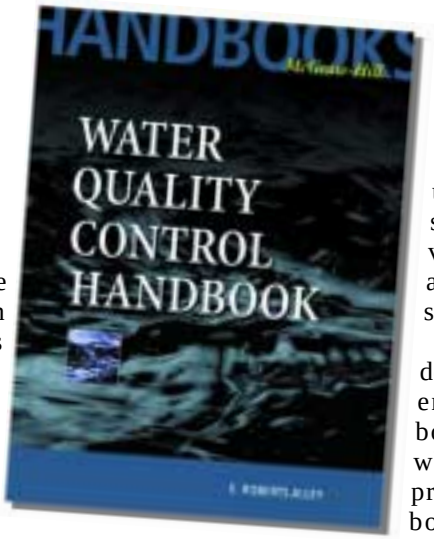
Books

Water Quality Control Handbook

E. Roberts Alley
McGraw Hill, New York, $99, 2000



Typically, a book's preface sets the tone for the rest of the text. An excerpt from the preface of this book reads, "For many years we have discharged waste products into the air, the water and the land as if they were limitless reservoirs of storage. We have found of course, that this is not the case, and they have deteriorated our air, water and land quality to the crisis point." Fortunately, the apoplectic inaccuracy of the preface is replaced in the body of the book by a thorough presentation of fact, science, technology and engineering.

Take the title literally. The purpose of the "Water Quality Control Handbook" is to describe what water pollution is and how to mitigate it. It describes in detail the design of wastewater treatment processes, clarifiers, sand filters, membranes, and chemical and biological treating, among others. This book is not about topics such as boiler water treatment; however, it deals, in part, with equipment and procedures used in preparing clarified water from raw water.

The book is derived from courses taught by the author and supplemented with sections written by the author's associates, all of whom, including the author, are employed by E. Roberts Alley & Associates, an environmental engineering design and consulting firm in Tennessee. The same organization also produced the "Air Quality Control Handbook" (1998) for McGraw-Hill.

Broken into six parts, the text defines water pollution and how to test for it, describes environmental management as the means to improve water quality and conserve water, lists regulatory requirements, details physical/chemical/ biological wastewater treatment-plant design methods (the text's single largest section), describes treating wastewater-treatment residual solids, and, in the final section, summarizes the first five sections primarily in an extended tabular format.

There are over 250 figures, photographs and tables that greatly contribute to the text's value. Almost two-thirds of the 1,300+ pages are appendices, which include hydraulic and chemical/physical data, corrosion information, and EPA published data on activated-carbon adsorption capacities for over 140 chemicals. About 570 pages of the appendix are reprints of EPA sampling and analytical methods for numerous pollutants. In fact, a great deal of the information in the book is available from the EPA either online, through its publications or from the Code of Federal Regulations.

There are some oddities in the manual. The design information appendix includes useful items such as pipe-fitting dimensions and a drainage time nomograph for variously shaped vessels. This appendix also includes recommended dimensions for stairs, ladders and ramps at various angles.

The compiled nature of the book is evident from the preface, which includes references to four different appendices. The book actually has seven appendices of which three of the four mentioned in the preface are in a different sequence in the book than described in the preface. Corrosion data presented in an appendix for various metals that repeatedly lists one of the metals for consideration as Monet instead of Monel.

This truly is a water quality control handbook. It is an accumulation of the what, why and how of water pollution and its control. Its worth is in the convenience of having disparate yet interrelated information brought together in a single volume. If you deal with topic regularly, you'll find enough value here to overlook the politics.

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Introduction to Transport Phenomena

W. Thomson
Prentice Hall PTR, Upper Saddle River, NJ, 510 pp., indexed, $97, 2000

The year 1960 is historic for chemical engineering. That is the year Bird, Stewart and Lightfoot published "Transport Phenomena." In that book, the authors implicitly demonstrated that momentum, heat and mass transports were a unified subject. Their book was recognized at its publication as a breakthrough in the presentation of the engineering science from which chemical engineering grows.

Prof. Sherwood acknowledged as much in his review of "Transport Phenomena" in 1961. However, he tempered his praise with caution. First, he warned that the book would give students the impression that every chemical engineering problem is analytically solvable. Second, "Transport Phenomena" does not explain the use of transfer coefficients. And third, only those mathematically oriented students with sufficient mathematical training can glean the *raison d'etat* underlying the text; *i.e.*, that momentum, heat and mass transport are one, the same phenomenologically.

However, all the issues raised by Prof. Sherwood have been successfully confronted in "Introduction to Transport Phenomena," by Prof. Thomson. First, Thomson clearly states that not all chemical engineering problems are analytically solvable. That is why transfer coefficients are measured and used, thus addressing Sherwood's second issue. And third, in Thomson's textbook, the student can see the engineering science at the heart of chemical engineering without needing an applied mathematician's license.

"Introduction to Transport Phenomena" has three parts: Part I presents molecular transport; Part II discusses convective transport; and Part III outlines design procedures using macroscopic calculations. The book has five appendices. Appendix 1 presents the generalized equations of change. Appendix 2 describes the use of the MATLAB ODE solver. Lennard-Jones and collision integrals are tabulated in Appendix 3. Appendix 4 briefly discusses the error function and Appendix 5 contains tables of viscosities and thermal conductivities.

Each chapter contains several solved examples and at least one example using MATLAB to achieve a solution. There is a variety of problems at the end of each chapter. As with any first printing, there are a number of typos. Also, the bounded integrals are difficult to read. However, the most annoying feature is the constant reference to the "phony film" present at interfaces. This sobriquet wears thin after the second encounter. Walter Nernst, its inventor, would object to its first usage. Thomson should spend more time explaining that the phony film is a method for picturing the presence of a driving force at an interface.

Nonetheless, this book is definitely the best undergraduate transport phenomena textbook to appear since Bird, Stewart and Lightfoot's book in 1960. "Introduction to Transport Phenomena" should be on every practicing chemical engineer's bookshelf.

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From at-the-source prevention to technical treatment solutions, the Water Quality Control Handbook brings you expert, crystal-clear guidance on assessing, controlling, eliminating, and remediating the many factors that contribute to water pollution.Â or evaluate management plans *Get expert guidance on regulations and laws The one reference that brings professionals comprehensive coverage of clean water issues and answers, Water Quality Control Handbook offers the full range of up-to-date equipment and solutions you need, from authorities you trust.