reading for advanced chemistry and biology students, or for other scientists interested in this aspect of pharmaceutical chemistry. The book is divided into six chapters, an appendix, a glossary, and an index.

Chapter 1 is more motivational than introductory, describing interesting medical and therapeutic challenges. For the novice, it might be best to follow the reading of this chapter with the appendix, which offers a useful refresher on the monomeric building blocks of the biopolymers discussed in detail in the text. The book is organized into a grouping of the three major classes: biopolymers, proteins, and nucleic acids and polysaccharides. A second level of organization is imposed within these major topics, covering gene cloning, protein engineering, and immunology, which makes the treatment somewhat disjointed. For example, vaccination is covered before cell-mediated immune response, chimeric and humanized antibodies are described before hybridoma technology, HIV is covered before T helper cells, and capsular polysaccharides are covered long after vaccines. This organization makes it an easy read for one familiar with the field, but may pose difficulties for the novice. Also, there are wide variations in the depth of treatment. For example, a very detailed description of immunosuppression is given, yet no mention is made of the different classes of immunoglobulins, and ribozymes are discussed but no mention is made of abzymes. Some important topics that should have been included are missing, such as how the ability to recognize self from non-self develops, and the concept of a provirus is never directly addressed. Some important aspects of pharmaceutical technology, such as the use of controlled release formulations for the delivery of biopolymers, and challenges in the formulation, stabilization, and analysis of biopolymeric drugs, are not discussed.

Despite these shortcomings, the author should be commended for putting together a nearly error-free text, covering a multiplicity of disciplines, that is readable and interesting. The figures and structures are of high quality, well reproduced, and with detailed legends. References to textbooks, review articles, and research publications are given at the end of each chapter. The text is up-to-date, it was written in May 2001, and it includes references to research articles published in the same year. Although the book contains no information about the background of the author, it appears that she is trained as a chemist but has acquired an excellent grasp of biology and pharmaceutical science. I recommend this book to those with an interest in the therapeutic aspects of biomacromolecules.

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Nationalizing Science. Adolphe Wurtz and the Battle for French Chemistry. by *Alan J. Rocke.* MIT Press, Cambridge 2001, 443 pp, hardcover $ 39.95.—ISBN 0-262-18204-1

A. J. Rocke describes in his book the development of chemistry in France in the 19th century. He often draws parallels between the state of chemistry in Germany, France, and partly England. The book describes quite accurately the status of chemistry in the 19th century. Adolphe Wurtz's life is used as a guideline in this book. A. J. Rocke has added biographies of Justus Liebig and Jean-Baptiste Dumas in the first two chapters. Liebig stayed several times in Paris and was strongly influenced by Gay-Lussac. Although Dumas and Liebig were competitors, they did exchange co-workers and ideas, so that decisive improvements in elementary analysis of organic chemistry could be achieved, which led to a rapid development in synthetic organic chemistry. French and German university systems were extensively compared in these chapters. It is shown that chemistry in France was losing competitiveness compared to Germany in the years from 1810 until 1865. Decentralization of scientific development in Germany allowed the establishment of first-class centers at several universities such as Giessen, Marburg, Heidelberg, and Göttingen. A. J. Rocke shows how centralistic administative organization as well as the need of cumulating positions for scientists had on obstructive effect on the development of research in Paris and France in general. This scientific behavior resulted in constantly less international exchange of French scientists. Moderate financial support of research in France, too, had a detrimental effect on French chemistry. Fortunately, Adolphe Wurtz and his co-workers had a positive influence on this situation. In the third chapter. A. J. Rocke describes Wurtz's scientific background. He was born close to Strasbourg, then studied chemistry in this city and stayed as a post-doctoral researcher with Liebig at Giessen. This stimulating experience influenced his whole life. He moved to Paris and became the successor to Dumas. Wurtz and his co-workers (300 spread over the years) represent the most important French chemistry school in the 19th century. A. J. Rocke then describes in chapter 8 the career of Marcellin Berthelot, who was not very supportive of German science. He gained reputation through the publication of books such as "La Chimie Organique fondée sur la Synthèse" rather than through personal scientific publications. Dumas had doubts about the Atomic Theory. Similarly, Berthelot did not support this theory. He changed his opinion only 12 years after Wurtz's death (1896). On the other hand, Wurtz and his students, influenced by international contacts, defended the Atomic Theory in France, although with little success. Under the influence of Wurtz and his co-workers important educational changes (additional practical training, mixing of research and teaching activities) took place. He was successful in persuading the French Government that it would be useful to let more money flow into chemistry. This investment led to a noticeable improvement in French sciences at the end of the 19th century. In the last chapter A. J. Rocke tries to explain how Wurtz's personality (modesty, provincialism) made it difficult for him to defend the Atomic Theory in France efficiently.

This book of A. J. Rocke contains an important set of historical data, which allows a better understanding of French, German, and English science in the 19th century. The book is highly suitable for

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chemists who want to be informed about the history of their scientific field. It demonstrates also that Wurtz was a true European scientist and that a European research approach already existed in the 19th century. This book is also appropriate for politicians. Its reading would help to avoid many mistakes being made. Although the text contains some repetitions, it is nevertheless an extraordinary interesting book. It is highly recommendable for every chemist who wishes to improve his historical knowledge in this field.

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Free Energy Calculations in Rational Drug Design. Edited by *M. Rami Reddy* and *Mark D. Erion*. Kluwer Academic/Plenum Publishers, New York 2001. 385 pp., hardcover € 127.00.—ISBN 0-306-46676-7

This monograph is concerned with the methodology of free energy calculations (or free energy perturbation methods, FEP), which are based on molecular dynamics or Monte Carlo simulations, and in particular with their applications to structure-based drug design in pharmaceutical research. The authors of the contributions include many of the key figures working in this field, and therefore the book contains a comprehensive and mainly very up-to-date presentation of the subject from various viewpoints.

The first FEP calculations on biomolecules, carried out in the mid-1980s, aroused great hopes that it would soon become possible, for practically any ligand, to calculate its binding affinities to important protein targets, thus eliminating the need for much expensive and time-consuming experimental work. Unfortunately this optimism turned out to be premature, and it became clear that many years of work on gradually improving the FEP method would be needed before its advantages and limitations could be properly evaluated. Consequently, because of these uncertainties and the heavy demands on computing time for performing the simulations, the method has not so far gained wide acceptance in pharmaceutical research. The editors of this book head one of the few research groups in the industry who have been successfully using FEP calculations for the last ten years. Their book is the first one to be devoted entirely to the subject, and much of it is concerned with applications.

In the short introduction (6 pp.) J. Andrew McCammon gives a very competent historical survey of the topic, including the initial euphoria and the subsequent decline of early hopes, and concludes by outlining the present state of research. This is followed by two excellent chapters on the methodology of FEP calculations and the calculation of binding affinities, contributed David Pearlman and Johan Åqvist, both well-known experts in the field. These two chapters, together with the introduction, can be recommended for the newcomer to get a good grasp of the characteristics of the FEP method. It is definitely not a method that can be treated as a "black box". Some of the remaining chapters of the book describe new variants of the method, such as the MM/PBSA method described by Kuhn, Kollman, and co-authors, and the λ-dynamics method of C. Brooks and colleagues, also including applications to important protein targets and describing their interaction with inhibitors. The inclusion of these chapters reporting practical examples in drug research makes the book an essential resource for pharmaceutical firms and research groups working in this area. Some of the examples are highly topical, up-to-date, and important, such as the report by Kollman and co-authors on thymidylate synthase, and that by Jorgenson and co-authors dealing with examples of applications to COX-2, the SRC/SH2 area, HIV reverse transcriptase, and thrombin.

However, some weaknesses of the book are apparent in the choice of certain chapters for inclusion. For example, although McCammon and Pearlman mention in the book that many of the studies in the 1980s gave results that were almost meaningless because of the unavoidably short computer simulation times, some of these are included in the book as individual chapters, without explaining the problems of interpreting the results that subsequently became known. Without wishing to detract from the important role of these early studies, it has to be said that some of the results are only of historical significance. Also, of course, repetitions appear as a common characteristic of multi-author books. For example, at least half the chapters introduce the reader to the principle of thermodynamic cycles. Two additional introductory chapters are devoted to the MM3 force field and by implication to solvent models (C. Cramer and D. Truhlar). Also, although the need to normalize absolute free enthalpies of bonds to standard conditions is mentioned in several places (see the 1997 publications by M. K. Gilson and J. Hermans), it would perhaps have been useful to discuss this in a separate chapter. That point is of particular importance if (as one hopes) the FEP method will be generally adopted in drug research in the future.

The book will enable not only those engaged in drug modeling in pharmaceutical firms, but also post-graduates in university research groups, to learn about the FEP method and its future potential within a fairly short time. It is intended for a specialist readership, and is likely to remain the only available work on this subject for some years to come, and for that reason alone it is a highly valuable addition to the literature.

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Organic Synthesis Engineering. By *L. K. Doraiswamy*. Oxford University Press, Oxford 2001. xviii + 918 pp., hardcover £ 150.00.—ISBN 0-19-509689-4

In this book L. K. Doraiswamy has set out to give a comprehensive treatment of both chemical process engineering and the catalysis of organic reactions, and to connect the two together. Thus, the unique feature of this work is that, unlike conventional textbooks on process engineering, it contains some good and substantial chapters on catalysis. However, that has not been allowed to limit the treatment of process engineering, which is where the book's main

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