join the profession by emphasising its highly creative nature through design and analysis. According to the authors, the book has two goals: firstly, to describe chemical engineering as a profession, and secondly, to introduce and develop basic engineering skills.

To avoid misunderstanding it is necessary to be precise about the semantic meaning of the title. By design the authors mean 'the ability to conceive and to develop plans', while analysis is 'the methodology to model and evaluate chemical and physical processes'. The word 'introduction' in the title should be kept in mind. In this respect the prerequisite knowledge of chemistry, physics and mathematics for following the book is only elementary. As a consequence, it should not be seen as a process design teaching course in a professional sense.

The book is divided into six chapters: overview, process design, models, graphical analysis, dimensional analysis, and transient processes. The chapter devoted to process design introduces some basic elements of a chemical process and emphasises its creative features. The authors use five well-selected examples: ammonia synthesis, purifying heptane, production of electronic-grade silicon, generation of electric power by means of fuel cells, and the desulphurisation of natural gas. Their clever choice does more than illustrate the diversity of chemical engineering. In fact, they provide opportunities to introduce key concepts such as; flowsheets, unit operations, recycles, physical properties, and economic trade-offs. Asking questions enables the authors to reveal the fundamental disciplines forming the hard core of chemical engineering.

Three chapters present analysis tools which an engineer can use to solve a design problem: models derived from laws and mathematical analysis, graphical analysis, dimensional analysis and dynamic scaling. Here more quantitative features, such as material balances, analysis of data, formulation of a model, and scaling of phenomena, are introduced. However, most of the material is based on qualitative reasoning rather than on abstraction through natural laws. Although this approach may be justified for educational reasons, in the longer term it runs the risk of generating a phobia against a more quantitative and sounder approach. Even more critical is the diluted treatment of the thermodynamic principles, which are essential for understanding a design process. The appendix on 'mathematics, mechanics and thermodynamics' has only three pages.

The final chapter handles transient processes as a general framework for introducing design principles based on the kinetics of phenomena, mainly in the field of reaction engineering. It is also an opportunity for a more rigorous approach, by including the time co-ordinate and differential equations.

The educational approach in this book is by examples and definitely not by theory. Each section contains a large number of problems, from different areas, of various difficulty, some of pure logic, some open ended. These offer a huge amount of material for customising the course to the level and interest of each class. Unfortunately, some (real) problems cannot be solved because the available knowledge is insufficient. For example, asking about the sizing of units and optimisation is premature, or should be restricted only to the level of 'good questions'. In this respect the role of the teacher is essential, in order to deliver the 'right answers'. A problem solution manual, possibly open to discussions on the Internet, would be a great help.

Summing up, this book is highly original and refreshing, both for its content and its presentation. The style is informal and stimulates curiosity. It offers an initiation into chemical engineering, by revealing its high innovative value and the contemporary challenges of the profession. This book can be used with real benefit as an introductory course in generalist universities, where insufficient scientific skills are often seen as the main hindrance in attracting students to the chemical engineering departments. Finally, this approach can be seen as 'something different', complementary, but not in direct competition with more advanced textbooks.

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PII: S1385-8947(99)00083-2

The Colloidal Domain: Where Physics, Chemistry, Biology and Technology Meet, 2nd Edition. D. Fennell Evans and H. Wennerstrom, Wiley-VCH, 1999, 632pp., hardback, £58.00, ISBN 0-471-24247-0

As the authors of this book say, great strides were made in the decades leading up to the 1930s in laying what have since become the foundations of colloid science. They point out however that for some considerable time following this, colloid science was 'relegated to the intellectual backwaters of science.. ' Indeed E.S. Hedges wrote, in 1931, about a common contemporary view of colloid science in the following terms. 'To some the word 'colloidal' conjures up visions of things indefinite in shape, indefinite in chemical composition and physical properties, fickle in chemical deportment, things infilterable and generally unmanageable'. What this excellent book does is to show us that colloid science has become a very modern science, with relevance in a range of other pure scientific and engineering disciplines, and with application in numerous industrial processes. It is now grounded in secure theory, served by a battery of modern instrumental methods and ready to take on a whole range of new challenges.

The general appearance and feel of the 2nd edition are much like that of the first. The book is very reader friendly with copious figures and illustrations. There is a large margin down the left hand side of the page into which

the detailed and useful figure captions are placed. Otherwise I suppose notes and comments could be made in the remaining space. In UK universities the level is appropriate for senior undergraduates and postgraduates; those engaged in underpinning research in industry will also find the book both rewarding and useful. To make full use of the book the reader will need to have a reasonable level of mathematics, although there is much of interest that can be gleaned by those with only rudimentary mathematical knowledge. A feature of particular use in the presentation is the 'concept map' at the front of each chapter. The map outlines what will be covered in the chapter, focusing the mind; it can also act as a good summary after reading the chapter. A small thing which makes the reader feel at home is the form of the section headings, which are sentences encapsulating the section content. For example the section on aggregation kinetics is headed 'Kinetics of Aggregation Allow Us to Predict How Fast Colloidal Systems Will Coagulate'. There are some worked problems within the text, and at the end of each chapter there is a collection of problems (without answers), and a literature table informing the reader which areas are covered further in a well-selected small number of standard texts. Specific references to relevant research papers and books are made in the text where appropriate.

Those who have the 1st edition will certainly want to have sight of the 2nd edition although they may not wish to purchase it. You get 100 pages more for your money, with extensions, updating and revisions in a number of chapters. There is also an extra chapter (chapter 12), the Epilogue, which in the words of the authors provides an 'integrative prospective', which makes very interesting reading. What stands out throughout the book is the authors' grasp of their subject (they have of course each made a number of very significant contributions to the subject themselves). They write with a clarity and authority one associates with first rate teachers.

For those who are looking for a modern, authoritative and coherent coverage of colloid science as it stands at the end of the 20th century this book, which can serve as both a pedagogic and a reference work, is for you.

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PII: S1385-8947(99)00084-4

Introduction to Particle Technology. Martin Rhodes (Ed.), Wiley, 1998, £29.95 (paperback), 320 pp., ISBN 0-471-98483-3

Particle technology has become increasingly important in a number of sectors of the Process Industries and, consequently, in a number of degree courses. The subject is very broad, covering topics which span from surface science to processing, from micro to macro. To write a book which covers the whole spectrum is a hard task. To find a compromise between writing an encyclopaedia and a reference book is even harder. The book is meant to be an introductory textbook and to give a flavour of the complex subject: the effort needed to cover a so broad field and to make it accessible to students has to be acknowledged.

The book starts from very basic fluid dynamic concepts on single and multiple particles immersed in fluids (Chapters 1 and 2), where concepts such as fluid regimes, drag, and buoyancy are compressed into 20 pages.

The 12 chapters reflect quite a number of topics. Following the first two chapters, the remaining ones deal with; particle characterisation methods (Chapter 3), processing (Chapters 4 and 5, dedicated to packed beds and fluidisation), transport (Chapter 6), separation devices (Chapter 7), storage (Chapter 8), mixing and segregation (Chapter 9), particle size reduction and enlargement (Chapters 10 and 11), and safety (Chapter 12).

A characteristic of all the chapters is the extreme conciseness, which can sometimes result in a lack of clarity. As an example, the chapter on particle size analysis might be confusing for somebody who is not familiar with the definitions and methodologies which are assumed to be known.

Fluidisation and pneumatic transport are treated in a much clearer way, giving the very basic concepts and flavour about the topics. However, the information presented here cannot be used as it stands, and the reader also needs to refer to more comprehensive and complete works. For a new book, on a well-researched field, it is a little disappointing that fluidisation is still presented in the 'classical' way, namely through what I would define as an empirical approach. There is no reference to more recent and more rigorous approaches. This is a general characteristic of the book: I could not find, for instance, any reference to any kind of modelling, constitutive equations, or to 'newer' systems. This is, without any doubt, a book about 'classical', old fashioned particle technology, as testified also by the fact that the most recent citation is at least 6-years-old!

Cyclones and silos are presented using the same philosophy: practical, useful design hints are given, but very few words are spent on the rationale justifying the practicality. In this regard, the book can be used as a handbook, from which one can get very useful suggestions about the range of values of variables important when designing. This aspect is a little unexpected for a book which is meant to be a textbook, and the only way a student can really find the information useful is by complementing it with further readings.

The collection of worked examples and exercises is rather good. The former give a very good illustration of the ideas presented, and are essential for expanding and understanding the otherwise compact writing better. Perhaps the book