

Table I. Nmr Data for **1a** and **1c**^a

Proton	Δ^8 -THC		1c	
	Chemical shift, δ	Coupling constants, Hz	Chemical shift, δ	Coupling constants, Hz
H _{10α}	3.22	$J_{10\alpha,10\beta} = 17.0$ $J_{10\alpha,10a} = 4.5$	3.36	$J_{10\alpha,10\beta} = 17$ $J_{10\alpha,10a} = 5$
H _{10a} ^b	2.70	$J_{10a,10\beta} = 10.9$ $J_{10a,10\alpha} = 4.5$	2.73	$J_{10a,10\alpha} = 5$

^a Nmr of **1a** is for 220 MHz and 100 MHz for **1c**. ^b $J_{10\alpha,10\beta}$ was not determined for **1c**, although the signal for H_{10 a} collapsed from a complex multiplet to a broadened single peak when H_{10 β} was irradiated.

spontaneous activity. The same profile of behavior is seen after administration of Δ^8 - or Δ^9 -THC. These studies indicated that **1c** had the same intravenous minimal effective dose as Δ^8 -THC itself, that is, 0.2–0.4 mg/kg. In addition, **1c** was again as effective as Δ^8 -THC in producing bradycardia and hypotension in anesthetized dogs.

These results provide for the first time conclusive evidence that metabolism to the 11-hydroxymethyl is not a prerequisite for the above cited biological activities in the THC's. It is noteworthy that **1c** may be metabolized at other sites in the molecule similar to the natural THC's to give compounds that may have biological activity. However, the goal which was sought and obtained in this study was to establish the role of 11-hydroxylation in the activity of the THC's.

A detailed account of the pharmacological investigations of **1c** will be published at a later date.

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Book Reviews

Studies in Organic Chemistry. Paul G. Gassman, Executive Ed. Vol. 1. **Organoboranes in Organic Synthesis.** Gordon M. L. Cragg, Ed. Marcel Dekker, New York, N. Y. 1973. xii + 422 pp. 16 × 24 cm. \$24.50.

This volume is a valuable compendium for the utilization of one of today's more versatile synthetic reagents, organoboranes. The material which is presented in this volume is not designed to be a substitute for that in Professor Brown's books on hydroboration, but rather to complement it by presenting in an organized fashion examples of the broad spectrum of the synthetic applications for organoboranes. The material is presented in ten chapters with numerous references at the end of each chapter and covers the literature through mid-1972. Therefore, the only significant advance in the field which is not discussed is the preparation and use of the various organohaloboranes which have recently appeared.

Chapter 1 constitutes an introduction to the remaining nine chapters by giving an overview to the numerous synthetic applications of organoboranes. Those nine chapters can be classified into two groups, chapters 2–7 concerning hydroboration and chapters 8–10 regarding the synthetic extension to functional groups.

Chapter 2 describes the syntheses and properties of the various classes of commonly used organoboranes while chapter 3 discusses

the mechanism, stoichiometry, and stereochemistry of the hydroboration of alkenes. Chapter 4 presents in a few pages the various methods of oxidizing organoboranes to alcohols or ketones. The next three chapters detail successively with the hydroboration of functionalized alkenes, dienes and polyenes, and alkynes.

The remaining three chapters describe the use of organoboranes in functional group synthesis or transformation. Chapter 8 explores the various methods for chain extension by one, two, three, or more carbon atoms along with their mechanistic implications. Chapter 9 discusses the synthesis of alkyl halides, amines, sulfides, organomercury compounds, and other miscellaneous functional derivatives from organoboranes. The last chapter covers the reduction of a variety of functional groups with emphasis on the functional group selectivity and, in the cases of optically active organoboranes, stereoselectivity.

The book makes no pretensions about being detailed concerning reaction conditions since it contains literature references which should supply all the information necessary for the synthetic chemist. In that regard it should be an extremely valuable reference work for several years to come for any chemist involved in organic synthesis.

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