heptylborane (12.1 mmoles), prepared from 1-heptene, 3.92 g (40.0 mmoles), and BH_3 (12.1 mmoles) in tetrahydrofuran,[7] was added at room temperature to a freshly prepared solution of ethyl (dimethylsulfuranylidene)acetate, prepared[6] from 12.2 g (53.4 mmoles) of (carbethoxymethyl)dimethylsulfonium bromide, and 1.16 g (48.5 mmoles) of sodium hydride in 200 ml of tetrahydrofuran.

After being stirred for 2 hr at room temperature, the solution was refluxed for an additional 3 hr. The solution was filtered and was treated with 10.0 ml of 3 *N* sodium hydroxide solution and 10.0 ml of 30% hydrogen peroxide at 30–40°. After being stirred for 1 hr at room temperature, the solution was saturated with potassium carbonate and extracted with three 50-ml portions of tetrahydrofuran. At this point, a 52% yield of ethyl *n*-nonanoate was indicated by glpc analysis.

The solvent was removed after the solution was dried over anhydrous magnesium sulfate, and the residue was distilled to afford 2.99 g, 45%, of ethyl *n*-nonanoate, bp 108–109° (8 mm), identified by comparison with an authentic sample.

The reaction of N,N-diethyl(dimethylsulfuranylidene)acetamide[6] (VI) with organoboranes proceeds in a manner analogous to that discussed above. For example, tri-*n*-hexylborane reacts with an equimolar quantity of VI to afford, after oxidation, 85% of the theoretical yield of the corresponding amide (*i.e.*, VII). Using a 4:1 molar ratio of ylide to organoborane, the over-all yield of VII is *ca.* 50%.

$$\underset{\text{VI}}{(CH_3)_2\overset{+}{S}\overset{-}{C}HCON(C_2H_5)_2} + R_3B \xrightarrow{\text{THF}} \xrightarrow[OH^-]{H_2O_2} \underset{\text{VII}}{RCH_2CON(C_2H_5)_2}$$

The functionalization of boron-bound groups is not restricted to the use of carbonyl-stabilized ylides such as IV and VI. For example, we have shown that equimolar quantities of triphenylarsonium benzylide[11] and tri-*n*-hexylborane react at room temperature under the usual conditions[4] to afford, after oxidation, 1-phenylheptane and 1,2-diphenyloctane, the product of double homologation, in a 3:1 ratio.[12] Thus, the product benzylboranes undergo hydrolytic cleavage during the course of the oxidative step.

$$(C_6H_5)_3\overset{+}{As}\overset{-}{C}HC_6H_5 + R_3B \longrightarrow \xrightarrow[OH^-]{H_2O_2}$$

$$C_6H_5CH_2R + C_6H_5CH_2CH(C_6H_5)R + ROH$$

$$R = n\text{-}C_6H_{13}$$

Acknowledgment. We wish to thank the U. S. Army Research Office (Durham) (DA-ARO-31-124-G889) for generous support of this work.

---

(11) A. W. Johnson and J. O. Martin, *Chem. Ind.* (London), 1726 (1965).

(12) The corresponding triphenylphosphonium benzylide has been shown[3] to react with organoboranes in a similar fashion, albeit under considerably more forcing conditions.

J. J. Tufariello, L. T. C. Lee, P. Wojtkowski
Department of Chemistry, State University of New York at Buffalo
Buffalo, New York 14214

Received August 14, 1967

Additions and Corrections

The Stereochemistry of the Coordination Group in an Iron(III) Derivative of Tetraphenylporphine [*J. Am. Chem. Soc.*, **89**, 1992 (1967)]. By J. L. Hoard, G. H. Cohen, and M. D. Glick. Department of Chemistry, Cornell University, Ithaca, New York 14850.

On page 1994 in Table I, the entries under B_x and B_y (columns 5 and 6) for Cl (line 2) should both read 5.4.

One-Step Synthesis of Bridged Aziridines [*J. Am. Chem. Soc.*, **89**, 5045 (1967)]. By Wataru Nagata, Shoichi Hirai, Kyozo Kawata, and Tsutomu Aoki. Shionogi Research Laboratory, Shionogi & Co., Ltd., Fukushima-ku, Osaka, Japan.

On page 5045, column 2, in line 11, $C_{22}H_{35}O_3N$ should read $C_{22}H_{33}O_3N$; in line 16, $C_{20}H_{29}O_3N$ should read $C_{20}H_{27}O_3N$; in line 19, $C_{20}H_{29}O_3N$ should read $C_{20}H_{27}O_3N$; and in line 24, $C_{22}H_{34}O_3NI \cdot 0.5H_2O$ should read $C_{22}H_{32}O_3NI \cdot 0.5H_2O$.

A New Method for Isoquinuclidine Synthesis. A Total Synthesis of Desethylibogamine [*J. Am. Chem. Soc.*, **89**, 5046 (1967)]. By Wataru Nagata, Shoichi Hirai, Kyozo Kawata, and Tamotsu Okumura. Shionogi Research Laboratory, Shionogi & Co., Ltd., Fukushima-ku, Osaka, Japan.

On page 5047, column 2, in line 9, $C_{17}H_{22}N_2O_2$ should read $C_{17}H_{20}N_2O_2$.

Stereoselectivity in Hydrogen Atom Transfer to the Vinyl Radicals Derived from the *cis*- and *trans-t*-Butyl α-Chloropercinnamates [*J. Am. Chem. Soc.*, **89**, 5251 (1967)]. By Lawrence A. Singer and Noland P. Kong. Department of Chemistry, University of Chicago, Chicago, Illinois 60639.

In footnote 15, we incorrectly cited the olefin distribution obtained from the thermal decomposition of either *cis*- or *trans-t*-butyl α-methylpercinnamate in cumene as *trans*:*cis* = 60:40. It should read *trans*:*cis* = 40:60 [L. A. Singer and N. P. Kong, *J. Am. Chem. Soc.*, **88**, 5213 (1966)]. This error invalidates the argument (on page 5254) which claims that the similarity of this ratio to that obtained from the *cis*-α-chloro system is a means of deciding that the product ratios obtained from the *cis*-α-chloro perester were more nearly the expected ones whereas those from the *trans*-α-chloro perester were richer in *cis* olefin than expected. This argument presumes that the stereoselectivity features of the α-chloro-β-phenylvinyl radical and the α-methyl-β-phenylvinyl radical are the same. In retrospect, the stereoselectivity features of the hydrogen atom transfer steps should be different since it is very probable that hydrogen atom transfer to the former is considerably faster than to the latter. Thus, the transition state involving the α-chlorovinyl radical should come earlier along the reaction coordinate and stereoselectivity factors should be less important than in the α-methyl system. The olefin product ratio should tend more toward the *trans*:*cis* vinyl radical distribution at lower scavenger concentrations as is observed in the *cis*-α-chloro perester system. Thus, we still believe the discrepancy in the kinetic parameters ($k_{\text{inversion}}/k_{\text{H transfer}}$) derived for both systems from the product ratios is associated with special features of the *trans* system. Our conclusion suggesting complexation between the acyloxy radical formed from the *trans*-α-chloro perester and π-systems remains unchanged.

The Juvenile Hormone. V. Synthesis of the Racemic Juvenile Hormone. [*J. Am. Chem. Soc.*, **89**, 5292 (1967)]. By Karl Heinz Dahm, Barry M. Trost, and Herbert Röller. Departments of Zoology and Chemistry, University of Wisconsin, Madison, Wisconsin 53706.

In Scheme I, reaction III → VI, 1.) Mg should read 1.) $NaOC_2H_5$.

Book Reviews

Interactions in Electrolyte Solutions (Metal Complex and Ion-Pair Formation in Solution). By George H. Nancollas, Professor of Chemistry, State University of New York at Buffalo, Buffalo, N. Y. American Elsevier Publishing Co., Inc., 52 Vanderbilt Ave., New York, N. Y. 1966. 14.5 × 21.5 cm. x + 214 pp. $14.50.

This monograph consists of a Preface, List of Main Symbols, Chapter 1 (Introduction, 23 pp), Chapter 2 (Experimental Methods: Determination of Association Constants, 48 pp), Chapter 3 (The Association Constant, 20 pp), Chapter 4 (Relationships Involving the Association Constant, 23 pp), Chapter 5 (Thermodynamic Properties, 49 pp), Chapter 6 (Mechanism of Complex Formation and Structure of the Complex, 13 pp), Appendix (7 tables, 26 pp), and Author and Subject Indexes.

The monograph is stated in its preface to be intended "as an introduction to the research work being done with aqueous solutions of electrolytes, particularly the thermodynamics of formation of ion-pairs and mononuclear complexes." As anyone with any knowledge of the author's contributions to this area would know it must, the book contains excellent and authoritative discussions of many important subjects. Chapter 2 falls in this category, as does Chapter 3, on the evaluation of association constants and the methods of working up data so as to obtain the most, and the most reliable, information from them. These include procedures for varying parameters for best least-squares fitting, which were not feasible before the advent of the computer. Of particular merit also are some of the interpretative passages of Chapters 4 and 5 and the tables in the appendix, in which are assembled critically selected values for ΔG°, ΔH°, and ΔS° of a large number of association reactions.

The writer of a monograph in this field is, however, confronted with a problem which the present reviewer cannot consider this book to have been completely successful in solving. This arises from the need for satisfactory theories of water structure and of the thermodynamics of aqueous ions if fully satisfactory interpretations of association processes are to be possible. Unfortunately, both water and electrolyte theories are at present in incomplete and even unruly stages, specialists in each being engaged in spirited controversies, of which the eventual outcome will seem to many still to be uncertain. In presenting a general background for his own studies, therefore (Chapter 1), and in the general discussion, for instance, of entropies of hydration (part of Chapter 5), the author has had to "decide where doctors disagree," and the results are understandably less satisfying than is the major part of the book, which reflects his own principal expertise. Thus, even aside from "proof-reading" errors, such as the statement that the Nemethy-Scheraga statistical treatment of water is rigorous (p 6) or that "For a binary electrolyte: $\bar{G} = \bar{G}^\circ + RT \ln m + RT \ln \gamma_\pm$," there are places where confusion which had crept into the literature is perpetuated, and where discrepant treatments are outlined almost side-by-side as though they supplemented, rather than contradicted, each other.

This shortcoming should not weigh too heavily against the real merit of a book which is not likely to be taken as a textbook in the subjects at issue. The disclaimer in the preface, "The present monograph is not exhaustive," also largely disarms the possible criticism that there exist "interactions in electrolyte solutions" which find no mention here, and that the degree of detail in which different interpretative essays are described is uneven. The author has a background of different degrees of involvement in these interpretations, and it is both natural and desirable that he should most emphasize what most interests him or to what he himself has most largely contributed. Every good book must necessarily bear a personal stamp, and the debt under which this author has placed us by writing this book is not lessened by its personal character.

Henry S. Frank
Department of Chemistry, University of Pittsburgh
Pittsburgh, Pennsylvania

BOOKS RECEIVED, *October 1967*

H. R. Allcock. "Heteroatom Ring Systems and Polymers." Academic Press Inc., 111 Fifth Ave., New York, N. Y. 1967. 401 pp. $16.50.

Louis F. Fieser and Mary Fieser. "Reagents for Organic Synthesis." John Wiley and Sons, Inc., 605 Third Ave., New York, N. Y. 1967. 1457 pp. $27.50.

Robert M. Mazo. "Statistical Mechanical Theories of Transport Processes." Pergamon Press Inc., 44-01 21st St., Long Island City, N. Y. 1967. 166 pp. $9.50.

A. N. Nesmeyanov and R. A. Sokolik. "The Organic Compounds of Boron, Aluminum, Gallium, Indium and Thallium." The World Publishing Co., Cleveland, Ohio. 1967. 628 pp. $24.00.

Charles P. Poole, Jr. "Electron Spin Resonance. A Comprehensive Treatise on Experimental Techniques." Interscience Publishers, John Wiley and Sons, Inc., 605 Third Ave., New York, N. Y. 1967. 922 pp. $29.75.

Hiroshi Suzuki. "Electronic Absorption Spectra and Geometry of Organic Molecules. An Application of Molecular Orbital Theory." Academic Press Inc., 111 Fifth Ave., New York, N. Y. 1967. 568 pp. $24.00.

J. M. Thomas and W. J. Thomas. "Introduction to the Principles of Heterogeneous Catalysis." Academic Press Inc., Ltd., Berkeley Square House, Berkeley Square, London, W. 1, England. 1967. 544 pp. $21.50.