

Chemical physicists contributing to the volume are Terenin, reviewing the electronic spectroscopy of adsorbed species, and Farnsworth, who discusses his own approach to low-energy electron diffraction (LEED).

Surface reactions relevant to catalysis which can be studied by LEED include epitaxy, adsorption, place exchange, and oxidation. Farnsworth's techniques differ in important details from those reported by Bell Laboratories. In particular the fluorescent display of diffraction patterns is augmented by semiautomatic scanning with a Faraday collector. This is somewhat slower than the visual readout, but is claimed to give more quantitative measurements of intensity.

Infrared spectroscopists lately have had to face criticism that the species they observe are too stable to be really involved as activated intermediates. The ultraviolet spectroscopists are less vulnerable in this respect. The carbonium ions and carbanions which Terenin describes have had a respectable history as catalytic intermediates. The added possibility of single electron transfer to or from the surface to give the corresponding radicals, broadens the field of mechanisms that can be supported by spectroscopic evidence. Those concerned with applications of electron spin resonance in catalytic research will find this review particularly helpful.

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Recent Progress in Surface Science, Vol. 1. Edited by J. F. Danielli, K.G.A. Pankhurst, and A. C. Riddiford. Academic Press, New York and London, 1964. xii + 414 pp. Price \$16.00.

This is the first volume of a series which attempts to bring together critical reviews on all areas of surface science. Although it is undoubtedly important to emphasize the common basis of subjects as widely apart as metal corrosion and adhesive properties of cell membranes, several of the chapters in this volume have clearly been written by experts and for experts, and it is difficult to see what purpose is served by collecting these contributions in a single volume. Thus, the extensive literature review on electrode reactions (by S. Schuldiner) and the detailed description of a method for making artificial lipid membranes

(by P. Mueller and co-workers) can hardly be expected to be of interest to the same class of research workers.

It was evidently intended to have the articles written in such a way that the subject matter can be understood by experts in quite different fields, who have no desire to study the specialized terminology used for communication among the workers on that subject. An example of how this can be achieved is the brief chapter on "Chemistry of Semiconductor Surfaces" by E. Tannenbaum Handelman. The chapters on "Foams and Free Liquid Films" (by J. A. Kitchener) and on the "Electrical Double Layer and Electrokinetic Phenomena" (by D. A. Haydon) are very complete and authoritative reviews of recent developments in these fields. Of the four final chapters on biological surfaces, those by W. D. Stein ("Facilitated Diffusion") and by E. J. Ambrose ("Cell Contacts") summarize our lack of understanding of these phenomena.

The contribution of Ambrose is especially interesting for the discussion on movements and mechanical properties of cell membranes. The chapter on "Cell Adhesion" by E. H. Mercer is not so much a review article as a collection of the evidence supporting the hypothesis according to which this adhesion is due to the presence of specialized adhesive molecules.

There seems to have been a regrettable delay in publication. Most of the contributions contain references up to 1961, in few cases part of the literature of 1962 was also covered, and only the chapter by P. Mueller and co-workers (which is not a review article!) mentions literature of 1963. This is especially unfortunate in those cases where recent developments have rendered many of the older concepts obsolete. Thus, M. Joly's article on "Surface Viscosity" considers only the shear viscosity, to the exclusion of dilational properties, but recent evidence shows that surface dilational properties are far more important for understanding other surface phenomena such as foaming and emulsification.

Not many printing errors were discovered, the most disturbing being in Chapter 9 where the name of Professor van Deenen is misspelled in the tables and in the author index, but not in the text.

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