tracing of historical arguments, one finds more or less two themes: "Value" comes through in neoclassicism as an immutable substance, conserved in exchanges; and "utility"—the sum of everyone's preferences—is the variational quantity that plays the role of what physicists would describe as a Lyapunov function.

A refined version of this notion is the Arrow–Debreu theory, but Mirowski speaks with considerable heat of everyone from Walras to Tobin, with a special chapter, dripping with irony, dedicated to "Paul Samuelson, Scientist." Mirowski argues that there is in fact no viable theory of value and that utility is not a unique quantity.

His view of physics is that it is transformed 19th-century economics, only recently breaking free of the "straightjacket" of conservation of energy with our "new" ideas about cosmology, chaos and the quantum theory. This view of trends in physics is perhaps that of popularizers and philosophers, several of whom are quoted, but it is not physics as the working physicists do it. In fact, quantum mechanics would have had to be invented as the ideal vehicle for symmetry principles and the resulting conservation laws, if it had not existed. We move on regularly to greater symmetries and more comprehensive conservations, from which we derive our equations of motion. Chaos theory is, paradoxically, a triumph of deterministic dynamics, and modern cosmology is an attempt to extend the whole structure farther than we had ever hoped.

We physicists may share a little guilt in misleading the unwary public, in that the writings of such enthusiasts as John Wheeler and Alan Guth, which emphasize the radicalism of new ideas, can be taken out of context to indicate controversy where none exists. In fact, statistical mechanics is with us for the foreseeable future, and the ideas of John Bell, which Mirowski sees as radical, merely confirm quantum mechanics. It is even possible for David Mermin to *complain* about the universe being boring quantum mechanics all the way down (PHYSICS TODAY, November 1990, page 9).

My experience as a part-time economist in a group at the Santa Fe Institute is that the same first-rate economists who erected the neoclassical structure are often those most concerned about its weaknesses and most eager to find ways to model the kind of effects that break it down—effects such as the dependence of preferences on history and mis- (or dis-) information, destabilizing effects such as costs that decrease with volume and the complex web of technological dependence of one product on another.

Mirowski's is an extraordinarily scholarly book, replete with the detailed intellectual history of the growth of modern economics. One must concede to him that excessive claims concerning the neoclassical structure have been made—usually by followers rather than leaders in the theory—for both the generality and the value for policy guidance. I might myself, in writing a polemic, have focused even more than Mirowski did on the dangers of basing public policy (growth at all costs or monetarism, for instance) on a flawed theoretical framework. Mirowski might have made the book much more readable by avoiding the temptation to score every possible point in favor of succinct and clear expression. One feels that the scholarly matter is expressed in excessively emotional rhetoric and in an inappropriate vocabulary. The final effect is, indeed, to shed "more heat than light."

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## Foundations of Applied Superconductivity

**Terry P. Orlando and Kevin A. Delin**
*Addison-Wesley, San Diego, Calif., 1991. 584 pp. $53.95 hc ISBN 0-201-18323-4*

The discovery of high-temperature superconductors has spawned scores of textbooks. Most of the classic texts have been reissued, and many new ones have appeared. This bandwagon effect makes one suspicious of the entire enterprise. In the case of Terry Orlando and Kevin Delin's new book, this suspicion is unjustified: They have produced an excellent text that takes a fresh approach to the field.

In the wake of the BCS theory many excellent books appeared in the 1960s, that were naturally highly concerned with the microscopic aspects of superconductivity: These books concentrated on showing that the properties of superconductors could be deduced from the microscopic theory or from the Ginzburg–Landau theory (with suitable references to the fact that the Ginzburg–Landau theory could be derived from microscopic theory). Orlando and Delin point out that this is not strictly necessary. Just as many of the properties of normal metals can be understood in terms of simple models, many of the properties of superconductors can be understood without microscopic theory. Orlando and Delin wish to make the subject accessible to advanced undergraduate engineers. They succeed at this. The book is also good for an introductory course for advanced undergraduate or graduate physics students and provides fresh insight for physicists working in the field, such as myself.

The book looks at successively more sophisticated models for superconductors, starting with perfect conductivity and perfect diamagnetism, and ending with the Ginzburg–Landau theory. Applications are presented as soon as the appropriate theoretical base is established. For example, transmission lines are discussed in terms of the two-fluid model, well before the authors introduce the quantum nature of superconductivity.

A lot of good physics can be done this way. Vortices are discussed in some detail, and practical matters such as vortex pinning and flux flow are included. The authors make it clear where their approximations break down, and results from Ginzburg–Landau or BCS theory are given when the simple models are incorrect. The same careful phenomenological approach is used to discuss Josephson junctions. When the Ginzburg–Landau theory is introduced—in the last chapter—it is also presented carefully and correctly; worked examples demonstrate how to use the theory.

A great deal of care is taken throughout the book. The usual difficulties of the subject—minus signs, the difference between $B$ and $H$, gauge choices and so on—are all nicely dealt with. There are many completely worked examples, and each chapter has a large variety of excellent problems.

This is not a book about fundamental theory, but a book for engineers and physicists who work with superconducting materials and devices. Combined with one of the more traditional texts, it gives a great deal of information about superconductors. I recommend it very highly.

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## The Exploratorium: The Museum as Laboratory

**Hilde Hein**
*Smithsonian, Washington, D. C., 1990. 256 pp. $35.00 hc ISBN 0-87474-466-0*

*Reviewed by Alan J. Friedman*

In the 1960s a number of science