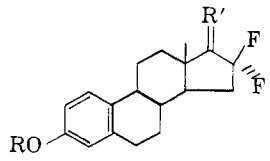
The hypocholesterolemic activity of compounds I-VI was determined in adult, male rats (Charles River), fed stock diet *ad lib.*

The compounds were suspended in peanut oil and injected subcutaneously for four days. Total serum cholesterol was determined by the method of Zak[8] and the results are presented in the accompanying table.

The estrogenic potencies were obtained by the uterotrophic response in the sexually immature mouse[9] following subcutaneous administration.[10]



RESULTS OBTAINED USING ESTRADIOL-17β AS STANDARD

Compound	Serum cholesterol lowering activity standard = 1	Uterotrophic activity standard = 1	R	R¹
I	0.42 (0.13–0.93)	0.0005	CH_3	=O
II	2.0 (1.8–2.7)	0.0001–0.006[11]	H	=O
III	0.88 (0.73–1.0)	0.0011	CH_3	OH, H
IV	4.3 (2.5–6.2)	0.02–0.03	CH_3	OH, C≡CH
V	0.65 (0.63–0.66)	0.0005–0.0045[11]	CH_3	OH, CH=CH_2
VI	~1.0	0.0004–0.0023[11]	CH_3	OH, CH_3

(8) B. Zak, *Tech. Bull. Registry Med. Technologists*, **27**, 71 (1957).

(9) Carworth Farms, strain CF-1.

(10) We wish to express our gratitude to Dr. Milton Eisler and Mr. Arthur Watnick for the uterotrophic assays.

(11) The large range is a result of non-parallel slopes shown by the dose-response curves.

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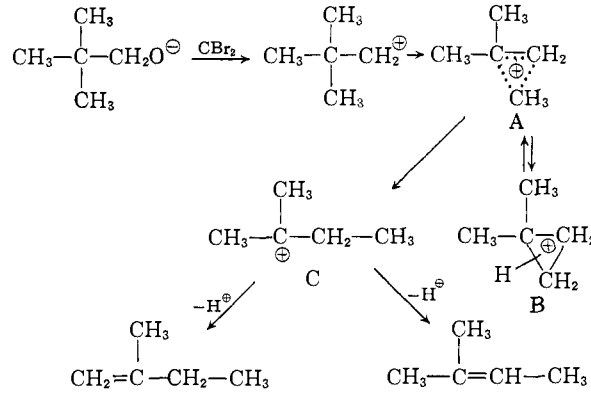
RECEIVED AUGUST 19, 1960

PROTONATED CYCLOPROPANE INTERMEDIATES IN THE NEOPENTYL CARBONIUM ION SYSTEM

Sir:

It was suggested[1] recently that protonated cyclopropanes might be important transient storage configurations for certain carbonium ions, particularly those involved in Wagner–Meerwein rearrangements. The neopentyl carbonium ion system was chosen for a critical test.

To learn whether appreciable storage in the form of a protonated cyclopropane occurred, this reaction was carried out with 1,1-dideuterioneopentyl alcohol. If equilibration between A and B occurs at rates competitive with conversion to *t*-amyl cation, then $(CH_3)_3CCD_2OH$ would be converted to $(CH_3)_2C^{\oplus}\cdot CH_2\text{-}CD_2H$ and $(CH_3)_2C^{\oplus}\text{-}CD_2\text{-}CH_3$,



and the olefins would have deuterium on both C_3 and C_4. On the other hand, if B is not a storage form for this amyl cation, only $(CH_3)_2C^{+}\text{-}CD_2\text{-}CH_3$ would be produced and the olefins would be labeled on C_3 only.

Reduction of trimethylacetic acid with lithium aluminum deuteride provided the 1,1-dideuterioneopentyl alcohol. De-oxidation of this neopentoxide ion was carried out with aqueous potassium hydroxide and bromoform. The two C_5 olefins were separated with vapor phase chromatography to provide the pure compounds which were examined with infrared and proton magnetic resonance spectroscopies. None of these examinations yielded evidence for deuterium labeling on C_4 of either olefin.

The infrared spectrum of 2-methyl-2-butene showed a sharp vinyl deuterium absorption[2,3] at 4.48 μ and was devoid of additional absorption bands up to 5.5μ, consistent with C_3 labeling only. The 2-methyl-1-butene showed C-D absorptions between 4.55 μ and 4.75 μ, yielding no additional information regarding C_3 and C_4 labeling.

Proton magnetic resonance spectra does not reveal vinyl hydrogen in the 2-methyl-2-butene or =C-CHD— in the 2-methyl-1-butene. With respect to the 2-methyl-2-butene the evidence is not strong, because the sample was small, and the vinyl hydrogen absorption of undeuterated olefin is of low intensity. The other olefin shows exactly the spectrum[4] expected for 2-methyl-3,3-dideuterio-1-butene, a quartet of vinyl hydrogens at 185.4 c.p.s. with relative intensity 2.0, a triplet of allylic methyl hydrogens at 68.2 c.p.s. with relative intensity 3.0, and a quintet of alkyl methyl hydrogens at 40.8 c.p.s. with relative intensity 3.0, all J values falling between 1.1 and 1.4 c.p.s. No other absorptions were evident, particular care being used to search the 70 to 80 c.p.s. region where allylic methylene proton absorptions were anticipated.

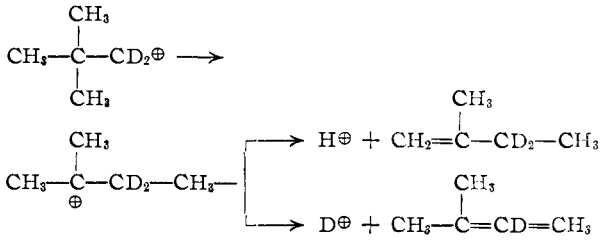
The evidence cited supports the conclusion that the 1,1-dideuterioneopentyl carbonium ion system yields rearranged olefins with deuterium labeling on C_3 only, thus excluding as significant intermediates any species in which the migrating methyl and the original methylene groups are equivalent, such as protonated cyclopropanes, etc.

(1) P. S. Skell and I. Starer, THIS JOURNAL, **82**, 2971 (1960).

(2) E. G. Hoffmann, *Ann.*, **618**, 276 (1958).

(3) P. S. Skell and R. G. Allen, THIS JOURNAL, **81**, 5383 (1959); also other unpublished work from this laboratory.

(4) 40 Mc. equipment; tetramethylsilane internal reference.



This experiment excludes a protonated cyclopropane intermediate from the neopentyl system and diminishes considerably the over-all attractiveness of the protonated cyclopropane hypothesis relative to Wagner–Meerwein rearrangements.

(5) Acknowledgment is made to the donors of The Petroleum Research Fund, administered by the American Chemical Society, for partial support of this research and to the Office of Ordnance Research, Contract No. DA-36-061-ODR-607.

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RECEIVED AUGUST 15, 1960

BOOK REVIEWS

Data for Biochemical Research. Edited by R. M. C. DAWSON, DAPHNE C. ELLIOTT, W. H. ELLIOTT, and K. M. JONES. Oxford University Press, 417 Fifth Avenue, New York 16, N. Y. 1959. xiii + 299 pp. 16 × 23.5 cm. Price, $10.10.

The rapid advances made in biochemistry within the past few years have created a need for a reference book devoted specifically to data, compounds and methods which are commonly utilized in the biochemical research laboratory. This book represents an effort along this line; information of particular interest to the biochemist, but not exclusive to him, has been collected and organized for ready reference.

The substance of the book is divided into fifteen major sections. These are: table of biochemical compounds; enzymes commonly used as laboratory reagents; buffers and physiological media; methods for the detection of biochemical compounds on paper; the properties of some ion exchange resins; isotopic data; manometry; nomograms for manometer constants; ammonium sulfate solutions; miscellaneous reagents, tests, and recipes; acid–base indicators; table of normalities; autoclaves: temperature–pressure conversion table; miscellaneous formulae; international atomic weights, 1955.

The first section constitutes more than half the book. Approximately one thousand biochemical compounds are arranged alphabetically in nineteen different groups, all compounds being classified according to their type of chemical structure. Tabulated data are given which include structural formula, molecular weight, melting or boiling point, solubility, etc. Where applicable, spectral data are provided. Columns also are listed which contain journal references for the preparation and estimation of most of the compounds. As might be suspected, the assignment of a certain compound to a particular group often is arbitrary. This, however, does not detract from the usefulness of this part of the book since a comprehensive alphabetical index is provided of all compounds which are listed in these tables.

Methods for the detection of biochemical compounds on paper comprises the other most useful and comprehensive section in this book. In an index preceding this section, compounds are listed in fourteen groups beginning with acids and ending with vitamins. The information given is readily accessible, contains numerous references, and appears to be fairly complete.

The editors did well to state that this book was not intended to be an exhaustive work of reference. Any material not meeting their criterion of being useful in the laboratory was deliberately omitted. As a consequence, I am sure that practically every biochemical investigator will find this book to be lacking in many ways with regard to his or her own specialized area of research. The very definite limits of the book in this respect have to be considered in light of the fact that even the information contained therein is not consistently presented, a not unusual development when several authors contribute to a single volume.

If the biochemist has the notion that this publication will provide him with all the reference material he needs under one cover, he will be disappointed. However, as a supplement to such standard reference volumes as "The Handbook of Chemistry and Physics" and the "Merck Index," this book will be of distinct value in the laboratory.

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Mechanical Properties of Intermetallic Compounds. A Symposium held during the 115th Meeting of the Electrochemical Society at Philadelphia, Penna., May 3–7, 1959, and sponsored by the Electrothermics and Metallurgy Division of the Society. Edited by J. H. WESTBROOK, Research Laboratory, General Electric Co. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1960. ix + 435 pp. 15.5 × 23.5 cm. Price, $9.50.

This book constitutes a publication of the 17 papers read at an international symposium on the mechanical properties of intermetallic compounds which the Electrochemical Society sponsored at Philadelphia, Pennsylvania, in May, 1959. In addition, it includes the informal discussion which followed the presentation of each paper. This latter feature is of particular importance since the conferees were world authorities in this new field of science.

The subject matter of the book may be divided into five categories. The first chapter is an excellent review of the literature by J. H. Westbrook who also served as editor of these conference proceedings. This is followed by two chapters on crystal structure and temperature. The experimental techniques for investigating the mechanical properties of these new compounds are covered in three papers dealing with tensile, fracture and extrusion studies. The next four contributions, which discuss the effects of dislocations and point defects, are followed by seven chapters dealing with the mechanical properties of specific compounds. Included in this last section are two papers of particular interest which bear on the semi-conducting compound indium antimonide.

This is a very timely book in view of the current interest in the development of alloys for practical applications at elevated temperatures. It is useful to research workers in the field since it points out many problems requiring further investigation such as bonding, slip mechanisms and the interaction of imperfections in a high temperature environment.

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