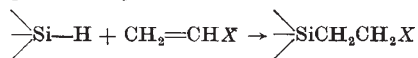
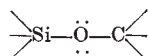


Special features are, first, the silicohydrocarbons having alkenyl, $R_2Si(CH_2.CMe=CH_2)_2$, or alkynyl groups, and Si—H and Si—Si bonds; and secondly, the organosilicon hydrides, including compounds such as $RSiHCl_2$. In addition to the lithium aluminium hydride method, other procedures for forming the Si—H bond are described. Addition to a double bond is merely one example of the fascinating reactivity of the Si—H bond:



The relative reactivity of the C—C and C—Si bonds has been much considered; but the variation of the relative reactivity of the Si—O and O—C bonds in:



and the basic function of oxygen in such compounds, according to the groups attached to Si and C, are matters in need of much further attention; $p_\pi-d_\pi$ bonding to silicon from both the lone pairs on oxygen has been suggested as a probability in certain cases.

Points of comparison among the analogous compounds of Ge, Sn and Pb provide a fitting ending to *Synthesis of Organosilicon Monomers*, which deserves a place in every chemical laboratory whatever the bias.

W. GERRARD

ELECTRICAL CONDUCTIVITY OF GERMANIUM

Progress in Semiconductors

Vol. 8. Edited by Prof. Alan F. Gibson and Prof. R. E. Burgess. (A Heywood Book.) Pp. vi+244. (London: Temple Press Books Ltd., 1964.) 70s. net.

THE latest volume of *Progress in Semiconductors* departs from the usual practice in this series and contains only one article, a substantial contribution, by Dr. E. G. S. Paige, to the literature on germanium, devoted exclusively to electrical conductivity. The sheer bulk of the present data on the transport properties of semiconductors, and of germanium in particular, poses its own problems for the planner of review articles. In the present instance the editors have evidently considered that a closely related group of topics in a well-defined field could be treated advantageously, in a unified manner, by a single author. This inevitably involves a rather wasteful duplication of material—the present article overlaps several others which have appeared in earlier volumes. Moreover, in assessing the value of a work of text-book dimensions, the element of topicality plays little part in view of the lengthy period (two years in the present case) required for publication.

What Dr. Paige has provided is a workmanlike and authoritative monograph dealing in detail with the theory of electrical (bulk) conduction in germanium and its application to experimental results. The object has not been to shed new light on the foundations of the theory, or to examine controversial aspects, but rather to present a comprehensive account within a firmly established framework.

Of the five main sections the central, and longest, contains an analysis of experimental data on carrier mobilities, Hall effect and magneto-resistance effect, in terms of the relevant scattering mechanisms and the structure of the conduction and valence bands. High-frequency phenomena, including microwave cyclotron resonance, and impurity conduction are also dealt with, but in far less detail. The theoretical foundation is laid in the first two sections, which introduce the solutions of the Boltzmann equation, specific to the germanium band structure (and non-degenerate statistics), and the calcula-

tion of relaxation times from a detailed investigation of scattering mechanisms. The last two sections deal respectively with the effects of elastic deformations and 'hot electron' problems.

In a review article of this nature, where many results are quoted and few are derived, no concessions are made to the beginner—nor, indeed, would they be expected. This is essentially a work for specialists who already possess an adequate grasp of the subject. The book (for as such it must be regarded) suffers from one minor but irritating disadvantage: if it is opened at random, there is no clue, either from the page heading or from the labelling of the equations, which indicates the exact place. The list of contents at the beginning does not help since page numbers are not given. An adequate index is, however, provided. As a source of information on a field of much diversity and elaboration, this article should provide a useful work of reference for experimentalists and theoreticians who are directly concerned with the electrical properties of germanium. B. DONOVAN

VERTEBRATE ETHOLOGY

Social Behaviour and Organization among Vertebrates Edited by William Etkin. Pp. xii+307. (Chicago and London: The University of Chicago Press, 1964.) 56s.

SOCIAL Behaviour and Organization among Vertebrates is a collective work developed as a result of the activities of the Textbook Committee of the Section of Animal Behaviour of the American Society of Zoologists. It aims at reviewing the activities of the past twenty-five years in the field of the social behaviour of animals as pursued not only by zoologists but also by experimental and clinical psychologists and other students of the behavioural sciences. Besides editing the work, William Etkin contributes four chapters which determine the scope and character of the book. The other five co-authors, Beach, Davis, Lehrman, Scott and Tinbergen, contribute a chapter each.

The book is wide-ranging and, for a co-operative work, well balanced. It gives a good general account, on the whole reasonably objective, of the contribution of modern ethology, and discusses such problems as the neuro-endocrine correlation in invertebrates, the physiological analysis of aggressive behaviour, the control of behaviour cycles in reproduction, and types of social organization in birds and mammals. The book extends far beyond the bounds hitherto considered respectable by the stimulus-response school of psychology so characteristic of North American thinking, and attempts, not always successfully, to get to grips with ethological principles, to interpret them and to relate them to sociological ideas and physiological facts. Topics as diverse as brain structure, "action-specific energy", drive, ritualization, imprinting, and innate releasable mechanisms are given special attention.

The significance of animal play is dealt with, and the widespread importance of the exploratory drive is understood. The views expressed as to the significance of the idea of instinct and the innate are somewhat muddled, and some of the very relevant contributions bearing on these problems, provided by European research workers (notably von Holst and Sokolov), are unaccountably omitted. Topics which seem to demand much more attention than they receive include homing and the orientation problem, and the development and spread of behavioural traditions in animals. A particularly excellent feature of the book is the abundance of clear and relevant illustrations coming from a wide variety of sources, some of them surprisingly and undeservedly unfamiliar. The work should be a valuable antidote for the students now being indoctrinated with the view that the whole of biology can really be summed up in the letters 'DNA'.

W. H. THORPE