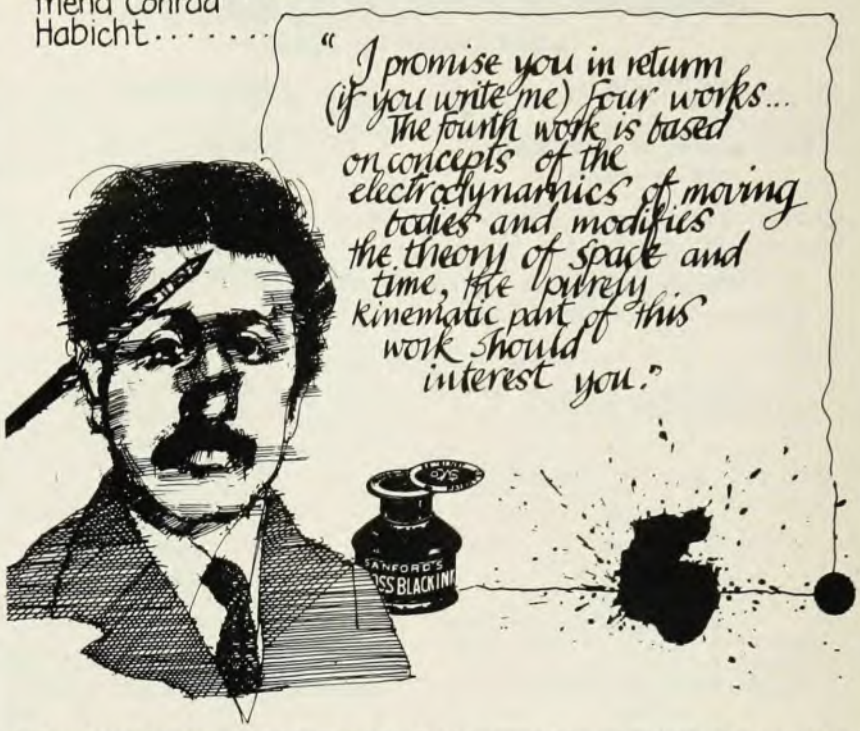

Einstein for Beginners is an amusing and not unsophisticated introduction to the life and thought of the renowned physicist. A timely gift in Einstein's centennial year, the book's "comic book" format makes it appealing to non-physicists. The book was written by Joseph Schwartz and illustrated by Michael McGuinness (Pantheon; $8.95 cloth, $2.95 paper).

3. C. van Schooneveld, ed. *Image Formation from Coherence Functions in Astronomy*, D, Reidel, 1979.
4. R. Gordon, PHYSICS TODAY, July 1978, page 46.

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Polymer Stress Reactions, Vol. 2 (Experiments)

A. Casale, R. S. Porter
342 pp. Academic, New York, 1979.
$32.00

Polymer Fracture

H. H. Kausch
332 pp. Springer-Verlag, New York, 1978.
$59.00

The brittleness of glasses, the impact strength of plastics in crash helmets, bottles or instrument housings, the tear strength of films or fibers are among the principal elements of concern in the burgeoning study of polymeric materials. These are the topics of the large and rapidly growing body of papers and books on polymers now available to scientists, engineers and designers. Now added to this group are two volumes that make notable contributions to the field: *Polymer Fracture* by Hans Henning Kausch and *Polymer Stress Reactions* by Antonio Casale and Roger S. Porter.

Kausch, at the Polymer Laboratory of the Federal Polytechnic Institute, Lausanne, Switzerland, is well known for his work on polymer morphology and molecular mechanics as well as his research on the strength of materials. The avowed aim of his book is to connect the more conventional statistical and continuum mechanics interpretation of fracture phenomena to the newer spectroscopic studies (infrared, electron spin resonance, nuclear magnetic resonance, neutron scattering) of highly stressed polymeric chains and the kinetics of their rupture. Relating the literature on the observed modes of viscoelasticity and irreversible deformation from polymer morphology and solid-state physics, Kausch explains the behavior and rupture of polymeric materials in terms of molecular slip and breakage processes. This leads to interesting, methodical and well-thought-out interpretations of fracture toughness, crack propagation rates and fatigue of all major polymer systems. Thus, the book is an outstanding contribution to our understanding of the role of chain ruptures during mechanical failure.

In view of this excellent coverage, one regrets that this book does not go somewhat further. Notwithstanding his extensive survey of the material and his valuable analyses, Kausch does not pro-

vide a comprehensive summary of his views. Further, the primary emphasis on chain rupture (6 out of 9 chapters) causes the role played by friction and dissipative mechanisms to be short changed even though dissipation typically contributes several orders of magnitude more to the level of fracture strength and toughness than does chain rupture. Lastly, the table of contents is overly brief. Nevertheless, every student and practitioner of polymer science and engineering should find this book to be a valuable resource for his work.

Volume 2 of *Polymer Stress Reactions*, by Casale and Porter, contains the experimental material which was the basis for the discussions in their first volume of the mechanisms of mechanical degradation and of the instrumentation for following molecular-weight changes. Porter, director of the Polymer Institute of the University of Massachusetts at Amherst, is well known for his pioneer work in shear degradation and hyperstrong polymers. Casale, senior scientist of SNIA VISCOSA of Milan, has had long experience in polymer physics.

The second volume is divided into sections on the principal groups of polymers and on the changes in the bulk and in the solution states during the most important operations. The authors present an extraordinarily extensive and complete survey in which they cover all important aspects and materials, hypotheses and experimental evidence in the field of polymeric stress. In most cases, the authors include the original investigator's interpretations, but in places they annotate the text with their own views.

The reader becomes familiarized with the extremely wide range of reactions that can be induced by mechanical energy. Starting from discontinuities and flaws and enhanced by other morphological features, stress reactions (mostly in the form of chain ruptures) determine strength, fatigue and wear. Porter and Casale discuss such important processes as mastication, blending, milling, grafting, shearing, extrusion, drilling, pumping and drawing. They point out the importance of free radicals and discuss their life times and their fates—reaction, healing or stabilization. The authors extend the discussion to treat molecular degradation kinetics by the determination of ultrasonic and viscometric flow stresses. There is even a section on drag reduction.

The book is thus a veritable fountain of information on all matters of molecular damage inflicted by mechanical stresses. Using extensive illustrations, tabulations and references, the authors pull together an extremely diverse field by juxtaposing the relevant pieces of literature; a most valuable service for any worker in this area. The only criticism one could level at this book is that in many instances,

Porter and Casale are satisfied with presenting an abstract of the literature rather than an analysis, digest or integration.

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book notes

Aspects of biophysics. W. Hughes. 362 pp. Wiley, New York, 1979. $18.95

William Hughes's new biophysics text is directed towards those "who have a basic knowledge of physics, chemistry and biology and who wish to see how some of the more elementary parts of physics may be applied to the study of living matter." He has organized the book according to biological systems of increasing complexity, beginning with molecules and proceeding to organelles, cells, tissues and so forth. The first two chapters discuss the physical aspects of biological macromolecules and the various techniques for their study. Hughes then introduces some elementary concepts for describing the behavior and properties of macromolecules, following this with two chapters devoted to enzymes and nuclei acids. After considering cell membranes and nerve impulses the author then provides an introduction to artificial membranes. Chapter 9 is concerned with energy transduction and chapter 10 discusses the basic ideas behind radiation effects. The next five chapters describe salt and water transport in the gut, the behavior of striated muscle, blood flow and heart action and the physical aspects of vision and hearing. Hughes finishes up with a discussion of the origin of living matter and a review of developments in bioengineering.

Magnetic Properties of Coordination and Organometallic Transition Metal Compounds, Vol. 10, Supplement 2 (Landolt-Börnstein). E. König, G. König. 982 pp. Springer, New York, 1979. $539.00

This is the second supplementary volume in the Landolt-Börnstein series on magnetic susceptibilities and electron spin resonance of coordination and organometallic transition metal compounds. The first part of this reference work complements and extends the collection of magnetic-susceptibility information for the aforementioned compounds, which was presented in volumes 2 and 8. The authors review the data published in 1969 and 1970 in this supplement.

Most of the magnetic susceptibility data refer to a limited temperature range (often between 77 and 300 K), however,