The chapter misses detailed discussions on reactor path synthesis and reactor network synthesis. These topics are treated very extensively in the chemical engineering literature. The next layer in the onion model is the separation system selection described in Chapter 3. The chapter presents units like sedimentation, flotation, centrifugal separation, filtration, distillation, and absorption for homogenous mixtures. This chapter also describes operation of evaporators and dryers. Chapter 4 on synthesis of reaction separation systems describes the recycle structure of the process and some heuristics for batch process synthesis. Unlike Douglas' hierarchical design procedure which decides batch vs. continuous operation up-front, the onion model does not talk about batch processes. Therefore, the description of batch process in this chapter seems to be slightly out of line.

In chemical engineering, the most widely-studied process synthesis problems pertain to reaction path synthesis, reaction network synthesis, distillation synthesis, and heat exchanger network synthesis. This book covers the latter two topics. Distillation synthesis is the focus of Chapter 5, which mostly deals with simple distillation sequencing and heat-integrated distillation synthesis. However, the chapter only considers ideal nonazeotropic systems. Azeotropic distillation is an important and widely used separation technique, and there has been a concerted effort during the last decade toward developing methodologies for azeotropic distillation synthesis. The chapter does not cover the subject of azeotropic distillation sequencing and hence is lacking in this respect.

Heat exchanger network synthesis using pinch technology is a very popular concept. Chapters 6 and 7 explain the basics of the pinch technology concept. Chapter 8 discusses briefly local and global economic tradeoffs and optimization keeping the heat exchanger networks and energy targeting in perspective. Each layer of the onion model is revisited for energy integration through application of the pinch technology in Chapters 12 to 16. Chapter 12 outlines the principles involved in process modifications for heat integration. Chapter 13 deals with heat integration of the reactors and Chapter 14 with heat integration of distillation columns. Heat exchangers and dryers are considered in Chapter 15. Chapter 16 concentrates on overall heat exchanger network synthesis in a process. These chapters outline the recent literature on pinch technology.

In the past, the design of environmentally compatible manufacturing plants generally meant the use of end-of-pipe treatment or separation devices through which effluent gases or liquids pass on their way to the environment. However, during the past few years, a movement has grown that stresses waste reduction or pollution prevention at the conceptual design stage itself. Recognizing this fact, the author has devoted three chapters on waste minimization and waste treatment. Safety and health considerations for the overall plant using again the onion model philosophy are discussed in Chapter 9. Waste minimization for the overall plant and life cycle analysis is the topic of Chapter 10. Different effluent treatment options and unit operations required for the effluent treatment are presented in Chapter 11.

Chapter 17 summarizes the hierarchical decision-making process used in the process design as described in Chapters 2 to 16.

Overall, Chemical Process Design is a well-written, comprehensive book on the subject of conceptual design. The book's main contribution comes from the treatment of recent advances in pinch technology, and the discussions on waste minimization and effluent treatment. Most chapters can be understood by a novice and an expert alike. Although it could be used as a textbook for an advanced undergraduate or graduate course in process synthesis, it is more in the line of a reference book, since there are no exercises of the type to be assigned as homework problems for students.

Urmila M. Diwekar
Environmental Institute
Carnegie Mellon University
Pittsburgh, PA 15213

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In chemical engineering, process design is the choice and sequencing of units for desired physical and/or chemical transformation of materials. Process design is central to chemical engineering, and it can be considered to be the summit of that field, bringing together all of the field's components. Process design can be the design of new facilities or it can be the modification or expansion of existing facilities. The design starts at a conceptual level and ultimately ends in the form of fabrication.