in several places.

In a foreword, the editors joke that Nambu's work is ten years ahead of us, because it takes ten years to understand him. The clear and well-written research papers belie this exaggeration. But it is in the less formal presentations that the motivation for Nambu's ideas, as well as his charming modesty, become evident and make reading this collection the pleasure that it is.

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Introduction to Superconductivity

Michael Tinkham
McGraw-Hill, New York, 1996.
454 pp. $61.88 hc
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It is fashionable to declare that various branches of science are dead, or at least no longer likely to produce genuinely new conceptual developments. This has been said of superconductivity, although not as often as of physics itself. The last time was in the mid-1980s, just in time to be confounded by the revolution in high-temperature superconductivity sparked by Georg Bednorz and Alex Müller. One of the happy products of the ensuing expansion of the field is a second and enlarged edition of Michael Tinkham's *Introduction to Superconductivity*, which surely is one of the most useful texts for those engaged in this extensively developed area of research.

This book, like the first edition, published in 1975 and by now familiar to several generations of students and researchers, covers the middle ground between applications and detailed microscopic theory. Drawing on the author's many outstanding contributions to our understanding of the phenomena of superconductivity, it gives a clear account of the experimental foundations of the subject, together with an uncluttered interpretation in terms of the order parameter theory of Vitaly Ginzburg and Lev Landau and the microscopic theory of John Bardeen, Leon Cooper and J. Robert Schrieffer.

The new edition is a testament to the fact that neither the field nor the author has been inactive over the past 20 years. Tinkham has taken advantage of his experience in teaching with the first edition to rearrange or expand the original material to make it more accessible for beginners. He has also added a substantial discussion of recent important developments and active research areas, notably high-temperature, nonequilibrium and mesoscopic superconductivity.

A new chapter on the high-temperature superconductors largely eschews the microscopic theory to focus on the elegant ideas introduced to describe the behavior of magnetic flux lines in the superconducting state. This was a wise choice, even though it meant excluding recent developments on the theory of strongly correlated electron systems, which will undoubtedly find their place in future texts. The phenomenology of the superconducting state is less controversial and lends itself to a rather compact exposition based on a more-or-less conventional Ginzburg–Landau model of layered superconductors.

The new chapters on nonequilibrium superconductivity and on the properties of small, low-capacitance junctions produced by modern nanofabrication techniques include discussions of the Coulomb blockade, the single-electron tunneling transistor, macroscopic quantum tunneling and the consequences of the uncertainty relation between phase and number. In the past, much of this material could be found only in conference articles or in the original literature.

The modifications for this edition of *Introduction to Superconductivity* have made a good book even better. It should continue to serve as a reference for researchers and a source of inspiration for teachers for many years to come.

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Introduction to Molecular Dynamics and Chemical Kinetics

G. D. Billing and K. V. Mikkelsen
Wiley, New York, 1996. 183 pp.
$49.95 hc ISBN 0-471-12739-6

We can divide the possible areas of coverage for a book like this into either kinetics and dynamics or experiment and theory. In this context, kinetics refers to chemical reaction rates in thermal ensembles, whereas dynamics also includes molecular-beam studies, laser-assisted processes, ultrafast events and energy transfer. *Introduction to Molecular Dynamics and Chemical Kinetics* by G. D. Billing and K. V. Mikkelsen is essentially all kinetics. As far as theory versus experiment, it is essentially all theory. Thus a better name might be "Introduction to Theoretical Chemical Kinetics." Within this corner of the kinetics-dynamics universe, though, the coverage is rather broad, including reactions in the gas phase, at gas–solid interfaces and in solution. The references are primarily to classic and pedagogical sources; there are 15 references to other books, 27 references to journal articles from the years 1918–42, 23 to articles from the 1949–79 period and only 11 from 1980–95. There are 16 chapters and 7 appendices, and the chapters tend to be very short; excluding exercises and references, the average chapter length is seven pages.

One feature contributing to the conciseness of the chapters is that some of the algebra is relegated to the exercises, which are answered in a 16-page section at the back of the book. But some subjects are simply insufficiently developed. For example, the chapter on generalized transition-state theory consists of algebraic manipulations that could be useful for introducing variational transition-state theory or vibrationally adiabatic models. But then the chapter ends, and the subject is abandoned. I found the chapters on classical trajectories and electronically nonadiabatic collisions frustratingly short as well.

The authors of this book are both widely respected research scientists in the areas they cover. The pedagogical quality of their book is a compromise between brevity and clarity. For example, the transition state is defined first in chapter 6 as "an activated complex" and then specified to be a point along the reaction path where the energy gradient is zero and the Hessian has one negative eigenvalue. Then the fundamental assumption of transition-state theory is stated to be that once a system has crossed the transition state it does not return. A novice to the theory might find it hard to appreciate the beauty and rigor of the transition-state theory from this discussion. For example, what if the system reacts without passing through this "point" along the reaction path? Modern treatments, following Wigner's approach from the 1930s, define the transition state as a hypersurface or, based on modern scattering theory, define it as a metastable quantum state, either of which allows a better appreciation of the fundamental dynamical assumption.

The best part of the book is its treatment of chemical reactions in solution. Unfortunately, this section makes little connection to the gas-phase part of the book. For example, in chapter 14 transition-state theory is derived from scratch—more clearly than it was in chapter 6, but also with no reference to chapter 6. A section I found especially interesting is the treatment of the electrostatic energy of the dielectric polarization of the sol-