and Overbeek, and Derjaguin is not mentioned. Another chapter treats the atomic structure of glass, with extensive quotations from Weyl's papers on the subject. A chapter on reactions of bentonite with organic compounds discusses the formation of the organophilic clays known as 'bentones'. The reviewer was interested to read here of experiments on the possibility of forming clay esters carried out at the Massachusetts Institute of Technology by Bart and Gusman, and later Bralove, experiments which do not seem to have been published (the upshot of them is negative). Deuel's work is noted in the bibliography, but not discussed; other important papers by Berger, Greene-Kelly, Brown and Norrish, and Martin Vivaldi and Hendricks are omitted.

A final chapter contains interesting brief discussions of a series of applications with which the author has been concerned; ceramics, catalysis, agriculture, bentonite films and plastics, drilling fluids, water softening, thixotropic rubber compounds, pharmaceutics, 'bentones' and silicones. There are also chapters on silicic acid, membrane equilibrium and related topics, ultra- and electron-microscopy, rhythmic precipitation, soil stabilization and silicones.

The reviewer would not care to recommend this book to students, because of its unsystematic character, and because the author is inclined to brush aside theories he dislikes, and insinuate unorthodox opinions without fair warning. Specialists in clay studies will be interested to read Prof. Hauser's ideas, drawn from a wide and long experience, especially with regard to practical applications.

D. M. C. MacEwan

LIFE OF THE SWIFT

Swifts in a Tower

By Dr. David Lack. Pp. 239+19 plates. (London: Methuen and Co., Ltd., 1956.) 21*s*. net.

THIS is a compact book written in non-technical language and felicitous style, with frequent incidental recognition of human values and many references to general literature. Yet it is rigorously scientific in its treatment of the subject, full of original observation and with critical appraisal of earlier publications. One would not need to be an ornithologist to enjoy this account of a most remarkable bird, and of the methods used for making its close acquaintance. To the ornithologist it is a fascinating addition to knowledge of a species at once familiar and in its habits little described since the time of Gilbert White.

The British swift, with its kindred elsewhere, is the most aerial of birds—to be seen at any time during four months of summer, but usually just as a fast-moving object and often high above us. Yet it is not impossible to observe accurately under these conditions, whether it be feeding on flying insects at 25 miles per hour or making a spectacular dash at more than twice that speed; whether it be gathering nest material in mid-air or sipping water without alighting on the surface: it has been seen, by Dr. David Lack among others, to mate in flight, and there is substantial evidence that it often spends the night on the wing. Its migrations are diurnal and have repaid observation.

The domestic life of the swift, on the other hand, was until lately almost unknown, because it nests in holes which are commonly inaccessible, on high buildings, and often too far into these to be reached in any event. This book, however, describes ten years of observation of nesting swifts 'from inside'. The opportunity was offered by the colony in the ventilation holes in the tower of the University Museum at Oxford (associated in memory with the historic debate on evolution between Huxley and Wilberforce); it was ingeniously taken, by the insertion of nesting boxes with lids and glass panels which made it possible to study the birds at the closest quarters from within the tower. Many ornithologists and others have climbed the tall interior ladders to see the birds, which are unafraid of approach in these circumstances; but it is to many hours of patient observation by the author, and by his wife and other assistants, that we owe the wealth of information now presented in such attractive form. The results are of great interest, and are illustrated by remarkable electronic flash photographs by Mr. H. N. Southern, but no attempt to summarize them can be made in a short review.

It must suffice to say that there are chapters dealing with the fight for homes, with courtship, with nest-building, with laying and incubation, and with the nestlings in their naked and feathered stages. Other chapters deal with the swift at large—its feeding habits, its flight and its migration. Then there is a statistical chapter on the birth-rate of swifts; and finally a philosophical chapter on the meaning of adaptation, a theme for which the extreme specialization of the swift provides an appropriate basis.

The British swift is but one of some seventy species, the majority of which live in the tropics, while the others are long-distance migrants exploiting the transient wealth of insect-life in temperate latitudes. The author makes frequent reference to what is known about the foreign species, and he touches on the taxonomy of the group. He pays tribute to the work of Mr. E. Weitnauer, who had earlier begun a similar study of the alpine swift—a larger and pale-bellied congener—in the tower of a village church in the Jura Mountains.

Landsborough Thomson

RESONANCE AND VALENCE

Resonance in Organic Chemistry

By Prof. George Willard Wheland. Pp. xiii+846. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1955.) 120*s*. net.

THE idea that molecules, particularly organic aromatic molecules, may be conveniently described in terms of quantum-mechanical resonance between several valence-bond structures was developed in the early 1930's mainly by Slater, Hückel and Pauling, after it had been foreshadowed in 1926 by Ingold's theory of mesomerism. Since that time the theory of resonance has been widely applied by organic chemists to provide a theoretical basis for an understanding of the structure and reactions of organic molecules. Unfortunately, there has not been such a wide understanding of the basic ideas of the theory nor a sufficient appreciation of its limitations. Consequently there are to be found in the literature and in text-books a number of incorrect, or at least misleading, expositions of the theory and many examples of its misapplication. Prof. Wheland shows, for example, that recent criticisms of the theory of resonance by Russian authors are based on