

unified presentation of the reactions of ketene and its derivatives—diketene, *isopropenyl acetate* and β -propiolactone—compounds which are of considerable industrial importance. Despite the existence of several standard works on the subject, the inclusion of a chapter in this series on the applications of nuclear magnetic resonance in structural elucidation is not surprising; such are the potentialities of this new tool. As the author rightly points out, its intelligent use demands more of an understanding of the principles involved than does any other form of spectroscopy in popular use by organic chemists. However, within this brief compass, the author is only able to deal with those aspects of theory which have direct structural analytical significance. The treatment is concentrated almost exclusively on proton resonance, and solid-state spectra are omitted. Despite these limitations, the review has its obvious merits and will be appreciated by practising organic chemists.

There are occasions when the use of hydrogen-transfer reactions offers striking advantages over catalytic hydrogenation and dehydrogenation and, in consequence, they have their established place in the armoury of the organic chemist. The advantages arising from the usually complete stereospecificity of biochemical hydrogen-transfer reactions had led to some subtle and elegant applications. Jackman's survey of new developments in this field is timely, and many would wish that the section dealing with biochemical systems could have been amplified. Recent years have witnessed a renaissance in photochemistry, and preparative photochemical methods are rapidly gaining favour in certain fields. De Mayo does a signal service by focusing attention on recent developments and suggesting further areas where photochemical processes might prove useful and profitable. Finally, Eugster presents an interesting account of the chemistry of the alkaloid muscarine, the relatively simple, but unique, structure of which has only recently been unravelled, despite the combined endeavours of many illustrious organic chemists over many years.

The series has a truly international flavour, and a very high standard is maintained throughout. The inclusion of some details of experimental procedures adds to the value of the series. If the more individual and original character of the second volume can be maintained in future issues, the series is likely to earn for itself a worthy place on the private book-shelves of many organic chemists as well as in their institutional libraries.

J. IDRIS JONES

THE PROTON IN CHEMISTRY

The Proton in Chemistry

By R. P. Bell. (The George Fisher Baker Non-resident Lectureship in Chemistry at Cornell University.) Pp. vii+223. (London: Methuen and Co., Ltd., 1959.) 42s. net.

IT is perhaps ungenerous to complain that the title of this book is wider than the contents, when the author himself has admitted this in his introduction and made his excuses. The book is, in fact, mainly about the properties of acids and bases, or at least about the transfer of protons from

one molecule to another. Within this chosen field, these lectures, given at Cornell University while the author was George Fisher Baker non-resident lecturer, provide a readable, accurate and lucid account of acid-base theory and associated phenomena, and the book can be wholeheartedly recommended to students of physical chemistry as a supplement of their regular texts.

In the final chapter the author has done much to clarify what is known about the isotope effect, that is, the change of properties resulting from the substitution of the proton by the deuteron, in acids and bases.

There are, of course, many other chemical phenomena with which protons are concerned. No doubt some of these would have taken the author too far from the general theme of the book, but some, such as hydrogen bonding, which is only briefly mentioned, might well have been treated at greater length. In view of the great importance of hydrogen bonding in organic and biological compounds, some consideration of the strength of hydrogen bonds would have been welcome.

An account of the present state of knowledge of the structure of liquid water would also have provided a useful background to the properties of the hydronium ion. Another rather surprising omission, since energy curves for proton transfers are given, is any reference to the neutralization of the proton in electrolysis, one of the most direct and simple ways of observing such transfers. It would also probably not be stretching the matter too far to include those redox potentials in which protons are involved.

Another matter of considerable interest, which might well be dealt with in a future edition, might be the circumstances in which a proton, free or hydrated, can capture a free electron and the properties of the hydrogen radical so formed. In view of recent work on the chemisorption of hydrogen at metal surfaces, the polarization of hydrogen atoms and their reactivity, it is not out of the question that this subject might also find a place among the phenomena which might reasonably be included.

It is only necessary to add that the book is very well produced and, under present conditions, reasonably priced.

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SIALIC ACIDS

The Chemistry and Biology of Sialic Acids and Related Substances

By Dr. Alfred Gottschalk. Pp. ix+115+8 plates. (Cambridge: At the University Press, 1960.) 22s. 6d. net

THIS book deals with a class of naturally occurring substance which has attained great biological importance in the past few years. Although the initial chemical work on the carbohydrate components of mucous secretions was done before the beginning of this century, it was not until about ten years ago that biochemical interest in the mucins of epithelial secretions was awakened by the discovery of their role in blood-group-specific substances and in the inhibition of influenza virus haemagglutination; Dr. Gottschalk is closely associated with the latter work.

The book starts out with a clear exposition of the historical development of the subject and is followed