basic unit cell. There exists a close analogy between isomorphous substitution and optical holography. In holography a reference light wave strikes a recording film, which has a specific phase relationship with the scattering from the object in question. The superposition of the reference and scattered waves produces intensity modulations on the film that are related to the relative phases of the scatterers in the object. Thus one converts phase information to intensity information, which can be recorded on the film. In isomorphous substitution the heavy atom acts as the reference wave.

Anomalous scattering can be thought of as a form of isomorphous substitution. One first obtains x-ray scattering data from a crystal at a wavelength far from any characteristic frequencies of the atoms in the structure. The experiment repeats the task with a wavelength close to an absorption edge of a particular atom. Consider as an example the iron atom in a hemoglobin molecule: In the second diffraction pattern, one can think of the iron atom as an isomorphous substitution (since it now scatters differently than before) and hence as a source of a reference phase. Thus one gets phase information through anomalous scattering.

If one were to consider the individual papers in *Anomalous Scattering* as potential papers for one of the standard scientific journals, it is most probable that 90% of them would not be acceptable for publication. As free-standing papers many of them appear incomplete, and many discuss work already published. For the most part the reports do not present a sufficiently clear and detailed description of the work to be of direct use to the reader. Several do not really belong in a discussion of anomalous scattering. One, for instance, on electron diffraction states at the outset that anomalous scattering, although present in electron diffraction, is a small effect compared to other dynamical diffraction effects. With this preamble, the paper goes on to discuss structure determinations by electron diffraction and ignores for the most part the entire concept of anomalous scattering.

The introduction to *Anomalous Scattering* states the goal as "a book that would be of immediate and continued value to all who measure or make use of anomalous scattering, whether in structural investigations, in solid-state physics, or in x-ray diffraction physics." I do not believe that these proceedings have attained that goal. One finds a patchwork-quilt collection of chewed-over work interspersed with some reasonably good review papers on specific topics. The subject needs a carefully orchestrated series of chapters written specifically for the purpose of reviewing a current aspect of anomalous scattering. Several papers in the book approach this goal and are useful, particularly those by the editors themselves. The paper by G. Kartha on applications to protein structure analysis is written from this point of view. A few other papers could also be considered as reviews but their scope is not very large.

The editors further state in the introduction that it is a remarkable fact that in spite of the widespread use of anomalous scattering no book has previously been written on the subject; this remarkable situation, unfortunately, remains with us. The editors have done a much better than average job of putting together proceedings of a conference. But conference proceedings do not make a treatise on a subject as specialized as anomalous scattering, and they surely do not provide a document by which a specialist in diffraction and crystallography can learn of the current advances in an important technique in crystallography. This book serves rather as a reference guide to specific papers in the field. I for one would like to see the editors initiate a true treatise on the subject by commissioning half a dozen important contributors in the field to write a well coordinated series of chapters. When one writes not only about his own work, one tends to be a better promulgator of useful information.

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Electromagnetic Excitation: Theory of Coulomb Excitation with Heavy Ions

K. Alder, A. Winther
364 pp. North-Holland, Amsterdam, 1975. $45.95

This book constitutes a classic in its field by two of the leading participants in the work. Worldwide interest in the study of heavy-ion reactions has stimulated the authors to complete their writing task begun two years ago. When one takes this book together with Larry Biedenharn and Paul Brussard's *Coulomb Excitation* (Clarendon Press, Oxford, 1965) and Kurt Alder and Aage Winther's collection of reprints with the same title (Academic Press, New York, 1966), one has the work of the masters easily accessible; this is good, because a great deal of our knowledge about nuclei comes from processes involving Coulomb excitation.

The present book limits itself to processes in which the projectile energy is well below the Coulomb barrier. The semiclassical treatment of the motion of the projectile dominates. The authors deal with the quantum-mechanical treatment in Chapter 9. Hans Uberall's *Electron Scattering from Complex Nuclei* treats excitation by high-energy muons or electrons, which are highly relativistic and penetrate the nucleus.

Most of the experimental data presented in the present volume have been obtained since 1966. In looking for developments on the theoretical side since that time, I took particular interest in the questions related to polarized beams and targets. There is no experimental datum mentioned in the book. Fascinating hints appear; on page 63, one finds a statement that in the sudden approximation or in first-order perturbation theory P_{yz} equals zero, where P_{yz} is a component of the tensor polarization of the excited nucleus. I should think that some experimentalist will want to measure P_{yz}. Appendices G and F tell how to do this, but the authors do not tell what would be learned about nuclei if the departure from zero were measured. Presumably the same sort of thing would be learned as is learned from the experiments discussed in the chapter on higher-order perturbation theory, but perhaps one could achieve more accuracy.

Chapter 10 takes up applications to experiments; this chapter should prove useful to experimentalists and theorists. TORBEN units come in for discussion in the second paragraph. The appendices are gems.

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Deformation Kinetics

A. S. Krausz, H. Eyring
398 pp. Wiley, New York, 1975. $24.95

After examining the book *Deformation Kinetics*, one takes away the impression that all deformation processes can be interpreted by the use of the Eyring theory and absolute reaction rates. While this may indeed be the case, the authors would have presented a far more valuable discussion had they contrasted this viewpoint with the conventional and more widely accepted theories.

The authors have divided the book into two parts. The first portion deals with the development of the molecular theory of deformation kinetics, the second with the analysis of deformation processes and applications both to polymers and to crystalline solids. Examples pertaining to such topics as fracture, hysteresis, stress relaxation of fibers in various environments and superplasticity appear; while this section may seem impressive, the authors could have found material of greater appeal. The examples permit of only minimal application to polymers, and even those that do so lack currency.

The authors either totally overlooked or deliberately ignored several good applications of kinetic theory to polymer systems, though they appear in the literature. Omitted topics include thixotropy.

In general, the book's authors have written clearly. Without a doubt, the volume presents a point of view that differs considerably from conventional viscoelastic theories of deformation. The book documents a vast amount of material that has appeared in the literature in fragmented form, and as such it represents a comprehensive text, useful as a reference source.

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book notes

The Compton Effect: Turning Point in Physics. R. H. Stuewer. 367 pp. Science History (Neale Watson), New York, 1975. $25.00

In late 1922 Arthur Holly Compton "calculated that a quantum of radiation undergoes a discrete change in wavelength when it experiences a billiard-ball collision with an electron at rest in an atom," begins Roger Stuewer, "and his x-ray scattering experiments confirmed this change in wavelength." Now the "long and difficult" route Compton pursued, which culminated in his discovery of the effect that bears his name, has been traced in detail. The essential fabric of Stuewer's book deals with the historical evolution of concepts behind Compton's work, but he also weaves in threads of biography and physical theory. More for physicists than for historians, this volume treats one particular development in the physics of the early twentieth century and examines its impact on subsequent work.

Vistas in Physical Reality: Festschrift for Henry Margenau. E. Laszlo, E. B. Sellon, eds. 228 pp. Plenum, New York, 1976. $25.00

Festschriften tend to be mixed bags, but this one is different—so say the editors, Ervin Laszlo and Emily B. Sellon. The distinguished contributors range over the scope of interest of Margenau's work: physics, philosophy and education. Eugene P. Wigner considers problems of communication and purpose in science, as well as of cosmology and epistemology. James L. Park draws some conclusions from the Einstein–Bohr controversy on the interpretation of quantum mechanics, and Håken Törnebohm defends special relativity theory from the charge of dealing only with clocks and measuring sticks. The other writers are Adolf Grünbaum, R. Bruce Lindsay, Wolfgang Yourgrau, Laszlo, Peter Caws, Siegfried Müller-Markus, John Bacon, Lee Thayer, Harold G. Cassidy and Sellon.