The third article by D. E. Ovsienko & G. A. Alfintsev is a highly specialist review detailed as *Crystal growth from the melt – experimental investigation of kinetics and morphology*. It presents a mass of experimental data covering a wide range of substances. In addition to the coverage of the kinetics and morphology of crystals grown from the melt, the incorporation and influence of impurities and the formation of unstable growth shapes are also discussed.

The final article by A. H. Morrish examines *The morphology and physical properties of* γ-Fe_2O_3, a material widely used for magnetic recording devices. This is also a specialist article but gives thorough coverage to the field whilst being concisely written. It summarizes preparative methods and appropriate physical properties as well as discussing the role of dopant additives.

In summary, this volume contains two articles which will be of general interest to crystal-growth scientists and two limited to a more specialist appeal. All four articles are comprehensively referenced and the diagrams, photographs and tables are clearly presented throughout.

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Ill-condensed matter. Edited by R. BALEAN, R. MAYNARD and G. TOULOUSE. Pp. xxv + 607. Amsterdam: North-Holland, 1979. Price US $97.50, Dfl 200.00.

This book is the outcome of the XXXI session of Les Houches Summer School which was held during the period 3 July–18 August 1978. The topic of the meeting was amorphous materials, but the volume is archly labelled *Ill-Condensed Matter*. This label is slightly better than 'non-crystalline', which tells us what the material is not, but it implies that something has gone astray in the assembly of atoms, thereby forming a structure with holes, like Swiss cheese. As a matter of fact, the cheese analogy (Gruyère was chosen, since the meeting was, after all, in France) is used in introducing percolation theory but the use of the term ill-condensed to describe materials which exhibit only short-range correlations was probably ill-advised since crystalline materials can also be ill-condensed in the sense that crystals may contain imperfections such as vacancies, dislocations and voids. With this cavil aside, however, the strength of the book lies in the depth of treatment of the topics which it covers and the weakness lies in several glaring omissions in topics which should have been covered in any general treatment of the subject. This was a summer school, with substantial sponsorship, and with the luxury and leisure to examine amorphous materials in a comprehensive fashion, but this was not to be the case.

The book begins with a good treatment of percolation theory by David Thouless of Queens University in Canada. Percolation is introduced by considering a solid which has a random distribution of small holes. If the number of holes is small there will only be a small number of overlapping holes, but as the concentration of holes increases the average size of overlapping clusters increases until at some critical concentration there is an infinite cluster. At this point, fluid can percolate from the exterior to the interior. Percolation processes can be considered for a regular lattice, but the concepts are also applicable when a lattice cannot be defined. The percolation problems can be defined as a site problem or as a bond problem with the corresponding probabilities of empty atomic sites or unoccupied bonds. Electrical network problems, antiferromagnetic behaviour, scaling and renormalization and spin-wave stiffness problems are discussed. Amorphous materials are approached by considering the concept of localization by disorder, by which Thouless simply means to describe a material with local atomic order. At this point the Anderson model of disordered solids is introduced as essentially a tight-binding model in which the disorder is induced by letting the binding energy vary from site to site, and the remainder of the chapter focuses particular attention on the electrical transport properties in such materials. What is percolating in these cases? The atoms are ignored, and we consider the percolation of electrons, holes and spins through vacant sites. The author has an interesting point of view on the correlation of experiment with theory. He considers the interpretation of experimental information to be ambiguous and prefers to compare theory with computer simulations. It would appear that such an approach provides greater comfort to the theorists.

At this point, it is best to go to chapter 3, *Lecture on amorphous systems* by Philip W. Anderson of Bell Laboratories. It would have been better to start the volume with this paper, since it presents a good general introduction to phenomena which are uniquely associated with glasses. He makes an important point in stressing the non-ergodicity of these materials in the sense that they do not move uniformly through phase space and that averages over all possible states are not applicable. Anderson discusses the glass transition, the electronic structure of glasses, spin glasses, renormalization, and transport problems. There is no attempt to provide rigor in any of these topics, but it all seems very plausible and is good reading.

One should then proceed to chapter 5, *Models of disordered materials* by Scott Kirkpatrick of IBM. The author takes up the percolation problem in amorphous materials, with particular attention to two-dimensional bond percolation. Here also, theory is compared to computer simulations. Random magnets and conduction are discussed along with such topics as spin glasses.

These three chapters define the core of the conference. The rest is a mixed bag. There is a review of physical phenomena in glasses by Joffrin (chapter 2) and an interesting chapter on algebraic topology by Poenaru (chapter 4). One either likes topology or one does not; I happen to like it, and a certain amount of intellectual broadening is certainly welcome in a summer school. The rest of the book considers such topics as critical phenomena in disordered systems and short summaries of a variety of other experimental and theoretical topics.

The overall effect of the book is vaguely unsatisfactory. At no point is there a discussion of the atomic arrangement in these disordered systems. The arrangement is implied only in terms of electrons and electron holes or spins, and the percolation of these electronic entities. There is considerable discussion of binding and bonding but no mention of what