Stanford. Designed to combat the increasing scientific illiteracy of our culture, the course of studies had some very illustrious names (Djerassi, P. Ehrlich, D. Hamburg, D. Kennedy, N. Kretchmer, J. Lederberg) among its founders. Among its students, those whose career goals lay in medicine, public health, law, ecology and political science predominated—exactly the audience that Djerassi needed to reach for informed contraception and population policy.

A committed team effort was made to promote discussion of biosocial aspects of birth control. In order to do justice to the cultural differences between different ethnic groups, it was not viewed as desirable to confine the debate to any particular single method out of the arsenal of contraceptive techniques. Most of these methods rely on the separation of sex and reproduction. The option "sex without reproduction" stands opposite from the option "reproduction without sex". Both cases are measures of family planning. Unlike the former, though, the latter measure is no tool of population control. Quite the reverse; it belongs among the practices of reproductive medicine, as a therapeutic strategy for involuntary childlessness. Both family planning measures are taken account of in This Man's Pill. Thus, references to in vitro fertilization (IVF) as the most important technique of assisted reproduction are to be found in many places in the book. Unlike the German edition, appearing at more or less the same time, the English edition provides an index. This fact is worth mentioning as various techniques of reproductive medicine (cryopreservation of unfertilized eggs, sperm, embryos, or blastocysts; intracytoplasmic sperm injection; preimplantation genetic diagnosis) appear widely throughout the book, with no direct cross-referencing.

This fascinating autobiographically outlined metamorphosis of Carl Djerassi—research scientist, educator, businessman, population policy activist, novelist, playwright, art collector, patron, all with total commitment—captured the keen interest and respect of the reviewer. In conclusion, the credo of "separation of sex and reproduction", touching on private spheres, may be (mis)interpreted as the maxim of a hedonistic society. The evolutionary horizon in front of which progression of the human species is taking place, though, is not going to be affected by the entertaining material in This Man's Pill.

Gerhard Quinkert
Institut für Organische Chemie
der Universität Frankfurt a. Main
(Germany)
Biographie/Biochemie

Membrane Technology in the Chemical Industry. Edited by *Suzana Pereira Nunes* and *Klaus-Viktor Peinemann*. Wiley-VCH, Weinheim 2001. xv + 295 pp., hardcover € 139.00.—ISBN 3-527-28485-0

The first part of this book, the shorter of the two, provides an introduction to membrane materials, methods for preparing them, commercial membranes (with performance data), and the various types of membranes (impermeable, porous,, asymmetrical, composite) including a discussion of their different morphologies and pore types, and ways of controlling these variables. Separate chapters are devoted to commercial membranes for reverse osmosis, nanofiltration, ultrafiltration and microfiltration, and techniques for surface modification of membranes (chemically, by plasma treatments, or by crosslinking of polymers), then there is a fairly detailed chapter on aspects of gas separation using membranes.

The second part of the book is concerned with actual applications of membrane processes and future prospects in various areas, including gas separation, pervaporation, membrane distillation, nanofiltration, membrane reactors, and ion exchange membranes. This part ends with a chapter on likely future developments, including an attempt at forecasting trends in some specific fields during the next 30 years.

The chapters have been written by various authors, and therefore as one expects, they vary in quality. In the second part they at least have a similar structure, with one exception. That is Chapter 4 (on nanofiltration), which is more like a report in a specialist journal, with detailed descriptions and analysis of a series of experiments, rather than a discussion of general principles followed by industrial applications. In this chapter applications are only touched on briefly in the introduction.

The text is illustrated by many figures which show details of actual membranes (especially scanning electron micrographs showing different pore structures in membranes), membrane modules, and flow schemes for separation processes together with diagrams of the equipment used. Some figures are repeated several times, especially that showing a spiral-wound module, although the quality of these differs unaccountably!

In fewer than 300 pages it is, of course, not possible to include much depth of detail. This is not suitable for use as a textbook, and for newcomers to the subject it is certainly not detailed enough to convey an understanding of the principles and relationships involved in the applications that are described. Although the individual chapters contain introductions that deal briefly with the relationships and basic principles, one would need to have some previous knowledge to use that information effectively. However, this is not the aim of the book; instead it is intended to give a survey of the applications of membranes, and it is successful in that aim.

The main strength of the book lies in its descriptions of the applications of membrane methods that have been developed over the years in the chemical industry, in water treatment, in the food industry, and in other areas, as well as in information such as up-to-date market data, material throughputs in the different areas of use, membrane and module costs, and development trends in recent years. Therefore the book is likely to be useful, for example, to university teachers seeking data to use in their lectures for illustrating the growing importance and wide range of uses of membrane separation processes, as an alternative to the unreliable random gathering of information from membrane manufacturers' commercial literature or from conference reports. Readers who are engaged in work on membrane processes will

perhaps find in this book some ideas for extending their activities into new areas of application. Thus the book can certainly be recommended from that viewpoint.

Gerhard Maier
PolyMaterials AG
Kaufbeuren (Germany)

Computational Chemistry. A Practical Guide for Applying Techniques to Real World Problems. By *David Young*. Wiley-Interscience, New York 2001. 381 pp., hardcover £ 50.50.—ISBN 0-471-33368-9

Computational Chemistry—A Practical Guide for Applying Techniques to Real World Problems, by David Young, is not so much an introductory textbook but more of a concise encyclopedia in textbook form. This book covers an enormous range of methods and applications in computational chemistry. It is aimed at the experimental chemist facing real world problems that are best tackled computationally. This book is an ideal starting point for solving these problems.
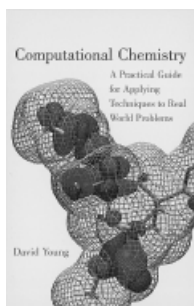
The book consists of three parts: (I) Basic Topics, (II) Advanced Topics, and (III) Applications. Part I follows the general introduction (Chapter 1) and begins, in Chapter 2, with a concise outline of very basic physical concepts and theories, such as thermodynamics, quantum mechanics and the Schrödinger equation, and statistical mechanics. The chapters thereafter treat most if not all modern computational methods, ranging from molecular mechanics via semiempirical methods to ab initio methods and density functional theory (DFT). Young also discusses molecular dynamics (MD) and Monte Carlo simulations, as well as population analysis and the computation of various molecular properties (e.g., NMR parameters, boiling point, and biological activity). But also more technical issues are addressed, such as Z-matrix construction for geometry optimization, basis sets in ab initio and DFT calculations, and the efficient use of computer resources. Part I closes with Chapter 16, which provides some general hints on how to conduct a computational investigation.

Part II starts off with five chapters on exploring potential energy surfaces and conformations, finding transition states and computing reaction rates. Furthermore, it has chapters that deal with QM/MM approaches, solvent effects, and excited electronic states. There are also more advanced chapters on computing properties such as, for example, quantitative structure–activity relationships (QSAR), NMR chemical shifts, and nonlinear optical properties (e.g., polarizabilities and hyperpolarizabilities). As regards technical issues, Part II provides suggestions for solving SCF convergence problems, and discusses size consistency of quantum chemical methods, spin contamination, and the customization of basis sets and force fields. Finally, Part II addresses relativistic effects, band structures of crystals, mesoscale simulation of, for example, solutions or crystallization processes, as well as synthesis route prediction.

The whole is nicely rounded off in Part III with applications of the various methods to practical problems in organic, inorganic, and biological chemistry, in the simulation of liquids and polymers, and in solid-state and surface chemistry.

As already pointed out, this work is not a textbook. It simply covers too many subjects to explain them in full detail. But that is not its purpose. Instead *Computational Chemistry* serves more as a concise encyclopedia: it has an excellent subject index leading to the chapter that explains the basic features in a clear and didactic style. The reader is then referred to the appropriate scientific literature (mainly reviews and textbooks) for full details. In conclusion, Young has written a very useful guide that assists advanced undergraduate and graduate students, but certainly also professional (experimental) chemists in conducting computational research projects in almost all areas of chemistry.

F. Matthias Bickelhaupt
Scheikundig Laboratorium
Vrije Universiteit
Amsterdam (The Netherlands)

Biotechnology. Vol. 5b. Genomics and Bioinformatics. Edited by *Christoph W. Sensen*. Wiley-VCH, Weinheim 2001. xvi + 462 pp., hardcover € 279.00.—ISBN 3-527-28328-5

When a book goes into a new edition after only a few years, it is an indication that it deals with a highly topical and rapidly developing area of work. However, in this case all comparisons fail to do justice to the situation. The combined subject index to the first edition of the eight-volume work *Biotechnology*, published in the period 1981–1989, did not contain the words genomics, proteomics, or bioinformatics! Now the new edition of the work, started in 1993, is complete. At the beginning of 2001, coinciding punctually with the announcement in *Nature* and *Science* of the determination of the human genome sequence, Volume 5b (*Genomics and Bioinformatics*) appeared, along with the index volume for the whole work.

The determination of the human genome sequence is only the first step in genome research. We read the letters, and we understand their meaning in many cases, but we do not understand the language itself. That is rightly emphasized repeatedly in this volume. The chapters, all written by top-class authors, deal expertly and concisely with every aspect of genome research, including especially their medical implications, and with proteome research and bioinformatics.

The section on applications contains a chapter reviewing the genome project for various model organisms (*E. coli, B. subtilis, Archaeoglobus fulgidus, S. cerevisiae, A. thaliana, C. elegans*, and *Drosophila melanogaster*), a chapter on the human genome project, two chapters on monogenic hereditary diseases and the predisposition towards certain diseases due to polygenic changes in the genetic make-up, a chapter on pharmaceutical bioinformatics and the discovery of new active agents (although this is mainly concerned with target identification and analysis rather than with searching for new active agents), and lastly a chapter on genome research in agriculture, an aspect that generally receives too little attention. The section on DNA technologies contains chapters on gene