and new ones are constantly appearing. The point is that, although many good books on quantum mechanics are available, this little booklet stands out amongst them as a gem. It is neither a treatise like those by Dirac or Kramer nor a precise text like the book by Schiff. It is rather a collection of mimeographed notes of a great teacher's lectures on quantum mechanics as he presented them the last time he ever taught the subject (1954). The notes are sketchy and sometimes difficult to read, but remarkably systematic and orderly. Fermi begins with Maupertuis' principle and concludes with a brief description of the Dirac Theory. In between, he covers all that usually comprises a first course in quantum mechanics, and at times more. However, because of its sketchy nature, its value is less as a text in quantum mechanics than as a book in which one may catch glimpses of what made Fermi a great teacher. In the latter role it has great emotional impact, especially for those who, like me, were not fortunate enough to have had Fermi as a teacher.

The Stability of Motion. By N. G. Chetayev. Transl. from Russian by Morton Nadler. Transl. edited by A. W. Babister and J. Burlak. 200 pp. Pergamon Press, London and New York, 1961. $9.50. *Reviewed by T. Teichmann, General Atomic, Division of General Dynamics.*

THE present tendency toward more elaborate and flexible control systems (and dynamical systems in general), including the conscious use of nonlinear elements, and of the "adaptive" principle, has stimulated interest in the stability theory of differential equations, a field to which the Russian school of mathematicians has given a great deal of attention. This work by Chetayev provides a valuable account of the basic results and methods of Lyapunov and illustrations of their application to a number of typical practical problems. As such, it can make a legitimate claim to a place in the library of anyone interested in understanding and using these techniques.

In addition to a discussion of the general features of stability problems, and of Lyapunov's basic theorems and methods, notable features include a very thorough discussion of the stability of linear systems and of the stabilizing effect of dissipative and gyroscopic terms on the motion. The stability of transient motions is also discussed, though somewhat more abstractly than the rest of the motion. Special attention is given to zero and purely imaginary roots of the equations of first approximation, as well as to periodic motions. A number of interesting examples are worked out, including several from mechanics and one from aeronautics (longitudinal stability of rectilinear flight). Unlike most Russian books, there are an appreciable number of references to Western mathematicians (about one-third), but, regrettably, not to any living ones!

The translation is syntactically correct, though not always quite idiomatic. The book is produced by a nonletterpress photographic process, which is not very

pleasing, though apparently quite expensive. Nevertheless the contents should be sufficiently attractive to overcome the appearance.

Thermodynamics. An Introduction to the Physical Theories of Equilibrium Thermostatics and Irreversible Thermodynamics. By Herbert B. Callen. 376 pp. John Wiley & Sons, Inc., New York, 1960. $8.75. *Reviewed by Robert T. Beyer, Brown University.*

IN writing this text, Professor Callen has undertaken a radical departure from the standard presentation of thermodynamics, endeavoring to present the subject from a postulational viewpoint rather than from the standard approach by the inductive method. Such an up-ending of the subject matter may well make the text a more difficult one to teach from. Nevertheless, in the long run, the method of presentation will impart a more satisfactory understanding of thermodynamics to the student than has hitherto been the case.

Thermodynamics has long been an orphan among physics courses. It is widely agreed that all physicists should understand it and master it as a working tool. It is further agreed that the approaches used by chemists and mechanical engineers, however admirable they may be in their own way, are not wholly satisfactory for the education of a physicist. Yet few are willing to teach the course, and far fewer are those who attempt to write about it.

Professor Callen falls into both these classes. He begins his text with a series of postulates, by which the defining terms of thermodynamic systems and variables are set forth and the laws of thermodynamics are represented. In a sense, then, the basic character of the subject has been established by the end of the first chapter.

That is not to say that the rest of the subject is left as an exercise for the reader. On the contrary, the author derives all the well-known working relations of the subject in considerable mathematical detail and guides the students with the addition of numerous problems on each step of the way. Excellent use is made of diagrams throughout the text. A considerable number of them make a real contribution to the pedagogical process.

The author introduces Legendre transformations to convert the expression for internal energy to the free energy and other representations. This mode of development appears strange and somewhat complicated, and will probably discourage a few, although the treatment is clear and the results standard.

Another favorite technique of the author is the use of the "thermodynamic square" as a mnemonic device. The reviewer is addicted to mnemonic schemes of his own design and is somewhat dubious of the advisability of instructing a whole class in them. However, like the olive in the martini, you can take or leave it without prejudice to the rest of the product.

The range of subjects covered is excellent. First- and