including experimental techniques, simple systems, complex systems, mechanisms, catalysis, multiphase reactions and enzyme kinetics. The CRE section has chapters on general process design of reactors, a chapter each on four ideal reactor types (batch, CSTR, PFR and laminar flow), together with one on combinations of ideal reactors, and one on reactors for complex reactions. Three chapters deal with various aspects of residence time distribution in ideal and non-ideal reactors. These are not consecutively placed, and the authors explain why in their introduction, but I feel it makes the topic a bit disjointed. The final four chapters deal with heterogeneous reactors – fixed bed catalytic, reacting solids, fluidised beds, and fluid-fluid reactors.

In many ways, the text falls between two stools. Billed as 'An Introduction', its mass of detail would daunt, rather than encourage the undergraduates I teach. This is especially true of the presentation of generalised stoichiometry in Chapter 1, clearly an interest of one of the authors, but, I should have thought, out of place in an introductory text. On the other hand, the book does not go into most of its topics in the sort of depth you would expect in an advanced text, such as Froment and Bischoff. An example would be its discussion of fixed bed catalytic reactors in Chapter 21, where it gives the equations for the non-adiabatic shell-and-tube type of reactor, and lists the solution procedure, without once mentioning temperature profiles, hot spots, and parametric sensitivity, which are the real problems. In contrast, Levenspiel mentions the problems in a paragraph in his text (430 p.), does not give any equations, and refers the reader to more advanced works for details.

For some years, no self-respecting text on chemical thermodynamics has been without its floppy disc of programmes to solve EOS-related problems. Now, it seems, CRE is joining the trend, although, moving with the times, the floppy has become a CD. To be fair, the CD does contain some general-purpose software, 'E-Z solve', which can solve sets of algebraic equations and of first order differential equations, and also do parameter fitting (non-linear regression). Some such programme is needed in CRE if anything realistic is to be solved without soul-destroying calculations. In this respect, the present text is more up-to-date than Levenspiel, who prefers graphical methods. Not being familiar with Mathcad or its stable-mates, I cannot compare 'E-Z solve' with them, but it seems easy enough to use. However, the authors seem at times to have a touching faith in its powers; for example, when fitting the dispersed plug flow model to experimental RTD curves in Chapter 19, they seem to imply that non-linear regression will automatically give you the 'right' answer, as though all the arguments over what constitutes a 'best fit' had never been.

One reason any lecturer turns to a new textbook is to look at its problems, and here the authors fare pretty well. Each chapter has a lot of worked examples (which will please students) and a large number of problems, often 20 or more, at the chapter end. Numerical answers are given at the end of the book for a selection of these (which will also please students!). While many of the problems are about hypothetical systems (A+B react to give), there are quite a few useful real examples with real kinetics, quoted from the literature. I was thrilled to find several of these in the early chapters, but they dwindle, or are endlessly repeated, as you progress.

In summary, this book is likely to prove too heavy for introducing the subject to UK undergraduates, but not deep enough for their design projects. Its good problems and rather neat CD software make it worth having in the library, and even on the lecturer's bookshelves, but I am still advising my students to buy Levenspiel.

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Chemical Reaction Engineering, 3rd ed., by Octave Levenspiel, Wiley, New York, 1999, 668 pp., £29.95, hardback, ISBN 0-471-25424-X

There are a few books in Chemical Engineering that can be defined as ''classical'', and Chemical Reaction Engineering by Octave Levenspiel is certainly one of them. Revisiting a classical, successful book is not only hard work for the author, it is also a courageous choice since the reader will inevitably make comparisons with the previous edition. In the present case, however, the result is even better than it was before. The book remains a textbook, the style is a didactic one; nevertheless, some new additions make it rather an advanced text. To some extent it is a hybrid: a textbook that can be used at different levels by different students. In other words, it is an undergraduate textbook for the first half and a book for the specialist or for graduate students for the second.

The book is divided into five parts; homogeneous reactions and ideal reactors are presented in Part I. This part is not essentially different from the previous editions, except for devoting two chapters to multiple reactions, with parallel reactions occupying the whole of Chapter 6. Indeed, this is not an isolated choice: flow models (dispersion, tanks in series, convection, etc.) are separated and occupy individual chapters as well. There does not appear a major change: the reader will find in a number of chapters material that was presented only in a couple of chapters before. However, for didactic purposes, the actual distinction results in a very effective Part I, which, together with Part II, constitutes our basic knowledge of Chemical Reaction Engineering. In other words, what we know (should know) and teach

(should teach) to our undergraduates. It stands as an undergraduate textbook on its own. There is nothing fundamentally new compared to the previous editions except additional examples; however, the material is organised in a much better way, the examples are great, and the result is highly didactic.

Parts III, IV and V represent the second half of the book, which is much more devoted to advanced material, certainly not the kind of material which can be taught at undergraduate level. Solid catalysed reactions, packed and fluidised beds, non-catalytic systems, and biochemical systems are treated there. Heterogeneous reactions are organised in a new and better way; the inclusion of a chapter on fluidised beds and another on biochemical reaction systems is an excellent choice. However, the material is not easy, and the style is hermetic. These chapters generate curiosity and a desire to search further on the specific fields. In other words, the second half of the book is introductory to further reading.

I quite like the emphasis on models, with the clear identification of their applicability and of their limitations. The approach to the field is very well suited to engineers and is quite practical, with frequent very helpful comments.

Constitutive equations are introduced very early (rate equation), but never mentioned as such. This is the only negative comment I have about the book: a clear distinction between balance and constitutive equations is never made.

The style reflects the author, it is colloquial, fresh, very enjoyable, often witty. The examples are well chosen, the problems challenging.

In conclusion, this new edition of Chemical Reaction Engineering was certainly overdue, and the result is a very good one. It is too bad that in this country there is not the tradition of buying, using or even borrowing books at the undergraduate level. This is a book that each one who plans to become a chemical engineer should have on his desk, and not only those aspiring to the profession: I suggest that everyone who ''deals'' with Chemical Engineering should have it: it remains always as a ''classical'' reference.

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Project Management for the Process Industries. Gillian Lawson, Stephen Wearne and Peter Iles-Smith. The Institution of Chemical Engineers, 1998, 381 pp., £56.00 (hardback), ISBN 0 85295 406 9.

Many books have been written on 'Project Management' (see, for example, the bibliography of this book). For that reason, it is a challenge to add another book to the literature on this subject even though this book is more focused on project management in one particular field: the process industry. The authors/editors have succeeded quite well in meeting this challenge. The product is a good book, paying attention to many aspects of project management in this field, and is easy to read. It is not necessary to read the whole book to get good information on critical phases in a project. Most chapters can be read independently from the other chapters, which also makes the book useful as a reference.

The book is set up in three sections. In the first section, the 'typical' phases of a project are described in chronological order, from project initiation, objectives and options through to project completion. All projects in the process industry go through these typical phases, so project managers will recognize the sequence and important aspects of all phases. The first section provides the overview; reference is made to special subjects which are discussed elsewhere.

Throughout Section 1, an example of a small and simple process industry project is used to illustrate the situations that may arise in the various phases described. In Section 2, tools and techniques relevant to project management are discussed, such as health, safety and environment aspects (including legal requirements and techniques to carry out hazard studies), quality assurance, risk management, planning and organization of projects. The most common techniques are described and characterized (advantages and disadvantages), making the toolbox fairly complete. The chapters on tools and techniques provide sufficient detail for the project manager to get a very good insight in specific aspects of managing a project. For more detailed information, some references to further reading material are given. In the Section 3, some of the more general competencies for a project manager are described. This section also touches upon subjects in which a project manager will usually not be an expert, but where he or she should have good awareness.

Sections 2 and 3 provide all the required information on specific subjects and can be read as relatively independent topics. A lot of attention is paid to cost estimating, planning and monitoring of a project, all very important tasks for a project manager. Relatively little attention is paid to the management of hazards and risks — the more difficult tasks of a project manager. In larger scale, complicated projects, the management of hazards and risks is probably even one of his main tasks. It is important to understand where risks come from and to take measures to deal with them at the appropriate phase of the project. The end phase of the project — handing over of the facilities to the owner/operator of the facilities, (pre-)commissioning and start up also might have got some more attention. It is important to realize that the project is only finished when 'product in tank' can be sold to the customer!

The book is useful in many situations. People who are involved in projects and want to know more about the