

errors which should have been eliminated on proof reading, and a few graphs which should be turned through 90°. These errors may have arisen out of a desire to publish as quickly as possible, but when the next printing is carried out these should be corrected. The price seems quite reasonable considering it is a translation.

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FATIGUE-RESISTANCE TECHNOLOGY

Fatigue Resistance of Materials and Metal Structural Parts

Edited by Alfred Buch. (Proceedings of an International Conference held in Warsaw.) Pp. viii+313. (London and New York: Pergamon Press, 1964.) 100s.

FATIGUE Resistance of Materials and Metal Structural Parts reports the proceedings of a fatigue conference held in Warsaw during May 1960 and, as might be expected, most of the contributions originated from laboratories in Eastern Europe. There are sixteen full-length papers and ten short summaries of research work; most of the summaries are little more than brief abstracts. Ten of the longer papers are in English and the remainder are in German with a synopsis of each in English.

The contents are arranged in three sections, headed "Special Problems", "Materials and Technological Problems" and "Constructional Problems". The first group of papers includes a comprehensive survey by Hempel of the fatigue of heat-resisting steels and alloys at elevated temperatures. There is also an interesting attempt by Kudryavtsev to explain fretting fatigue in terms of the difference in electrode potential between specimen and rubbing pad. Special mention must also be made of a short but succinct paper by Uzhik that discusses the factors affecting the residual static strength in bending of steel bars containing fatigue cracks. The treatment emphasizes the importance of specimen geometry on fracture behaviour, and illustrates the advantages of replacing a single load-carrying component with a multiplicity of smaller members that together provide the same cross-sectional area. This is a conclusion that will encourage those who advocate the control of fracture behaviour by the use of fibre-reinforced metal composites. Compared with previous fatigue symposia, the Warsaw conference had little to say on the micro-structural aspects of fatigue and, in particular, none of the research reported involved thin-foil transmission electron microscopy. The only purely metallographic paper, an electron microscopic study of the fatigue fracture surfaces of a medium carbon steel by Kocanda, is disappointing. No mention is made of the characteristic Zapffe and Worden lamellae or ripples, which are probably the most important characteristic of fatigue fracture surfaces, presumably because they were not observed. This in turn suggests that the specimen replication techniques used were not particularly sensitive since striae should be visible in this material and were reported on in detail by Crussard *et al.* in 1956.

The remaining two sections of the book contain papers of rather more esoteric interest and include contributions on topics as diverse as the fatigue of cermets and the failure of vibrating brass plates in alarm sirens. There are three contributions on the fatigue of welded structures one of which is particularly interesting since it deals with welded crankshafts.

As is often the case with a conference report, the scientific content of the individual papers varies widely in quality. It is perhaps unfair to criticize the clarity of presentation of some of the papers written in English since the authors were writing in a language not their own. There are, however, a number of cases where the presentation makes it difficult to follow the argument put forward. The number of typographical errors, incorrect

references and misspellings is also rather high, and this book would have been much more valuable had the minor defects, and the ambiguities arising from the language difficulty, been eradicated.

This book will be of value to the research worker actively engaged in the fatigue field not least because it provides a broad picture of the sort of work which is in progress in Eastern European laboratories. This value is substantially offset by the long delay between the conference and publication of the proceedings. Engineers in search of special data may also find this book useful, but it cannot be recommended to students or to those with only a general interest in the fatigue problem.

D. A. RYDER

SURFACE SCIENCE

Recent Progress in Surface Science

Vol. 1. Edited by J. E. Danielli, K. G. A. Pankhurst and A. C. Riddiford. Pp. xii+414. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1964.) 114s. 6d.

SURFACE science is of immediate concern to chemists, physicists, biologists and engineers, and it is the intention of the editors of this serial publication to review all aspects of the subject. There is no doubt that a distinct need exists for such a publication and it should perform a useful service for all workers in the field. In this, the first volume of the series, the authors were asked to lay particular emphasis on significant advances in their subject made during the period 1956-61 and on problems as yet unsolved. On the whole this has been achieved and the result is eminently successful. However, rapid publication of review articles on recent progress in a subject is essential and the delay in publishing this valuable volume is to be regretted.

The present volume contains eleven chapters authoritatively written on a variety of topics and each includes an adequate list of references not all of which, by any means, originated during the period 1956-61. Some aspects of the liquid/air interface are considered in Chapter 1 ("Surface Viscosity", by M. Joly) and Chapter 2 ("Foams and Free Liquid Films", by J. A. Kitchener). Recent developments in double-layer theory and in the interpretation of electrophoresis data are reviewed in Chapter 3 ("The Electrical Double Layer and Electrokinetic Phenomena", by D. A. Haydon). In Chapter 4 ("Electrode Processes", by Sigmund Schuldinor) advances in experimental techniques for the study of electrode processes and the nature of the electrolytic hydrogen reaction are discussed. Metallic corrosion in aqueous media is surveyed in Chapter 5 ("Corrosion of Metals", by C. V. King), and Chapter 6 ("Surface-Active Substances", by W. Black) is concerned with the recent advances in the synthesis, production and utilization of surface-active agents. The relation between surface properties and semiconductivity is discussed in Chapter 7 ("The Chemistry of the Semiconductor Surface", by E. Tannenbaum Handelman). The remaining four chapters deal with certain aspects of surface science in biology. Facilitated diffusion across the cell membrane is discussed in Chapter 8 ("Facilitated Diffusion", by W. D. Stein), the morphology of the cell surface and of intercellular contacts are considered in Chapter 9 ("Cell Contacts", by E. J. Ambrose) and Chapter 10 ("The External Surface of the Cell and Intercellular Adhesion", by E. H. Mercer), and Chapter 11 ("Formation and Properties of Bimolecular Lipid Membranes", by P. Mueller, D. O. Rudin, H. Ti Tien and W. C. Wescott) is concerned with lipid bilayers.

This book is well produced but is expensive. There can be few people concerned with surface science who would not find it both stimulating and invaluable. Its publication is welcomed.

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