sedentaria and the vagile fauna. Behavioral patterns and their relations to the close affinities of animals (mainly fishes) to marine caves are a further subject of discussion.

After a prefatory account of methods and concepts in autecology and synecology, Riedl elucidates the biocenotic relations of marine caves in chapter 6. Faunal associations are characterized (by statistical material and Riedl's "method of homogenity determination," explained in chapter 1), and the trophic structure of caves and their biological connections with neighboring biotopes is demonstrated. Further, climatic conditions, as well as interspecific relations and their effect on associations, are treated. The concluding chapter is concerned with the origin of the marine cave fauna and the question of what part of the littoral system it occupies. By comparison with the fauna of other marine environments and by the tracing of rows of correlations of species and biotope characters, it is shown that the marine cave fauna is a special and comparatively young branch of the littoral hard-bottom fauna. The incorporation of sea caves and their fauna into the "littoral system" as an extreme form of a secondary production area follows, as a consequence, the author's presentation of the division of the littoral.

Biologie der Meereshöhlen, with its wealth of information, is a highly significant contribution to the literature on marine biology. Riedl has produced a unique volume which will prove to be a must for workers in the field of marine science.

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Optical Processes in Metals

Optical Properties and Electronic Structure of Metals and Alloys. Proceedings of an international colloquium held in Paris, September 1965. F. ABELÈS, Ed. North-Holland, Amsterdam; Wiley (Interscience), New York, 1966. 655 pp., illus. $18.50.

The understanding of simple metals and alloys has advanced in the last decade. The increasingly accurate Fermi surface and optical experiments have armed band theorists with the information necessary for adjusting and testing their calculations. Yet these band-structure calculations are unable to predict quantitatively the strength, and often the shape, of the observed inter-band optical spectra. This colloquium was held just as the participants were realizing that optical processes in simple metals are not yet quantitatively understood. Are many-body effects important for interpreting optical experiments? Are optical intensities determined primarily by transitions which are vertical in wave vector space, or by indirect processes? Is the "optical" mass in the Drude term the same as the "polaron" mass? This conference asked more questions than it answered. The major progress has been logged by the experimentalists, who have advanced their art enormously.

The volume is a compendium of the major problems in the optical and electronic properties of metals. This seems to be its main virtue to prospective purchasers. The experimental articles are especially good in surveying a subject rather than dwelling on a recent result. The theoretical articles, although fewer in number, have a greater variation in quality and general interest. Those of W. Kohn, J. C. Phillips, and P. Nozières are excellent in sketching ideas rather than details.

This is also a lively book to read. The general discussions following each presentation provide drama, controversy, and much entertainment. They also provide the reader with an accurate index to what the conference participants considered interesting. This makes these proceedings especially useful to anyone wanting to read up on the field.

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Solid State Physics over 13 Years

Introduction to Solid State Physics. CHARLES KITTEL. Wiley, New York, ed. 3, 1966. 662 pp., illus. $12.50.

It is a truism that physics is progressing at a rapid rate. Most of us, of course, are not aware of this on a day-to-day basis, since we are immersed in our own particular lacunae of research. But on occasion something happens to jolt us into an awareness of just how rapid the pace has become. I received such a jolt when I read the third edition of *Introduction to Solid State Physics*.

Only 13 years have elapsed since the first edition and 10 years since the second, but the tables of contents tell the story. There were 23 pages on superconductivity in the first edition and 26 in the second, but there are 40 in the third edition. Whereas the second edition had a 10-line note added in its third printing to tell the reader that the Bardeen-Cooper-Schrieffer theory of superconductivity existed, the third edition makes full use of the theory and goes on to include tunneling phenomena. Magnetic resonance now merits a chapter of its own, which is written in a very economical style indeed. The use of inelastic neutron scattering for determination of phonon dispersion curves is now covered, and a brief introduction to localized phonons is provided. The discussion of ferromagnetism and antiferromagnetism now includes magnons and reduces magnetostriction to a homework problem. The list of such changes is endless.

In most respects the third edition needs to be considered as a brand new book, although the author's point of view is unchanged. He still treats in depth the elementary excitations in solids (phonons, electrons, magnons, plasmons, polarons, excitons), outlines and gives references to experimental techniques (deHaas-van Alphen effect, ultrasonic attenuation, and so on), and briefly considers a host of important, but not quite as fundamental, applications (Van Hove singularities, the Fermi surface of copper, type II superconductors, iron garnets, hydrogen bonding in DNA, and others). Not every topic in solid state physics is covered, and the treatment is somewhat uneven, as it must be in an introductory book. But Kittel's style has become more compact, and the third edition reads more slowly because it is meatier and more sophisticated.

Beginning graduate students and advanced undergraduates will find the book very worthwhile as an introduction to the solid state. Their research supervisors can also profitably look through it to appreciate the depth and breadth of the mainstream. Kittel's book sets the standard for introductory works on solid state physics.

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