



Book reviews

Environmental Chemistry of Arsenic

William T. Frankenberger Jr. (Ed.), Marcel Dekker, New York, NY, 2001, 404 pp., US\$ 175.00, ISBN 0-8247-0676-5

This book has made a timely appearance, especially in the United States, where there is debate over the safe concentration of arsenic, to be specific in drinking water standards. The debate has been long and has spanned part of the tenure of two American Presidents (Clinton and Bush). Just recently, the Environmental Protection Agency (EPA) has confirmed the arsenic standards proposed in the waning days of the Clinton administration.

The arsenic concentration in drinking water is of major concern as it is a cancer-causing agent. But concern for its effects ranges far outside the United States as evidenced by the very beginning of the book.

“Arsenic is a known carcinogen and mutagen posing serious health risks to humans and animals. Health effects including cancers of the skin and internal organs have been linked to chronic exposure to arsenic in drinking water.

The effect of arsenic on human health is an issue of global concern. A large-scale shift in water resource allocation from surface water to ground water in West Bengal, India, and Bangladesh (tube well water) and the exposure of local populations to ground water containing arsenic at concentrations of several hundred $\mu\text{g/l}$ have resulted in very extreme environmental health effects.”

The book has 16 chapters contributed by 35 scientists on topics that include toxicity of arsenic, analytical methods for the determination of arsenic compounds in the environment, health and risk exposure of arsenic, biogeochemical control of arsenic, treatment of arsenic-contaminated water, and microbial transformation of arsenic that may be useful in bioremediation.

Chapter 1 (Arsenic Poisoning Through the Ages) is a very interesting historical treatise that traces the sordid history of arsenic through time and discusses its many uses in human therapy, murder, daily commerce, pesticides, animal husbandry and war.

Chapters 2 and 3 focus on analytical methods for determining arsenic and its compounds in the environment. Chapters 4–6 discuss human exposure to arsenic ingestion, inhalation and dermal absorption. The biogeochemical control of arsenic occurrence and mobilization in water supplies is the subject of Chapter 7 while Chapter 8 discusses arsenic’s cycling in soil and natural water.

Remediation of arsenic-contaminated waters is the subject of Chapter 9, which is entitled “Metal-Oxide Adsorption, Ion Exchange, and Coagulation-Microfiltration for Arsenic

Removal from Water.” Processes for arsenic removal (metal-oxide adsorption using packed beds of activated aluminum, ion exchange bed adsorption, iron coagulation-microfiltration, lime softening, and reverse osmosis are discussed with a view to presenting the influence of water quality on arsenic removal efficiency, identifying reasonable process design parameters and companion processes.

The seven final chapters (Chapters 10–16) discuss the respiration and oxidation of arsenic by bacteria of soil dwelling microorganisms. *Desulfomicrobium* sp. str. Ben-RB and *Aclaligenes* flocculation among others. The last chapter discusses volatilization of arsenic by bacteria.

A final note is warranted regarding secondary sources (i.e. references). As one might expect in a review book, the contributors have provided numerous citations to their work—more than 1100 by my count.

Gary F. Bennett

PII: S0304-3894(02)00012-2

Physical and Biological Hazards of the Workplace, Second Edition

Peter H. Wald, Gregg M. Stave (Eds.), Wiley-Interscience, New York, NY, 2001, 700 pp., US\$ 149.00, ISBN 0-471-38647-2

The primary focus of this book is to provide a practical approach to securing information on the physical and biological hazards of the workplace with the target audience being occupational health and safety professionals who have an occupational health perspective. However, it is not meant to be a definitive reference book; rather, its focus is on being used in a “quick introduction or refresher to a topic on physical and biological hazards.”

Forty-six contributors (most of whom have combined MD and MPH or MPSH credentials) authored 34 separate chapters.

“All recognized sources of physical hazards are discussed, including ergonomic hazards; dangers associated with shift work; extremes of temperature and atmospheric pressure; energy hazards including noise, electricity, infrared and ultraviolet light, lasers, magnetic fields, and microwave and RF exposure; ionizing radiation. Biological agents are covered in equal depth from the fundamentals of microbiology and infectious disease to the specific details of organic hazards like wood dust and endotoxins—plus viruses, bacteria, fungi, parasites, envenomations, and more. The latest research and pharmaceutical technologies and their attendant risks are considered, including recombinant organisms, prions, and malignant cells.”

The book is divided into two major parts:

- (I) Part 1: Physical Hazards
 - (A) Section I: Worker–Material Interfaces
 - (B) Section II: The Physical Work Environment
 - (C) Section III: Energy and Electromagnetic Radiation
- (II) Part 2: Biological Hazards

As a biochemical engineer, I was fascinated by the last section which takes up more than half the book. It has 17 chapters on such topics as viruses, bacteria, mycobacteria, fungi, rickettsia, chlamydia, parasites, envenomations, allergens, latex, malignant cells, recombinant organisms, prions, endotoxins, and wood dust.

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PII: S0304-3894(02)00013-4