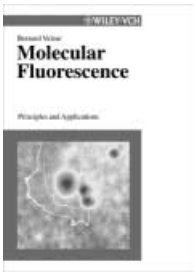
A Little Light Reading

Molecular Fluorescence. Principles and Applications. By *Bernard Valeur*. Wiley-VCH, Weinheim 2002. xiv + 388 pp., hardcover € 99.00.—ISBN 3-527-29919-X

Fluorescence is an area of research that is relevant to many applications, and accordingly it has been studied intensively in recent times. In the last few years several new methods have been added to the existing ones, making fluorescence an attractive technique for some new areas of application. Thus, not only photochemists and analytical chemists, but also now biologists, medical researchers, and materials scientists are making increasing use of fluorescence phenomena, opening up new perspectives in their research.



In his book, Bernard Valeur deals with aspects that range from the historical beginnings of fluorescence research to the most powerful modern methods and applications. He especially addresses advanced chemistry students and scientists in related disciplines who wish to begin work in the field. While deliberately approaching the subject from the point of view of the physical chemist, he is also very aware of the need to make the text understandable by nonspecialists, and with the intended readership in mind he avoids long mathematical treatments.

The book consists of 11 chapters, with a well-structured list of contents providing good access to the material. Each chapter ends with a bibliography which opens up opportunities for more in-depth study and provides links to current research programs. In these lists Valeur has wisely concentrated on reviews, monographs, and just a few important original publications, providing starting points for more advanced reading. The extent to which the references are up-to-date varies between chapters. All the chapters contain "boxes" that touch on more advanced aspects of the topics, and many footnotes, mostly giving definitions or explaining mathematical points.

In the first five chapters a historical introduction is followed by a description of the physicochemical fundamentals of fluorescence. After describing absorption and emission processes, the author discusses other types of processes by which the excited state may be deactivated, including energy transfer, excimer formation, proton transfer, and electron transfer. In this he succeeds in conveying to the reader a feeling for the relationships between the individual processes and their time-scales. The text contains frequent cross-references to other parts of the book, and these help the reader to understand how the individual chapters are related. Chapter 5 is devoted to fluorescence polarization. Here the numerous illustrations make it easier for the reader with limited mathematical knowledge to understand the discussion. The chapter ends with a concise description of the most important areas of application of fluorescence polarization, but the coverage of the literature on applications in biology and molecular biology is too brief.

Chapter 6 is concerned with measuring techniques. Here the discussion of common errors in measurements caused by shortcomings of apparatus or technique is especially valuable for nonspecialists.

The following chapters take up the topics of the introductory section, and lead into areas of practical applications. Chapter 7 is concerned with polarity effects in solutions and the use of polarity-sensitive fluorescence probes. The chemical structures and fluorescence spectra of the most commonly used fluorescent compounds are discussed, and some typical applications are described. Chapter 8 then discusses the use of fluorescence probes for studies of viscosity and microviscosity. A valuable aspect is that the author does not omit to mention the general and special problems that can arise in the use fluorescence probes. Chapter 9 describes techniques based on Förster energy transfer processes (RET), which are of great practical importance, as they can be used to determine distances on a molecular and supramolecular scale. Here the author treats the different aspects very thoroughly. The chapter ends with a summary of applications of RET in chemistry and life sciences, but here one would have liked to see a classification and evaluation of the relevant sources. This is followed by a long chapter on fluorescence sensors for ions and molecules, a subject in which the author has a special interest. He gives information not only about the chemical aspects but also about techniques for constructing sensors. The book ends with a short chapter containing brief descriptions of some other techniques: fluorescence on the femtosecond time-scale, fluorescence microscopy, and single molecule fluorescence spectroscopy. This chapter gives only a brief initial survey. That seems appropriate as these are such rapidly developing topics. Unfortunately though, the author does not offer a view of future prospects and trends.

The strength of the book lies in its clear and understandable presentation, and in the thoroughness of the descrip-

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tions of fluorescence applications, enabling one to quickly appreciate the many questions and problems in the field of fluorescence. *Molecular Fluorescence* is more a textbook than a monograph, and therefore it is of special interest for students and beginners in the field, and can be recommended.

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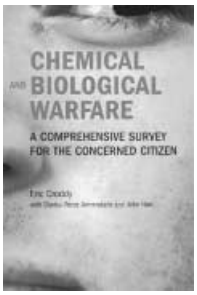
Chemical and Biological Warfare. A Comprehensive Survey for the Concerned Citizen. By *Eric Croddy, Clarisa Perez-Armendariz* and *John Hart*. Springer-Verlag, Heidelberg 2002. 306 pp., hardcover $ 27.50.—ISBN 0-387-95076-1

As the title states, the authors of this book have set out to give the "concerned citizen" a comprehensive overview of chemical and biological weapons. In their descriptions of the various agents that can be used and their effects they have succeeded very well, but the book also contains many serious errors and shortcomings. Right at the start, the authors uncritically adopt a new definition of the term "weapons of mass destruction" proposed by Ken Alibek, a former emigrant from the Soviet Union. That term was not coined by Marshall Zhukov in 1956 as they state, but by the UN Security Council, to distinguish nuclear weapons from conventional weapons. Also the expression "the poor man's atomic bomb" did not originate from President Rafsanjani of Iran in 1988, but from the American industrialist George W. Merck, head of the United States Committee on Biological Weapons, shortly after World War 2.



Again, it is not true that, after the signing of the Geneva Convention in 1925, which banned countries from starting to use chemical or biological weapons in war, there was no further open discussion about the control of such weapons. After 1925 several years of discussion resulted in the very comprehensive MacDonald Plan, which aimed to prevent the development and production of such weapons, but that failed in 1933 when Germany and Japan pulled out of the League of Nations. Controls on the export of such materials did not first come into force with the signing of the Chemical Weapons Convention, but earlier through the actions of the "Australian Group" set up in 1984. Unfortunately it is not true that the conventions on chemical and biological weapons are "almost universally accepted". A quarter of the world's nations have not yet ratified the agreements. The authors uncritically accept and echo the USA's condemnation of some countries for allegedly possessing weapons of mass destruction, without including any reference to the clear mistakes made by the CIA in gathering such information. They also fail to mention Hitler's decision not to engage in biological warfare; instead they state incorrectly that his injury caused by poison gas during World War 1 led him to hesitate about using chemical agents in war, whereas in fact he took a keen interest in their development and production.

Bacillus anthracis was not isolated by R. Koch in 1876, but in 1849 and 1855 by A. Pollender. The alleged "convincing evidence" that in World War 1 the Germans used glanders against the Russians does not exist, but the authors do not mention that anthrax- and glanders-inducing agents were probably used in several other countries. Furthermore, it is irresponsible to report, without critical comment, that after World War 1 "some people" believed that Germany had deliberately spread the influenza virus which killed 20–50 million people worldwide in 1918. The name of the inventor of tabun was not "Schräder" but Gerhard Schrader, and that nerve gas was produced not in "Dyenfurth" but in Dyhernfurth. In 1945 the tabun factory fell into the hands of the Red Army. Thus, the assertion by a Soviet expert, repeated in this book, that no knowledge about the production of nerve gases came to light until 1957, is incorrect.

The arrangement of the book's contents also invites criticism. For example, the description of chemical and biological weapons comes before an account of their history. The placing of the last chapter on the role of vaccination in biological warfare seems quite inappropriate. Although the problem of developing antidotes and vaccines to protect against attack by chemical and biological weapons, and also to protect their users, is undeniably important, this chapter of 17 pages is too long, especially when compared with the space devoted to other important aspects—for example, only 12 lines are devoted to the role of measures to build trust. Considerable attention is given to measures for preventing war-induced epidemics, but that has nothing at all to do with biological warfare. In this connection the authors completely overlook the effect of military vaccination activities in arousing distrust, and ignore the pressures that are evident throughout the world for such activities to be transparent and coordinated, either within a country or, better, internationally. That would also help to discourage biological terrorist attacks or to improve preparedness against them. That thought would have made a good conclusion for this book, instead of considering the populist question of whether Osama Bin Laden is on the point of using anthrax-inducing agents as a terrorist weapon, or is indeed already doing so.

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Science, Truth, and Democracy. By *Philip Kitcher.* Oxford University Press, Oxford 2001. 219 pp, hardcover $ 29.95.—ISBN 0-19-514583-6

Imagine that scientific inquiry was truly democratic. Representatives of the public would make significant contributions to decisions about funding priorities and about which scientific endeavors are regarded as significant. Such public participation surely seems like a good thing in the abstract. By representing all affected parties, the demands of progress would be balanced with values such as justice and equality.

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