The book will be of value to all who are interested in what is presently being done in this area of research. Owing to the large number of invited papers (25), which have more of a review nature, the book will also be of some interest to non-specialists and students.

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This first volume of a set of five contains five totally independent articles, each with its own title, contents pages and list of references. Only the author and subject indexes and the editor’s fifteen-line preface are shared by the various articles. This review is accordingly broken into sections, reflecting the very fragmented nature of the book.

The introduction by J. Friedel is well illustrated and non-mathematical. The treatment is nonetheless reasonably advanced, including some discussion of dislocations as solitions. The reference list is curiously (and unnecessarily) split into a list for section 1 and a list for the remaining sections.

A. M. Kosevich discusses crystal dislocations and the theory of elasticity in a useful, detailed discussion containing 281 equations: it is unfortunate that the addendum sections, dated 1976, could not have been inserted after the appropriate sections of each chapter, in view of the 1979 publication date.

J. W. Steeds and J. R. Willis very briefly discuss dislocations in anisotropic media: I found their table of analytic solutions, with examples of real crystals, rather interesting and worthy of extension.

J. D. Eshelby provides a useful chapter on boundary problems, and the final chapter by B. K. D. Gairola concerns non linear elastic problems, which is complicated by the use of inappropriate vector formulae and differential operators which act on the preceding rather than the succeeding quantity. The author does, however, provide alternative precise tensor formulations for each vector equation and an appendix on tensor theory, which is not the best I have seen. Both of these articles have 1976 addenda.

Technically, the book is well produced and attractively type-set. My overall impression is that the book makes a worthwhile contribution to our overview of the subject and makes a good start to a series which subscribers may purchase at a 15% discount on the total price of Dfl 790.

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This is a brief textbook on an important, fast-moving subject, well printed and bound. The mathematics is treated briefly and yet thoroughly. Unfortunately, careful examination shows this to be a very poor undergraduate text. The Table of contents shows that it does not cover the material suggested by the title. It is really an introduction to
conventional semiconductor physics. It starts from a very elementary level and only gets as far as \( p-n \) junctions, surfaces and MIS structures in the last two of the 15 chapters. Physical concepts are badly explained. the relevance of the material to solid-state electronics, in the few places where there is any, is not brought out. There are two pages on tunnelling through potential barriers but there is no mention of tunnel diodes. Esaki or superlattices, for example. Much unnecessary material is included and there are a number of careless mistakes. A few examples illustrating these points are as follows.

The first sentence gives the wrong year for the discovery of the transistor. The third and fourth figures in the book are interchanged. Semiconductors are only reached in chapter 8 (out of 15) and yet seven pages are devoted to explaining and tabulating the electron states of all the elements of the Periodic Table. This section also contains the statement that the atomic numbers of the inert gases are given by \( Z = 2n^2 \) where \( n = 1, 2, 3, \ldots \) (equation 5.9.1, p. 79). This is wrong from \( n = 3 \) onwards. Expressions for wave functions are consistently referred to as wave equations which will irritate good students and baffle weak ones. Chapter 14 on the \( p-n \) junction is taken uncritically from a 1949 paper by Shockley with the result that (a) the energy band diagrams are upside down by modern convention, i.e. the valence band is at the top and the conduction band at the bottom and (b) the depletion region as it is now known is referred to throughout as the transition region. To Shockley's algebra and diagrams the author has added his own mistakes. Figure 14.1.1.(c) is identical to 14.1.1.(b) and does not show the quasi-Fermi levels mentioned in the caption and the text and shown in Shockley's original figure. The quality of the explanations of physical ideas is shown by the second paragraph of this chapter which ends as follows 'The rectifying process occurs in the transition region. Appreciable currents may flow into the \( n \)-type region beyond the transition region. Therefore, the rectifying process is not limited to the transition region. The volume of a semiconductor specimen within which the rectifying process occurs is generally termed the junction and includes the transition region and beyond.' Comment: The whole passage is unnecessary and confusing. Sentence 1 of this passage is wrong and contradicted by sentences 3 and 4. Sentence 2 is less than half the story. The electrons will be injected into the \( p \)-type material also in forward bias while neither type of carrier is injected under reverse bias. Sentence 4 is excessively vague and pointless.

Conclusions: This is not the book of the title and cannot be recommended to students. It is a pity that the author, who has on the whole handled the mathematics well, did not put an equally successful effort into checking facts, explaining ideas and relating the work to solid-state electronics.

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_Book Reviews_

_The following books have been received by the Editor. Brief and generally uncritical notices are given of works of marginal crystallographic interest; occasionally a book of fundamental interest is included under this heading because of difficulty in finding a suitable reviewer without great delay._


