theory and elementary properties of Boltzmann equation. In the remaining chapters the author reviews attempts to reach mathematically rigorous solutions of the Boltzmann equation from the viewpoint of existence theory (III), by normal solutions following Hilbert, Enskog, and Chapman (IV) and by other general techniques (V).

Transport Phenomena in Gases at Moderate Pressure (220 pages) was written by Ludwig Waldmann of the Max Planck Institute for Chemistry in Mainz. Moderate pressure in this connection requires that the dimensions of the vessel be much larger than the mean free path, thus excluding the Knudsen region of highly dilute gases as well as highly compressed gases. The chapters are entitled: the phenomenology of transport processes, methods of measurement, the fundamentals of the kinetic theory of monatomic gases, heat conductivity and viscosity of simple gases and mixtures, diffusion, quantum mechanical effects, and applications to polyatomic molecules.

The remaining two articles: General Vacuum Physics (94 pages), by Rudolf Jaeckel of the University of Bonn, and Production and Measurement of Ultrahigh Vacuum (55 pages), by Daniel Alpert of the University of Illinois, are excellent summaries of the experimental methods of obtaining and measuring low pressures; $10^{-8}$ mm. is taken to be the upper limit of very low pressures. Both authors appear to have written very careful treatments of these important experimental techniques and the articles are copiously illustrated.

There seem to be extremely few misprints. The traditionally high quality of book production of the Springer-Verlag has been maintained as well as the price.

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**Solid State Physics. Advances in Research and Applications.** VOLUME 7. FREDERICK SEITZ, Department of Physics, University of Illinois, Urbana, Illinois, and DAVID TURNBULL, General Electric Research Laboratory, Schenectady, New York, Editors. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1958. xiv + 525 pp. 15.5 × 23.5 cm. Price, $12.00.

**Solid State Physics. Advances in Research and Applications.** VOLUME 8. FREDERICK S. SEITZ, Department of Physics, University of Illinois, Urbana, Illinois, and DAVID TURNBULL, General Electric Research Laboratory, Schenectady, New York, Editors. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1959. xiv + 519 pp. 15.5 × 23.5 cm. Price, $13.50.

These volumes continue the extensive review of the field of solid state physics begun in earlier volumes. They are extremely comprehensive and authoritative. Space permits only a brief description of the contents of each.

In Volume seven the following articles appear: 1, "Thermal Conductivity and Lattice Vibrational Modes" by P. G. Klemens; 2, "Electron Energy Bands in Solids" by J. Callaway; 3, "The Elastic Constants of Crystals" by H. B. Huntington; 4, "Wave Packets in Metals" by H. W. Lewis; 5, "The Study of Surfaces by Using New Tools" by J. A. Becker; 6, "The Structure of Crystals" by A. F. Wells.

Article 1 deals with the theory of heat transport by lattice vibrations, the thermoconductivity of non-metals and the thermal conductivity of metals, alloys and semiconductors.

Article 2 includes a discussion of the general theory of energy bands and an application of this theory to many particular types of solids. The different solids are grouped in the following way: 1, the alkali metals; 2, metals of group II and III (which includes solid helium); 3, elements of group IV and the related semiconductors indium antimonide, indium arsenide and gallium arsenide; 4, the transition metals and other substances.

Article 3 includes a section on theory and one on experimental techniques for measuring elastic constants. Another section is devoted to presentation of elastic data for various pure materials. These data are organized into tables according to crystal symmetry. The article also includes a section on the variation of the elastic constants with temperature and pressure, and a section on the influence of composition phase changes, dislocation motion and radiation damage.

Article 4 is a theoretical discussion of electron-impurity scattering, phonon interactions and transport phenomena.

Article 5 describes experiments on absorption and desorption of gases by solid surfaces and the surface migration of atoms. The new tools discussed are the fast responding ion gauge and the field emission and field ion microscopes.

In Article 6, Dr. Wells treats the structure of crystals from the standpoint of topology rather than the conventional one of lattices and symmetry. That is, he considers ways of connecting atoms together rather than ways of placing them in symmetrical groups.

Volume 8 of the series contains five papers: 1, "Electron Spectra of Molecules and Ions "in Crystals," Part I, by D. S. McClure; 2, "Photo Conductivity in Germanium" by R. Newman and W. W. Tyler; 3, "Interaction of Thermal Neutrons with Solids" by L. S. Kothari and K. S. Singwi; 4, "Electronic Processes in Zinc Oxide" by G. Heiland, E. Mollwo and F. Stöckmann; and 5, "The Structure and Properties of Grain Boundries" by S. Amelinckx and W. Dekeysor.

Article 1 is concerned with molecular crystals. A theoretical treatment of the electronic absorption spectrum of such crystals is given and available experimental data are discussed. Fluorescence and energy migration in molecular crystals is also included in the article.

Article 2 is an exhaustive review of photoconductivity in germanium. Sections on the preparation and electrical properties of doped germanium crystals and germanium as an infrared detector are included as well as a discussion of photoconductivity theory and experimental studies of photoconductivity.

Article 3 includes sections on: the general theory of neutron scattering, cold neutron scattering, crystal dynamics and inelastic scattering of neutrons, and the slowing down of neutrons near thermal equilibrium.

Article 4 is a very complete review of the electronic properties of zinc oxide. There are sections on preparation of samples; diffusion of defects; optical properties, absorption and catalysis; conductivity in thermal equilibrium; the variation of conductivity as the result of various influences such as field effects and irradiation with light and electrons; and a discussion of electron mobility, thermoelectric power and surface conductivity.

Article 5 is a review of dislocation theory and experiment and a discussion of grain boundaries as arrays of dislocations. The work includes many photographs of dislocation nets in various materials. The section headings are: The "Geometry of Grain Boundaries as Arrays of Dislocations"; "Observations Concerning the Geometry of Grain Boundaries"; "Mechanics of Grain Boundaries as Arrays of Dislocations"; "Energy Measurements"; "The Generation of Sub-Boundaries"; "Diffusion along Grain Boundaries"; "Segregation and Precipitation of Solutes at Grain Boundaries"; "Melting at Grain Boundaries"; "Boundary Migration" and "Electrical Properties of Grain Boundaries."

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