tensive variations. The chapter concludes with an excellent summary in which it is shown that the many vector integration formulas are all special cases of three basic tensor integral transformations.

Having developed the elaborate machinery in Chapters 1–5 the author devotes the next three chapters to three applications of these established results, namely, dynamics, fluid mechanics, and electrodynamics. The five earlier chapters are so carefully planned, and the results so excellently stated, that the applications are developed neatly, concisely, and with a minimum of effort. In this respect the book is excellent. However, unless the reader is already familiar with the basic principles of dynamics, fluid mechanics, and electrodynamics, he will be unable to appreciate the organizational structure of the book which leads so naturally to a clear elucidation of these fundamental applications.

Chapter 9 is divorced from the remainder of the book. In this chapter the author axiomatically defines what is meant by a vector space over a field and discusses some of the elementary properties of vector spaces. Since this algebraic concept enters into most branches of modern applied mathematics it is gratifying to find even a brief introduction to this subject in a book dealing with what is usually referred to as a classical discipline.

The book is excellently provided with illustrative examples and problems. The examples complement the text and range from an elegant formulation of Desargues' Theorem, Ceva's Theorem, and Pascal's Theorem in Chapter 1, to a discussion of the magnetostatics of certain geometrical configurations in Chapter 8. Each chapter is provided with several short sets of problems, and answers to the problems are listed in the back of the book.

This reviewer found several points in the exposition which could be subject to criticism. Some of these are cited below together with a few of the more glaring typographical errors:

1. As noted in the index, the definition of the term "basis" occurs on p. 37; however, the term is first used on p. 31.
2. In Chapter 1 the symbol ($\vec{u}$, u_0) denotes a straight line. In Chapter 2 the same symbol denotes a line vector.
3. The term "cycl" first appears in a hint in Problem 17, §11, Chapter 1, but this term is never explained. It also occurs later in the text with no explanation.
4. The term "weighted centroid" is used in §7 of Chapter 1 without being previously defined. It may not be clear how this term differs from a centroid.
5. If P is a dyadic, it is never explicitly stated what is meant by the product $\vec{u}\cdot P$, although some vague hints are given.
6. Although the term "double layer" is defined, the term "single-layer" is used in §82, Chapter 8, without being previously defined.
7. In §97, Chapter 9, the author promises to prove that $U + V$ is a vector in Hilbert space, when U and V are elements of Hilbert space. He never does so explicitly, although the machinery is developed.
8. In Figure 2a, the letter "D" is missing.
9. In §67, Chapter 7, equation (53.3) should read "W_1" instead of "W".
10. In §88, Chapter 9, property A_4 is incorrectly stated.
11. There is a confusion in subscripts in the statement of Theorem 1, §97, Chapter 9.

In conclusion, the organization of the book, with the possible exception of the superfluous Chapter 2, is so outstanding that it far outweighs any of the minor flaws cited above. The book is strongly recommended.

Thermodynamics: An Advanced Treatment for Chemists and Physicists (3rd Revised Edition). By E. A. Guggenheim. 476 pp. (North-Holland, Holland) Interscience Publishers, Inc., New York, 1957. $9.75. *Reviewed by Harold W. Woolley, National Bureau of Standards.*

In its third edition, this valuable reference book and text has been improved further by several changes. The treatment of mixtures has been made more unified and the topics covered have been extended into the field of the thermodynamics of irreversible processes. The author of this book does not claim completeness of coverage of all topics touched on. Instead, there has been judicious choice of items of principal interest to both chemists and physicists in the broad field comprising physical chemistry.

In a presentation emphasizing the logical application of fundamental principles, there may be less emphasis on the spirit of adventure than some experimentalists feel necessary to be consistent with the original development of the science. Professor Guggenheim has given references to many of his original scientific contributions, however, to which one may turn for examples of such developments. Though it may appear to some experimentalists that this is primarily a theorists' book, there are actually numerous examples of quotation of experimental data and comparison with theoretical indications. This reviewer considers it quite proper that the subject of thermodynamics be presented as a mathematically exact discipline and considers it appropriate to possess a copy of so excellent a book prepared on this basis.

Vector Spaces and Matrices. By Robert M. Thrall and Leonard Tornheim. 318 pp. John Wiley & Sons, Inc., New York, 1957. $6.75. *Reviewed by T. Teichmann, Lockheed Missile Systems Division.*

Vectors and matrices have become an almost indispensable tool in modern applied mathematics and physics. Parallel with this interest in applications there has been a revival in pure mathematical activity concerned with linear algebra and vector spaces, stimulated at least to some degree by the applications. In the usual way, however, the abstract and applied approaches have gradually diverged so that it may often be perplexing for the user of these methods to gather information from a pure mathematical book on these topics.