

rather weakly compared with the theoreticians. Perhaps this is because of the absence of some of the experimentalists who have given a great deal of careful attention to the collection of large amounts of reliable intensity data from simple single-crystal metal surfaces. Nevertheless the standard is still high and should give the reader an accurate sense of values as to the experimental 'state of the art'.

The proceedings open with a review by Professor R. M. Stern who is one of the few physicists bridging the experimental and theoretical sides of the subject. He stresses the similarities and differences between low and high-energy electron diffraction and points out clearly why the large (real) Fourier coefficients and the large plasmon scattering cross section make the interpretation of LEED data so difficult but suggests various experimental and theoretical developments which may help to simplify the situation. S. Andersson and A. Delong describe respectively the determination of the size and symmetry of surface meshes and the various forms of LEED apparatus. Subsequent papers are concerned either with LEED theory (C. B. Duke, K. Kambe and J. B. Pendry) or with the application of LEED to various surface problems. Thus, M. G. Lagally and C. B. Duke both address themselves to surface crystallography and, in particular, attempt to reduce the data to a kinematic or quasi-kinematic form in order that the known methods of X-ray crystallography can be used; K. Muller describes LEED and the study of the adsorption of foreign atoms; G. Ertl discusses the problems in catalysis to which LEED has and may be applied.

Other methods are covered in the school where they are treated as complementary to LEED studies. F. Lukeš describes why optical ellipsometry is good for accurate determinations of adsorbate thickness – perhaps at the cost of minimizing the difficulties associated with using macroscopic models to describe microscopic, even atomic, situations; N. J. Taylor and L. Fiermans both discuss the uses of Auger electron spectroscopy which is now the most important tool for the determination of what chemicals are present on the surface. Unfortunately, neither of these authors covers the attempts to make *quantitative* assessments of the material at the surface – a step which is crucial to the subsequent determination of the surface structure. A. Frankzukov discusses mass-spectroscopic methods for establishing surface coverages; J. Holzl deals with secondary electron emission in terms of both 'true' secondary electrons and rediffused primary electrons and presents some theory/experiment comparisons.

The volumes have been produced by photolithography from the authors' manuscripts and, accordingly, they are not glossy to behold. Nevertheless they are clear and easy to read and have appeared very quickly after the school was held. They contain extremely interesting material both

for those already involved in the field and for those embarking upon a study of solid surfaces.

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Point defects and diffusion. By C. P. FLYNN. Pp.xi + 826. Oxford Univ. Press, 1972. Price £15.00.

This is a long, scholarly, yet very readable treatise covering the whole field of diffusion in the solid state in the most general way. It can be regarded as a compendium of diffusion and of ideas relevant to the study of diffusion; not a compendium in the experimental sense with tabulation of diffusion constants, but in the wider sense of bringing together all the general physical principles necessary for the proper study of diffusion.

The approach used has been to begin with point defects, with consideration of their structure, concentrations and interactions, leading from this to studies of defect mobility and atomic migration. Diffusion fluxes appear as the aggregated motion of point defects with specific applications including diffusion under mechanical stress, electromigration and the phenomena of precipitation. In the later chapters aspects of defect properties specific to differing material structures are explored in chapters on molecular, ionic, valence and metallic crystals.

In level, the book is addressed to the well informed but not necessarily specialized physicist. Throughout, the treatment is uncompromisingly mathematical, but it is backed by an exposition in purely physical terms which makes it interesting and readable, and serves to relate ideas of diffusion to more general physical ideas such as reversibility. In bringing the double field of point defects and diffusion into one volume, the author has undertaken a considerable task. The measure of his success is that his treatment brings to the subject a coherence it did not have before.

At £15, this book is unlikely to tempt the non-specialist reader, but it has chapters which will interest anyone concerned with point defects. For the diffusion man, it is a volume which will repay continued study.

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