The final