- addresses such issues as species selection, dose level and dosing regimen, animal number, routes of exposure, and proper statistical evaluation;
- presents insights into future directions in the field of toxicology and how new techniques in molecular biology, such as the use of transgenic animals, will impact the practice of this discipline.

The book has the following 13 chapters contributed by 18 writers in addition to the editors themselves:

- use of laboratory animals in toxicology studies;
- toxicity associated with single chemical exposures;
- multidose toxicity and carcinogenicity studies;
- metabolism and toxicokinetics;
- inhalation toxicity studies;
- genetic toxicology;
- developmental and reproductive toxicology;
- neruotoxicology;
- toxicological assessment of the immune system;
- toxicological pathology assessment;
- assessment of laboratories for good laboratory practice compliance;
- use of transgenic animals for the assessment of mutation and cancer;
- health risk assessment of environmental agents: incorporation of emerging scientific information.

As a chemical engineer involved, obviously, with chemicals and the safe use thereof, chemical effects/toxicology/safety/chemical testing is of interest. This book appears to address all aspects of that concern. Unfortunately, I must admit my obvious inability (background) to allow me to critically review what is written.

Gary F. Bennett

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Introduction to Risk Analysis

Daniel M. Byrd and C. Richard Cothern (Eds.), Government Institutes, Rockville, MD, 2000, US$ 99.00, 453 pp., ISBN 0-86587-696-7

Risk analysis is a controversial subject. So begins this book. But it is a very important topic because of its universality: all activities and processes have risks. Thus, the authors state “risk analysis is ubiquitous”, being “an activity that is persuasive at an informal level being inherently a part of everyday decision making”.

Moreover, risk analysis plays an important role in developing the policy and regulation of the US Environmental Protection Agency, Occupational Safety and Health Administration, Department of Agriculture, Department of Transportation, Food and Drug Administration, Nuclear Regulatory Commission and State Environmental Agencies.

The first chapter sets the stage for the book by defining terms and describing the background (controversial as it is) surrounding risk analysis. The authors even say that experts

have been unable to agree on a definition, but, undismayed, Byrd and Cothern carry on to discuss (and differentiate between) risk assessment and risk management. The former is the process (generally mathematical) of characterizing a risk. The latter is the process of deciding what to do about it. This discussion is followed by short sections on risk communication, risk policy, risk characterization, and public perception thereof.

The first chapter ends with a discussion of models which they define as "representations of objects or processes". Such models can be physical, conceptual, biological or mathematical.

On the subject of mathematics, I noted that the authors presented a mathematical treatment of risk at appropriate points in the book but did not take it to exhaustive ends. They also gave examples of calculations using the formulae they presented.

Following the introductory chapter, they presented chapters on functions, models and uncertainties, regulation, exposure assessment, risk assessment dosimetry, epidemiology, toxicology, risk characterization, comparative risk analysis, ecological risk analysis, risk management values and decisions, and risk communication.

The last chapter in the text interests me not only for the discussion of the broad topic of risk communication, but also for its advice on communicating environmental issues in general to the public, something I commonly do. The chapter is full of good advice ending with the following summary.

"Risk communication is one of the three major elements of risk analysis. After you assess a risk and decide how to manage it, you need to communicate this information with other groups. The important aspect is two-way communication, which requires both sides to listen to each other. Only by working together can good communication be achieved and the goals of all parties involved be met. In general this is a continuous process and involves patience, endurance, and hard work".

The authors end the book with the following six case studies of real world examples to illustrate the problems of applying the principles discussed in their book. These examples were as follows:

- ecological risk assessment — acidic deposition;
- arsenic and cancer;
- electromagnetic fields;
- environmental tobacco smoke;
- indoor air;
- radon.

While the book is touted on the cover as being of interest to practicing professionals (and I agree it is), the authors note in the preface that it also could be used as a text. I agree, especially if they included some example assignments and problems. Already available are Power Point Slides to use in one's lectures plus a separate publication on "Introduction to Risk Assessment Models for Fitting Dose Response Curves".

Gary F. Bennett

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