strained by the others' work? The most important insight to emerge from this part of the book is that there is unlikely to be a unitary, exclusive explanation for preference evolution. The possibility of a variety of forces acting sequentially or in concert promises to make this rather difficult problem even more intractable.

In reviewing all these issues Andersson has accomplished an amazing, almost herculean, task. There is no question that this book will take its place among the classics in its field.

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Vignettes: Pleasures of Chemistry

Vigorous evolution of gas, quick coloration to brown, and the formation of precipitates; there, hidden, was the treasure of possibility in the bubbles of foam on the surface, which were observed in the reaction vessel in a corner of our small laboratory! For organic chemists, facing such an unpredictable phenomenon is not uncommon. In flasks, that which can never be predicted by thought or discussion with co-workers often happens.

—*Teruaki Mukaiyama*, in *Challenges in Synthetic Organic Chemistry* (Clarendon Press)

No other profession is endowed with such a rich landscape, draws inspiration from so many fields of science, exercises the hand and mind in so many different ways, offers such opportunities to employ creative instincts, and mixes ideas, theory, and experiment on a daily basis. Hurrah for the science of organic chemistry, and for the joy it brings those who play the research game.

—*Donald J. Cram*, in the preface to *Container Molecules and Their Guests*, coauthored with Jane M. Cram (Royal Society of Chemistry and CRC Press)

Condensed Matter

Die Kunst of Phonons. TADEUSZ PASZKIEWICZ and KRZYSZTOF RAPCEWICZ, Eds. Plenum, New York, 1994. xii, 432 pp., illus. $110. From a school, Kudowa Zdrój, Poland, Feb. 1993.

Phonon physics, the science of the properties of solids and liquids arising from collective atomic vibrations, is perhaps the oldest branch of condensed matter physics. In 1893, four years before the discovery of the electron by J. J. Thomson, F. Richarz, in an effort to establish a theoretical basis for the observed constancy of the specific heat of a crystal at elevated temperatures (the law of Dulong and Petit), was led to characterize a crystal as an assembly of atoms each of which executes a simple harmonic motion about its mean position. The same model of a crystalline solid was subsequently used by Einstein in attempting to explain the optical properties of diamond, and in this way he was led to his well-known theory of lattice specific heats. One hundred years later, in a testimonial to the vigor the field continues to display, the Winter School of Theoretical Physics held annually in Poland was dedicated to the physics of phonons. The book under review contains the proceedings of this school.

The 36 presentations at the school were divided into seven fairly broad categories—Phonons: General; Phonon Focusing; Nonequilibrium Phonons; Interaction of Bulk Phonons with Low Dimensional Gases of Carriers; Phonon Mediated Detectors of Elementary Particles; Molecular Crystals; and Electron Systems. These were selected with the desire to provide a review of the progress made in phonon physics since a winter school on the same topic was held in 1987. In this reviewer's opinion this goal was well met. However, the book as a whole displays the strengths and weaknesses of most such proceedings. Among the strengths is the breadth of the subject matter and an up-to-date quality reflecting the fact that the authors are all working actively in the fields of their contributions. Among the weaknesses is a certain loss of completeness and coherency. In addition, though the origin of the presentation suggests that they should possess some didactic qualities, not many of them in fact do: a large number instead read like brief research articles. One notable exception to this is A. G. Every's discussion of thermal phonon imaging, the study of the highly anisotropic ballistic, or near-ballistic, phonon flux patterns in crystals that are due primarily to phonon focusing, that is, to the concentration of the energy flux of phonons in special directions in anisotropic crystals. It summarizes in a clear and readable fashion the history of the subject, its theoretical underpinnings, including the contribution of catastrophe theory to the interpretation of the images predicted and observed, experimental methods for studying phonon imaging and their results, and applications of phonon imaging. The figures displaying theoretical and experimental results for phonon images in this and several other contributions on the subject are sufficiently attractive that they go a long way toward justifying the fractured German of the book's title. Another notable survey is that of A. Thellung on momentum and quasimomentum in the physics of condensed matter. The definitions of momentum and quasimomentum, the conservation law each satisfies, for an isolated system or for one interacting with an external electromagnetic field, and new physical effects in which the conservation of quasimomentum plays the central role are expounded in a thoroughly didactic paper that is a pleasure to read. The same qualities are found in the two lengthy papers, by H. Kraus and by R. Gaitskell, in which the possibilities of applying phonon physics to the construction of cryogenic detectors of elementary particles are described.

Someone interested in learning about this new field, which is still in an early stage of development, could hardly do better than read the papers mentioned above. However, even the shorter contributions give snapshots of various activities that confirm the breadth and continuing liveliness of the field of phonon physics. I would rate the volume as a better than average example of its genre, which will reward workers in the field with new insights and new results.

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Other Books of Interest

Historical Perspectives in Plant Science. KENNETH J. FREY, Ed. Iowa State University Press, Ames, 1995. x, 205 pp., illus. $44.95.

In a series of lectures presented at Iowa State University in 1991 eight scholars identified as "makers of plant science history" expounded their views of the course of