knowledge, it is the first English text that deals clearly and completely with the subject of terrestrial gravity. In view of the growing interest in the practical applications of the subject, the appearance of this book is particularly welcome.

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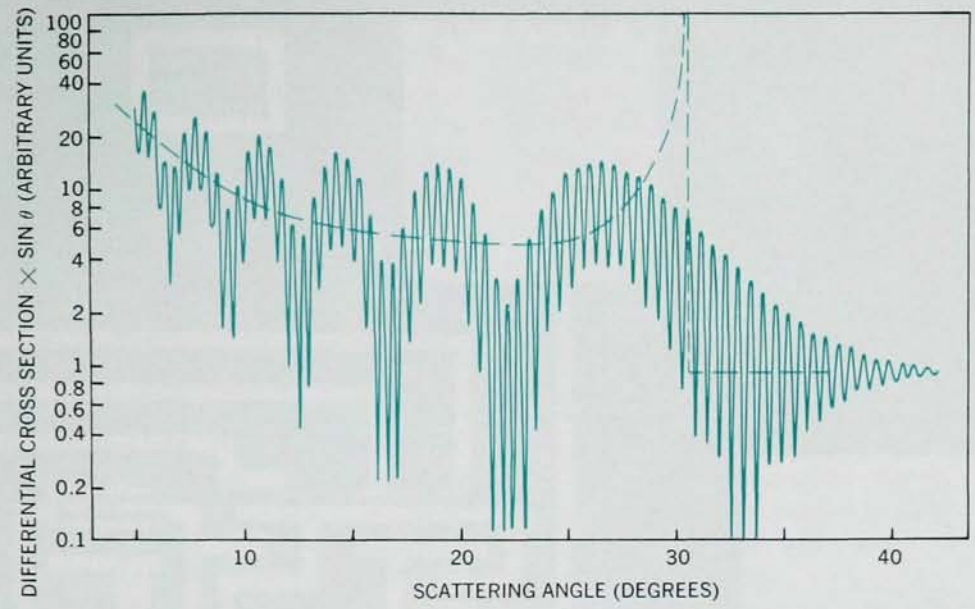
Techniques for collisionmen

METHODS OF EXPERIMENTAL PHYSICS, VOL. 7A: ATOMIC AND ELECTRON PHYSICS. Benjamin Bederson, Wade L. Fite, eds. 506 pp. Academic Press, New York, 1968. $21.50

by JOHN B. HASTED

L. Marton, the editor in chief of this well known series, claims that the "mushrooming" of the atomic- and electron-physics text from two to four volumes is not his fault. Personally, I would have gone along with an even faster growth rate and tried to take some of the credit. Volume 7, Part A describes the crossed-beam and beam-gas techniques for elastic- and inelastic-collision study, whilst a further volume on collision processes in bulk matter, mostly plasma, is promised.

The subject lends itself to systematization; for example, one can enumerate the possible binary processes between photons, electrons, neutral atoms and molecules, positive ions, negative ions and excited species; one then searches for an expert in each of these processes and compels him to appease his conscience by writing a chapter. In many ways the variety of approach adopted by each expert is an attractive feature. Some authors prefer to go no further than to describe the actual techniques of beam production and detection, together with collision-chamber design—for example the excellent discussion of electron scattering by gases due to Chris E. Kuyatt. Others will question why the collision process is of interest in the first place—for instance the discussion by Hans Pauly and Peter Toennies of neutral-beam experiments at thermal energies is probably the outstanding article in the book, even though much of the material in it has appeared before. Again, other collision processes such as those of excited species with neutral atoms and molecules are unfortunately not included.



CALCULATED DIFFERENTIAL SCATTERING cross section (weighted with sin ϑ) for a Lennard–Jones potential. The dashed curve shows the classical cross section for the same potential and energy. (From *Methods of Experimental Physics, Vol. 7A.*)

The contributors are ten Americans, four British, two Germans. The balance is not unsatisfactory, but I would have welcomed articles from the USSR and Holland. The days of "latitude effects" in collision cross sections are mercifully almost over. I don't suppose that more than one or two of the authors, if that many, would describe themselves as chemists. But this is a subject under extensive invasion from chemists, and one would like to see them represented; for example, photoelectron spectroscopy could have enjoyed a more generous discussion.

In general, this is a volume that is going to be of great value to the ever increasing tribe of "collisionmen," and the editors and contributors are to be congratulated.

* * *

John Hasted, who is head of the physics department at Birkbeck College, University of London, was for 20 years a member of the atomic-collisions team of Sir Harrie Massey at University College, London, where Hasted studied both electron and heavy-particle collisions.

Light scattering

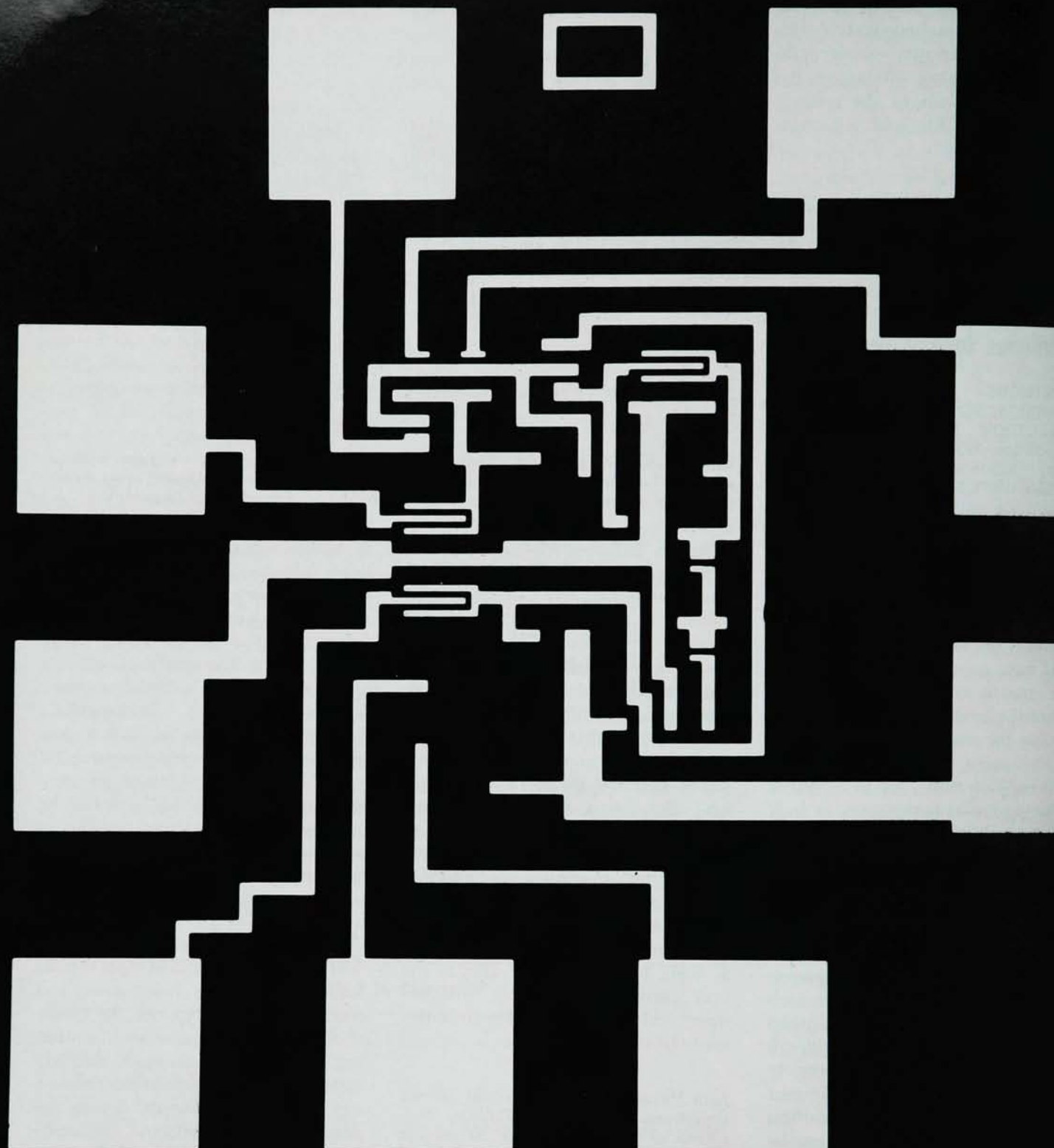
MOLECULAR SCATTERING OF LIGHT. By Imrnanuel L. Fabelinskii. (Trans. from Russian) 622 pp. Plenum Press, New York, 1968. $32.00

by HOWARD B. LEVINE

The invention of the laser has opened the new field of nonlinear optics, and in addition has renewed interest in linear light-scattering phenomena. It would be particularly convenient at this time to have on hand a comprehensive treatise in this field, which would review the existing literature and also provide a unified framework for understanding it. Immanuel L. Fabelinskii has been an active contributor to light-scattering research for many years, and I obtained the general impression from this book that he possesses the knowledge needed to provide the suggested treatise. This book represents the author's attempt to share his knowledge with other physicists.

The various sections of this book deal with Rayleigh and Mandel'shtam–Brillouin scattering from gases and condensed isotropic phases, the theory of the spectral shape of such scattering, experimental techniques, auxiliary measurement of macroscopic parameters (such as the adiabatic density dependence of the dielectric constant), depolarization of scattered light, scattering by glasses, the spectrum of the wing of the Rayleigh line, scattering by crystals and a number of other topics of linear scattering theory. The primary missing element is Raman scattering, but except for this deletion, the variety of subjects encompassed is large. The title states the approach to be molecular, but in fact the approach is probably better said to be hydrodynamic or thermodynamic or both, as the theories discussed for the most part are based upon empirical relaxation equations that utilize bulk properties such as sound velocity, vis-

Computer-Generated Integrated Circuit Mask



Lincoln Laboratory, a research center of the Massachusetts Institute of Technology, conducts investigations in advanced electronics directed toward the solution of problems of national defense and space exploration. The *General Research* program provides a background of experience and ideas for programs concerned with specific defense and space problems, as well as a continuing source of contributions to electronics science and technology. All qualified applicants will receive consideration for employment without regard to race, creed, color or national origin. Lincoln Laboratory, Massachusetts Institute of Technology, Box 15, Lexington, Massachusetts 02173.

Solid State Physics
Information Processing
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Re-entry Physics
Space Communications

A description of the Laboratory's work will be sent upon request

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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Howard B. Levine is a member of the technical staff at the Science Center, Aerospace and Systems Group, North American Rockwell Corporation; he does theoretical research in chemical physics. One of his recent interests has been light scattering due to binary molecular collisions.

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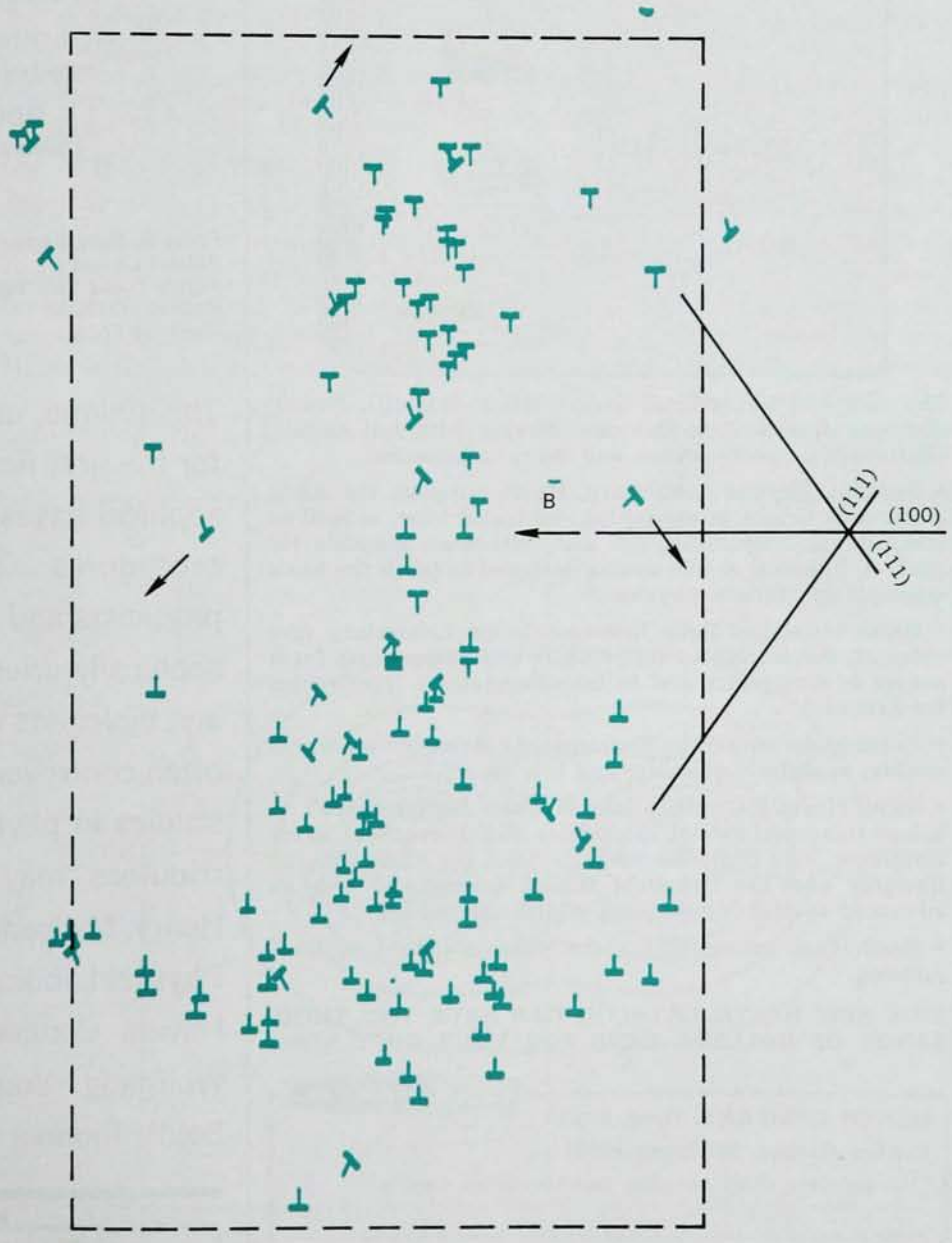
The reviewer is professor of metallurgical engineering at the University of Missouri



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.*)**