

levsky and Weierstrass" (page 116). Far from proving her point, Koblitiz' own evidence argues that a liaison would have been stormy and would have endangered a friendship that was important to both of them. Fortunately, Koblitiz rarely commits such offenses.

Koblitiz' understanding of Russian and European social, political and intellectual history permeates this enjoyable book, and her analysis and conclusions are particularly enlightening. She points out, for example, how Kovalevsky's scientific legacy exceeds the theorems she proved and the problems she solved. Not Weierstrass' most creative student, she was quick to understand, persistent, and a gifted expositor. She demonstrated the power of methods that remain useful today. Her correspondence and visits with mathematicians in France (Charles Hermite, Henri Poincaré) and Russia (P. L. Chebyshev and others) as well as Germany and Sweden provided a significant conduit for ideas, especially between Russia and the West.

The story of Sophia Kovalevsky, very *au courant* in feminist scientific circles since the appearance of *A Russian Childhood*, deserves a wider audience. Be assured that in *Convergence of Lives*, the feminist Koblitiz has avoided using her for political ends. It is the somewhat shoddy *Little Sparrow* that exploits Kovalevsky's popularity with the women's movement.

## Optoelectronics: An Introduction

J. Wilson, J. F. B. Hawkes

445 pp. Prentice-Hall, Englewood Cliffs, N.J., 1983. \$34.00

The potential impact of optoelectronics—the development and application of devices and systems that exploit the interaction between light and matter—is perhaps most clearly evident in communications, a field in which systems based on the semiconductor laser and the low-loss optical fiber are about to revolutionize the information industry. Given the pace at which new devices and applications are appearing, it seems safe to project that optoelectronics will continue to be an important technology in the future.

J. Wilson and J. F. B. Hawkes have created a very readable textbook that surveys an impressive array of important optoelectronic devices. It is aimed towards both senior-level undergraduates and working professionals who require an introduction to the field. The book begins with summaries of important topics drawn from classical optics and solid-state physics and then jumps directly into reasonably detailed discussions of modulators, display de-

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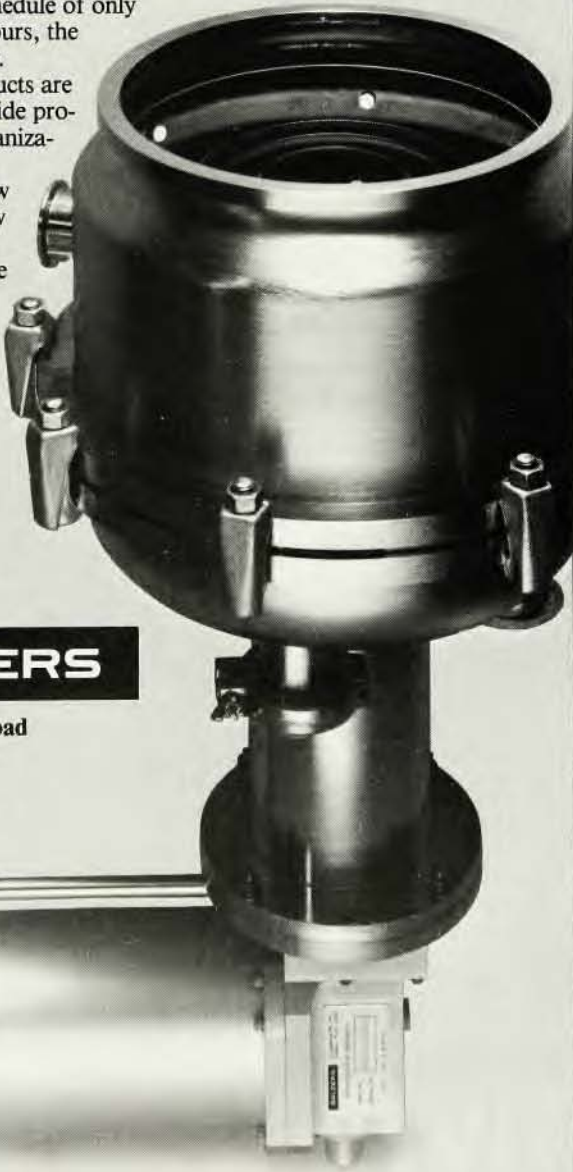
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vices, lasers, photodetectors, optical waveguides and optical communications systems. Because of the rather broad range of subjects covered in the text, the treatments tend to be descriptive and not strongly quantitative. For example, the discussion of birefringence considers the qualitative aspects of the Huygens construction of the e-wave and o-wave surfaces, but it does not develop the usual index-ellipse formula that allows one to calculate the index of refraction as a function of direction. Two chapters of the book devoted to lasers are a bit more quantitative than the other chapters: The authors present a brief rate-equation analysis of a four-level system and calculate the population inversion required to achieve the laser threshold.

The book's greatest strength is its very clear qualitative descriptions of the principles of operation of dozens of optoelectronic devices. The authors capture the essence of each device and explain the fundamental physics in an appealing way. There are a great many illustrations in the text that contribute significantly to the clarity of the presentation. A list of questions and problems follows each chapter, and the answers to the numerical problems appear as an appendix.

The standard textbook for optoelectronics is Amnon Yariv's *Optical Electronics*, which is much more quantitative and requires a more sophisticated reader than the present book. Wilson and Hawkes intend their book to give a "first glimpse" into a growing field and to lay a conceptual foundation to be built upon by more advanced and specialized texts. All things considered, it succeeds. Even when a more quantitative exposition is needed for the principal text in a course, it would make an ideal supplementary text.

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## Waves and Photons: An Introduction to Quantum Physics

E. Goldin  
211 pp. Wiley, New York, 1983. \$25.95

Quantum optics, although as old as quantum mechanics itself, has been experiencing its most significant developments since the advent of the laser. To some extent, this progress has been witnessed at the five Rochester conferences on coherence and quantum optics held during the last two decades. Even though several intermediate and advanced books on quantum optics already exist, an elementary textbook on this subject, such as the present book by Edwin Goldin, is a welcome addition.

The book aims to present the wave-