cosity and index of refraction. Except for the last chapter, the material is essentially all linear and almost all "prelaser." The last chapter, written especially for the English edition, discusses some of the newer nonlinear effects.

This book would have been of great value if it had been well written. The amount of material discussed is huge (over 700 references are given), and presentation in a comprehensive manner would have been splendid. Unfortunately the indications are that the book represents a collection of notes originally written by the author for his own benefit, which are now to be shared with others without serious editing. The result is difficult to read, suffering from an excess of undefined symbols and terms, allusions to concepts and ideas not discussed and inadequate passing references to things that are known to the author but not necessarily to the reader. Despite this shortcoming the book is not without some value. In particular it is useful as a guide to the literature of light scattering, and as such is worthy of a place in the research library, if not in the private collection of the individual physicist.

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Soviet metal physics

GROWTH AND IMPERFECTIONS OF METALLIC CRYSTALS. D. E. Ovsienko, ed. (Trans. from Russian) 268 pp. Consultants Bureau (Plenum Publishing, New York), 1968.

by M. E. STRAUMANIS

It is well known that the exploration of single crystals is of paramount importance in solid-state physics. However, in the large variety of studies, metals and especially metallic solid solutions or metals containing small amounts of impurities have received only scant attention.

The present volume is a presentation of the results attained in the Soviet Union in metal physics during the two or three years prior to its original publication in 1966. The book consists of 40 articles (in 268 pages) written by 62 authors (14 women among them). Many of the articles are short and resemble extended abstracts.

The book is divided into three parts: The first (and longest section) contains theoretical and experimental results on the mechanism and kinetics of crystal growth from the melt and on methods of growing metallic monocrystals. The next part, which is slightly shorter, deals with crystal imperfections and their study. It seems to me that one of the best papers is the review article of the editor, D. E. Ovsienko (pp. 131–149), who is a member of the Institute of Metal Physics of the Academy of Sciences of the Ukrainian SSR, Kiev. In addition to metals, some data relating to defects in semiconducting crystals are also given. The last part, on the generation of crystallization centers and the effect of high cooling rates, consists of four articles in 24 pages.

Although the articles of the book are at least four years old, many of them are still valuable mainly because of the reference to Russian publications. Naturally, the broad subject of crystallization and crystal growth can not be covered in detail by a comparatively short book, and the value of it lies in the literature cited.

In general the translation sounds good, although some sentences in some articles are hardly understandable.

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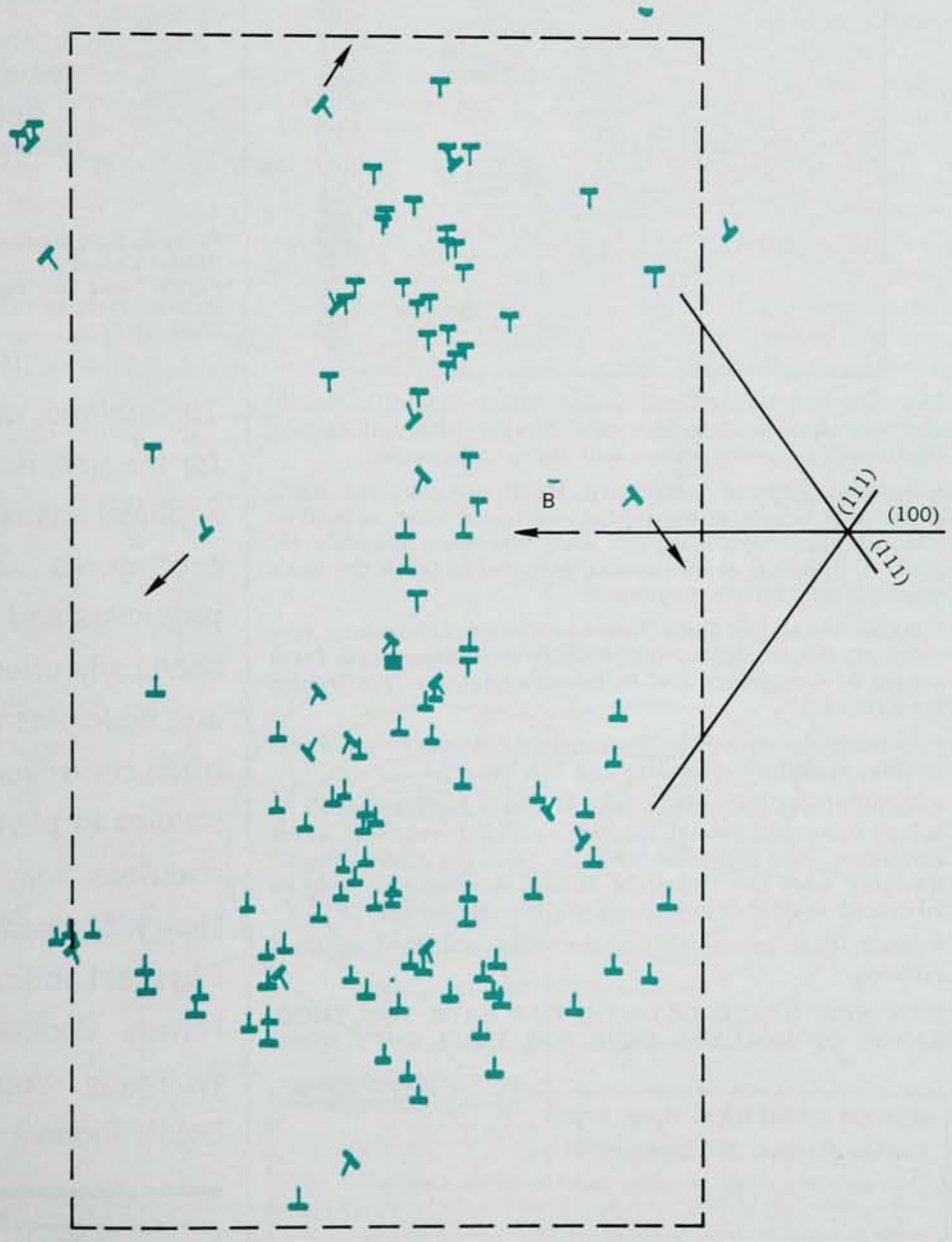
The reviewer is professor of metallurgical engineering at the University of Missouri



DISLOCATION STRUCTURE (schematic of a silicon sample). **Symbols for positive and negative edge dislocations are ⊥ and T, respectively; symbols for positive and negative 60-deg dislocations are γ and λ, respectively. Arrows show direction of motion of 60-deg dislocations. (From *Growth and Imperfections of Metallic Crystals.*)**

–Rolla and did some work in the field of eutectic crystallization.

Physics of vision

HUMAN COLOR PERCEPTION: A CRITICAL STUDY OF THE EXPERIMENTAL FOUNDATION. By Joseph J. Sheppard Jr. 195 pp. American Elsevier, New York, 1968. $10.00

by ISADORE NIMEROFF

In recent years information theory, developed to process and understand experimental data, has been extended to speculation about how the brain processes the stimulus information it receives. The subtitle of this short book by Joseph Sheppard indicates that the author critically reviews the experimental data of color perception but does not convey the idea that the critique will take on the information-theory approach.

This book, written by a comparative tyro in the field of color vision, is intended for scientists and engineers to whom knowledge about human visual processes is important for their research and work. The author is to be commended for having covered so many topics of the physics, physiology and psychology of color vision in a book of less than 200 pages. This brevity was accomplished by the author's generally clear and concise writing style that fails, however, to treat with sufficient depth the subject matters about which he complains. For instance, on pages 23, 39 and 47, he is critical of the use of average spectral tristimulus values and luminous-efficiency values to represent all observers or any one observer. Sheppard, however, has not reviewed the literature sufficiently deeply to have found the readily available work of David L. MacAdam, W. R. J. Brown, Gunter W. Wyszecki, and myself on the variability within and among observers.

Sheppard has criticized a wide variety of related topics, the collection of which is not to be found within the covers of any other book. Such a collection, if treated in depth, would have been extremely useful had it been written as late as 15 years ago. The terms, definitions and symbols Sheppard uses would have been consistent with those used then and could have had a strong influence on the direction of research. As it is, he leads the reader to wonder whether some of his criticisms in a field one step removed from the reader's main interest are no longer justified.

I found the chapters on the psychology and physiology of color perception reasonably informative. These chapters should serve physicists as a ready source of reference to these topics. In Chapter III, Sheppard also shows that he has a penetrating understanding of the concept of metamers. The treatment of the other physical aspects of color vision in this book is not quite adequate however. It may be that psychologists and physiologists will have the same opinion about the manner in which their respective specialities were presented.

Despite the shortcomings of this book, I recommend the acquisition of it by all who have an interest in color-vision investigation. No scientific field should be above a critical appraisal.

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Isadore Nimeroff is chief of the Colorimetry and Spectrophotometry Section of the National Bureau of Standards. He joined the NBS in 1941 and has been there ever since.

Quanta for nonphysicists

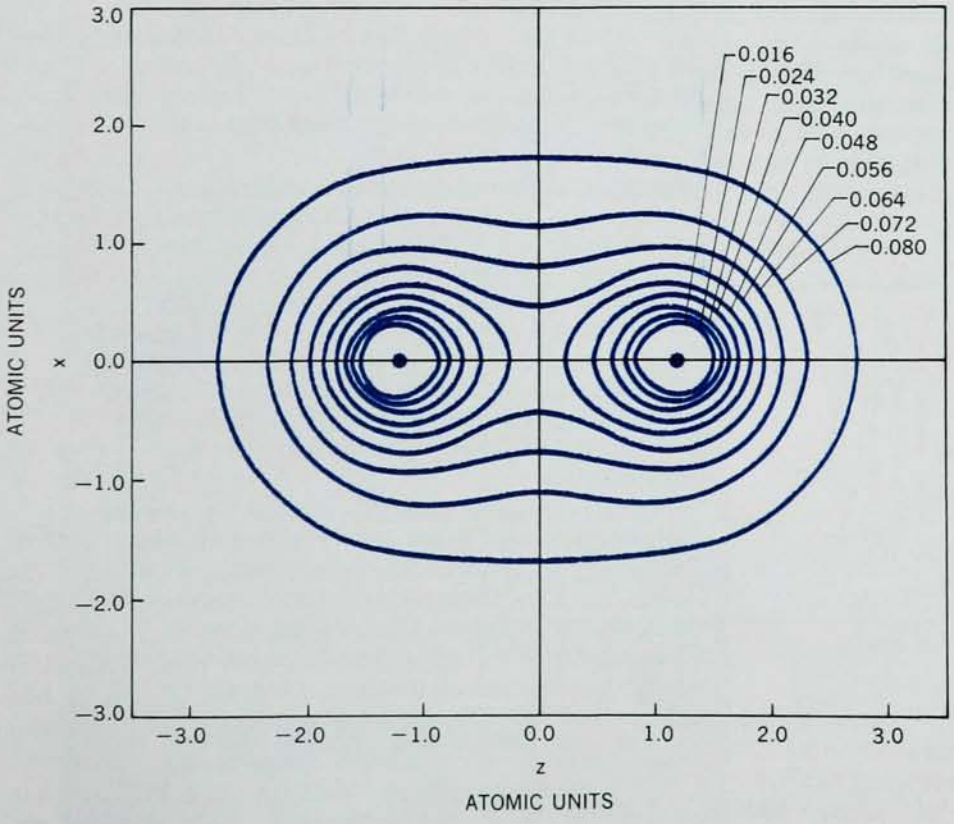
QUANTUM MECHANICS: AN INTRODUCTION. By Herbert L. Strauss. 192 pp. Prentice-Hall, Englewood Cliffs, N. J., 1968. Paper $4.95, Cloth $7.95

by PETER J. SILVERMAN

The usual introductory quantum-mechanics textbook, written with physics students in mind, presents quantum mechanics as the basis for understanding modern theoretical physics. This book is intended for students majoring in chemistry, molecular biology and related fields where quantum mechanics receives less emphasis than it does in physics.

Designed for seniors or first-year graduate students, the book requires a good working knowledge of vector calculus and a familiarity with thermodynamics and classical mechanics. However, the book is replete with mathematical tables and a fine appendix illustrating the basic facts of vector calculus, which should be both handy and helpful to anyone with an insufficient mathematics background.

The contents of the book are suffi-



CHARGE DISTRIBUTION or wavefunction squared of the 1s gerade state of the hydrogen molecule ion. (After D. R. Bates, K. Ledsham, A. L. Stewart, *Phil. Trans. Roy. Soc. London* **246**, 215 (1953), from *Quantum Mechanics: An Introduction.*)