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Book reviews

Elements of Environmental Chemistry, R.A. Hites. John Wiley & Sons Inc., Hoboken, NJ (2007). 212 pp., Price: US$ 40.00, ISBN: 978-0-471-98815-0

"*Elements of Environmental Chemistry* uses real-world examples to help readers master the quantitative aspects of environmental chemistry." This task is accomplished by using problems and their solutions. Posing problems and having students solve them provides them with a toolbox for understanding the complex issues in the environment. In addition to providing students with problem solving skills, this book provides the basic concepts of environmental chemistry.

The table of contents is shown below selectively:

Chapter	Title
1	Simple tool skills
2	Mass balance—steady and non-steady state
3	Atmospheric chemistry—atmospheric structure, ozone, smog, kinetics, greenhouse effect
4	CO_2 equilibria—pure and polluted rain, surface water
5	Fates of organic compounds—vapor pressure, water solubility, Henry's law constant, partition coefficients, lipophilicity, fish partition coefficients, adsorption, water–air transfer
6	Toxic environmental compounds—pesticides, mercury, lead

Numerous problems for student assignment are provided in each chapter. In my opinion, these are very interesting problems as many are based on (or described) real life applications. Numerical answers for each problem are found in the Appendix, while full solutions are available on the Internet. Hites strongly recommends students solve each problem and not just say "I could do it if I wanted to."

Hites notes that only a few supplementary lectures would be needed to explain the material using this book. I am not sure I agree that only a few lectures are needed. Personally, I would discuss the environmental topic at hand at greater length than he suggests and then assign the chapter problems relating to the topic. I was impressed by the scope of the problems and their relevance to the subject. Were I still teaching, I would seriously consider adopting this book as a supplementary text in courses on air and water pollution.

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Water Infrastructure Protection and Homeland Security, F.R. Spellman. Government Institutes/Scarecrow Press, Landham, MD (2007). 295 pp., Price: US$ 79.00, ISBN: 978-0-86587-418-3

"This book (the author notes) was written as a result of 9/11 and in response to the critical needs of water/wastewater plant managers, plant engineers, utility managers and anyone with a general interest in the security of their water/wastewater facility."

Working for a large sanitation district, Spellman decided that his district was failing to address steps needed to protect his facilities (wastewater treatment plants, maintenance centers, pumping stations, and main office complexes). These security items were discussed and the following list of required security steps was compiled: awareness, vulnerability assessment, needs list, presentation of findings and recommendations, commission presentation, implementation, and outside contractors/visitors.

To illustrate the seriousness of the problems facing water infrastructure installations, Spellman describes the wide range of processes involved in water and wastewater treatment systems. He also discusses the US EPA Water Protection Task Force established in 2001. This discussion is followed shortly by an excellent review of "Vulnerability Assessment" that runs 15 pages. That dialogue follows some amazing statistics regarding the number of potential targets in the United States: 100,000 pumping stations, hundreds of thousands of miles of water distribution systems and sanitary sewers, and 200,000 miles of storm sewers. The foregoing constitute one of the country's most valuable resources valued at $2.5 trillion.

Drinking water systems receive special attention (as they should) with a thorough discussion of the threats and the many possibilities for contamination through introduction of bacteria, viruses, cyanides, molds, pesticides, biological toxins, and radionuclides. Even cyber security is discussed, as competent

hackers may attempt to gain access to remotely controlled systems.

At this point in the review, I think it would be useful to list the chapter titles:

1. Introduction
2. Water/wastewater infrastructure
3. Homeland security strategy: water/wastewater
4. Security philosophy: know thine enemy
5. Vulnerability assessment
6. Drinking water contamination threats and incidents
7. Cyber security: SCADA
8. Emergency response
9. Security techniques and hardware
10. A changed nation
    Appendix: Safety requirements of Sections 1433, 1434, and 1435 of Safe Drinking Water Act

In the past, I have reviewed several of the 48 books on safety, occupational health, water and wastewater operations, environmental science and concentrated animal feeding operations that Spellman has authored. None has disappointed me. Spellman writes clearly, logically and focuses on the problems and their solutions. His books are practical rather than theoretical. This book should be consulted by all those involved in the provision of water and wastewater services.

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Lead Regulation Handbook, E.E. Shea (Ed.)., second ed. Government Institutes/Scarecrow Press, Lanham, MD (2007). 304 pp., Price: US$ 95.00, ISBN: 978-0-86587-161-8

During the last two decades, numerous scientific studies have been published linking the exposure of very young children to lead-based paint hazards that result in neurological damage as manifested by lower performance on intelligence tests as well as behavioral problems. Hence this book, written by an attorney who has had considerable practical experience with the metal itself as well as serving as an attorney for plants producing resins and pigments for the paint industry.

"Cutting to the chase," I turn to Chapter 22 which provides an excellent discussion of important new developments in lead-based paint litigation including the major lawsuits based on a public nuisance theory. The basis of most of the suits is the danger lead-based paint (in homes) poses to children and, of course, the significant removal cost.

I was not at all surprised by that chapter dealing with legal issues. Indeed, I thought the topic would dominate the book. But I was wrong.

Shea begins the book with three very informative chapters entitled:

- Lead—general background.
- Modern uses of lead and lead compounds.
- Lead mining and production; alloys and compounds.

The material in these chapters appears to have been adapted from two major chemical technology encyclopedias. Abstracted or not, the material is very nicely presented in a very readable form even including a four-page flow diagram illustrating the production of lead.

Chapter 4 discusses the health effects of lead and its compounds. A large amount of the data is from foreign sources. The good news is that exposure to lead has been declining rapidly. Lead ingested fell from 200 μg/day in 1940 to 90 μg/day in 1974 and 10 μg/day in 1988. Mean blood cell concentration plummeted also from 12.8 in 1976 to 2.8 in 1991 to 1.6 μg/dL in 1999–2002. This is good because Shea discusses a litany of potential effects of lead ingestion. In this discussion, Shea supplies a list of reviews of major studies supported by literature citations.

The next chapters report on the major U.S. environmental laws dealing with lead. Separate chapters discuss lead as covered by: The Clean Air Act; The Clean Water Act; The Safe Drinking Water Act; The Emergency Planning and Community Right-to-Know Act; The Solid Waste Disposal Act, as amended by The Resource Conservation and Recovery Act; Comprehensive Environmental Response, Compensation and Liability Act; Occupational Safety and Health Act; The Federal Hazardous Substances Act; The Consumer Products Safety Act; The Federal Food, Drug and Cosmetics Act; The Hazardous Materials Transportation Act; The Lead-Based Paint Poisoning Prevention Act and The Residential Lead-Based Paint Hazard Reduction Act; The Toxic Substances Control Act; The Atomic Energy Act of 1954; and State and Environmental Health Laws.

The next to last two chapters are entitled:

- Evaluation, inspection and abatement of paint, dust and soil.
- Standards organizations: ACGIH, ASTM, NAS, NSF, and ANSI.

As noted previously, the last chapter deals with litigation.

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