cludes detailed numerical results as well as analytical studies.

In today's market, there seem to be a lot of "me too" books, as publishers and authors compete for a specific readership. Welford and Winston's book is refreshingly different. It covers new ground, it describes a new point of view, and will be enjoyed by all who have an interest in light collectors.

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Models of Disorder: The Theoretical Physics of Homogeneously Disordered Systems

J. M. Ziman
538 pp. Cambridge U., New York, 1979. $59.50 clothbound $19.95 paperbound

John Ziman has covered a wide area of theoretical physics in *Models of Disorder*. More than a quarter of it is taken up with the description of structural aspects of disorder. Chapters on the statistical mechanics of order–disorder transitions and on the statistical mechanics of fluids bring critical phenomena within its scope. There is a chapter on macromolecular disorder, and last two hundred pages are devoted to various types of excitations in disordered systems, particularly electrons and phonons. Ziman explains the emphasis of his book in the preface. Firstly, he says he makes no reference to the results of experimental research. Secondly, there is the statement, "I have also taken a somewhat cautious and sceptical attitutde towards many imaginative proposals that have not yet shown themselves to be well-founded or fruitful. Nothing is more permanent than a valid theorem; nothing fades more rapidly than an unwarranted speculation. In thus excluding current conjectures I may have made the book less exciting, but I cling to the principle that to ask to be up to date is to admit to being obsolescent." Thirdly, Ziman mentions that all references after 1975 are sporadic and consciously fragmentary in coverage. I counted twelve 1976 references, many of them review articles, and no later ones.

Though I found the chapters on structural aspects of disorder inconclusive and somewhat unrelated to the rest of the book, this is a reflection of the state of the subject rather than on the book. Most of what is said here is familiar to me from other general surveys I have read. I did note a brief and inaccurate dismissal of the Kosterlitz–Thouless theory of two-dimensional phase transitions (the theory is not based on rough approximations and it is not true that most of the energy of a dislocation is associated with atomic disorder in the core). The discussion of the statistical mechanics of substitutional disorder is weak and marred by the failure to bring out essential points—for example, Landau–Ginzburg theory is discussed without any reference either to the role of symmetry, or to the possibility of allowing for fluctuations as Kenneth Wilson and his followers (and predecessors) have done. I found the chapters on the thermodynamics of topological disorder and on macromolecular disorder well-balanced and interesting, but the latter seemed to make no contact with the current research on polymer theory with which I am familiar. While the chapters on excitations are very variable, the discussion of the coherent potential approximation is better than any other I have seen. The sections on localization of electrons are inaccurate and misleading, in particular where direct comments are made on Philip Anderson's original paper.

There is a lot of emphasis in this book on various cluster modifications of mean-field theories. Ziman also deals extensively with one-dimensional sys-

tems, which of course is in line with the remark I quoted about valid theorems. However, the more difficult two-dimensional systems, such as the eight-vertex model, are not discussed in detail, and many powerful techniques in statistical mechanics, such as the proof of exponential decay of correlation at high temperatures, are ignored. Although he includes a short section on scaling and renormalization, the author does not seem to have come to terms with the importance of length scales in this subject. For example, the difference between "topological" and cellular disorder, which is emphasized throughout this book, is unimportant when long length scales are involved. In addition, length scales determine whether systems behave one-dimensionally or three-dimensionally. The failure to mention Sir Nevill Mott's theory of minimum metallic conductivity underlines one of the most serious weaknesses of this book, a weakness that derives from the author's exclusion of the more speculative recent work in the field.

My reaction to this book comes partly from my different view of what theoretical physics is about. In several places Ziman seems to be putting forward the point of view that good theoretical physics involves calculating from first principles the properties of more or less realistic models, and from that point of view progress in the theoretical physics of disordered systems has been unsatisfactory. I think that our task is to develop useful ways of thinking about physical systems. Ziman and his colleagues at Bristol have done some good work on the electronic properties of disordered metals. At one point in the book he would clearly like to argue in favor of this work, but unfortunately he has denied himself the possibility of talking about experimental results.

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new books

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Theory of Chemisorption. J. R. Smith, ed. 249 pp. Springer, New York, 1980. $34.30

Introduction to Radiochemistry. D. J. Malcolme-Lawes. 152 pp. Halsted (Wiley), New York, 1979. $24.95

Symmetry Groups: Theory and Chemical Applications. R. L. Flurry, Jr. 366 pp. Prentice-Hall, Englewood Cliffs, N. J., 1980. $26.50

Intercalated Layered Materials. F. Lévy, ed. 585 pp. Riedel, Hingham, Mass., 1979. $78.00

Nuclear Magnetic Resonance in Rare Earth Metals. M. A. H. McCausland, I. S. Mackenzie. 159 pp. Taylor & Francis, London, UK, 1980. £7.00

Polymers, Part C: Physical Properties. R. A. Fava. 550 pp. Academic, New York, 1980. $59.00

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Electron-Molecule Scattering (Papers presented at a lecture, New Haven, Conn., October 1979). S. C. Brown, ed. 206 pp. Wiley-Interscience, New York 1979. $22.95.

Advances in Chemical Physics, Vol. 18. I. Prigogine, S. A. Rice. 287 pp. Wiley-Interscience, New York, 1980. $36.50

Rezonanţa magnetică în compuşi cu uraniu. I. Ursu. 235 pp. Editura Academiei Republicii Socialiste România, Bucharest, Romania, 1979. (Price not stated)

Magnetic Properties of Free Radicals: Organic Anion Radicals (Landolt-Börnstein). H. Fischer, K. H. Hellwege, eds. 904 pp. Springer, New York, 1980. $548.80

Optics and Acoustics

Ultrasonics. A. P. Cracknell. 200 pp. Wykeham (Taylor & Francis), London, UK, 1980 (US dist.: Crane, Russak, New York). $15.95

Cavitation and Inhomogenities in Underwater Acoustics (Proc. of an int. conf., Göttingen, Fed. Rep. Germany, July 1979). W. Lauterborn, ed. 328 pp. Springer, New York, 1980. $36.00

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Condensed Matter and Materials Science

Electron and Magnetization Densities in Molecules and Crystals (Proc. of a NATO Adv. Study Inst., Arles, France, August 1978). P. Becker, 917 pp. Plenum, New York, 1980. $75.00

The Molecular Physics of Liquid Crystals (Lectures presented at a NATO Adv. Study Inst., Cambridge, UK, August 1977). G. R. Luckhurst, G. W. Gray, eds. 503 pp. Academic, London, UK, 1979. £20.00

Excitation of Plasmons and Interband Transitions by Electrons. H. Raether. 196 pp. Springer, New York, 1980. $32.50

Condensed Matter Physics: Dynamic Correlations. S. W. Lovesey. 204 pp. Benjamin/Cummings Adv. Book Program, Reading, Mass., 1980. $26.50 hardbound, $14.50 paperbound

High Pressure Properties of Matter (Landolt-Börnstein) G. Beggerow. 427 pp. Springer, New York, 1980. $257.60

Physics of Nonlinear Transport in Semiconductors (Proc. of a NATO Adv. Study Inst., Urbino, Italy, July 1979). D. K. Ferry, J. R. Barker, C. Jacoboni, eds. 634 pp. Plenum, New York, 1980. $65.00