

C. Kemball has written a clear and concise chapter on catalytic exchange of hydrocarbons with deuterium. The principles of exchange reactions are followed by examples studied from the point of view of hydrocarbon structure. J. J. Chessick and A. C. Zettlemoyer treat immersional heats and the nature of solid surfaces in a chapter which is a welcome *apologia* for a method that could certainly be more widely used. The last article, on catalytic activation of hydrogen in homogeneous, heterogeneous and biological systems, is by J. Halpern. By collating advances over a broad field and emphasizing the success of electronic interpretations in homogeneous catalysis, the author has written a stimulating chapter.

In Volume 12, T. B. Grimley begins with a short account of the wave mechanical approach to chemisorption. The move away from metals towards semi-conductors as being the most amenable solid type for theoretical study is evident here, and this is strongly accentuated in a later chapter by Th. Wolkenstein (F. F. Volkenstein) on his elegant electronic theory of catalysis on semi-conductors. This is particularly welcome as being the first account of Wolkenstein's work to appear in English. The longest chapter (80 pages) is by D. E. O'Reilly, entitled "Magnetic Resonance Techniques in Catalytic Research". The theoretical background to nuclear magnetic resonance and electron paramagnetic resonance is presented in rather excessive detail, but about a dozen examples of the applications of these methods in various fields of catalytic interest are discussed. In sharp contrast is an article by R. A. van Nordstrand, who presents his extensive experimental data on the X-ray K-absorption edges of the 3d metals and their dependence on chemical environment. The correlations here, although purely empirical, are very clearly set out. The link between homogeneous and heterogeneous systems is evident in an authoritative chapter on base-catalysed reactions of hydrocarbons by H. Pines and L. A. Schapp. The authors develop a consistent mechanistic interpretation of these reactions on the basis of carbanion intermediates. The final chapter is a comprehensive review by D. J. C. Yates of dimensional changes in porous solids (notably porous glass) during physical adsorption, together with the related infra-red work on changes in the OH absorption bands. It is always salutary to be reminded that the solid is not an inert partner in adsorption.

These two volumes deserve to be widely read by all those interested in the fundamental aspects of adsorption and catalysis, and the editors are to be congratulated on maintaining such a high level of authorship.

F. S. STONE

## DETERGENCY

### Surface Activity and Detergency

Edited by K. Durham. Pp. xiii+250+14 plates. (London: Macmillan and Co., Ltd.; New York: St. Martin's Press, Inc., 1961.) 35s. net.

THIS book is based on a series of lectures given at the Liverpool College of Technology during the winter of 1957-58 by K. Durham, H. E. Garrett, T. G. Jones, A. S. C. Lawrence and D. G. Stevenson.

The first two chapters deal with the properties of detergent solutions with particular reference to surface activity and micelle formation. Some attention is given to the increasingly important non-

ionics. The three chapters that follow are concerned with applying these ideas to the basic processes of detergent action—wetting, dirt removal and the prevention of redeposition of the dirt. The separate consideration of these processes is logical since detergency is so complex that no complete theory seems possible. A clear account is given of wetting phenomena and their relation to the washing process, with emphasis on the difficulty of applying simple theoretical models to the wetting of a fabric. Removal of dirt is considered in terms of the modern theories of colloid stability (Derjaguin, Verwey and Overbeek) assuming that 'deflocculation' occurs in the disruption of the dirt-fabric complex. A useful theory of builder action is presented. The importance for efficient washing of maintaining the dirt in suspension is emphasized and the fundamentals of stability are discussed. Then follows an account of ancillary effects in detergent action, including some particularly good photographs of dirt removal from fibres and the cleaning action of foam. Lawrence has written an interesting chapter describing mainly his own work at Sheffield and has presented a plausible picture of the mechanism of detergency of most greasy and oily dirt. The remainder of the book deals with kinetic effects, a subject not discussed in other books in this field, and a brief summary of the evaluation of detergent efficiency.

It is clear from reading this book that there is much more work to be done before a general theory of detergent action can be constructed.

The book successfully combines a reasonable amount of theory with as much practical information as possible—a comprehensive account of the whole field of detergency is not intended. Unfortunately, work published since the lectures has not been included.

In general the book is well written but contains a number of misprints, and more care could have been taken over the lettering on the diagrams. However, these are minor faults and the book is a useful addition to the literature on colloid and surface chemistry. It is highly recommended to technologists working in this field.

G. D. PARFITT

## UP TO DATE ON LIGNIN

### The Chemistry of Lignin

Supplement Volume, Covering the Literature for the Years 1949-1958. By Friedrich Emil Brauns and Dorothy Alexandra Brauns. Pp. x+804. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1960.) 18 dollars.

INCLUDED in this critical literature review are a few papers, mostly from the U.S.S.R. and Japan, which were not available for inclusion in the original standard work by Brauns published in 1952. *The Chemistry of Lignin*, which is produced in a similar type and style, is of the same length as its predecessor, testifying to the widespread interest, except apparently in Britain, in lignin chemistry and the large amount of work in this field over the past ten years. There is little repetition of the information in the original book and frequent references are made to its contents, although unnecessary disruptions due to this are avoided.

This is an essential reference work for all interested in the chemistry of cellulosic raw materials, for those with little knowledge of the subject it presents in a most digestible form the results of a specialist lignin