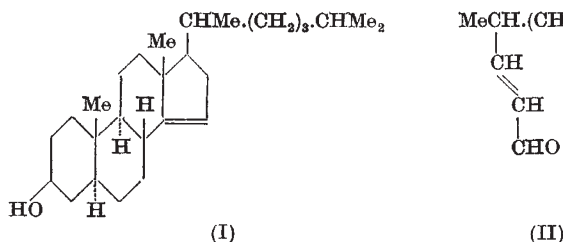


LETTERS TO THE EDITORS

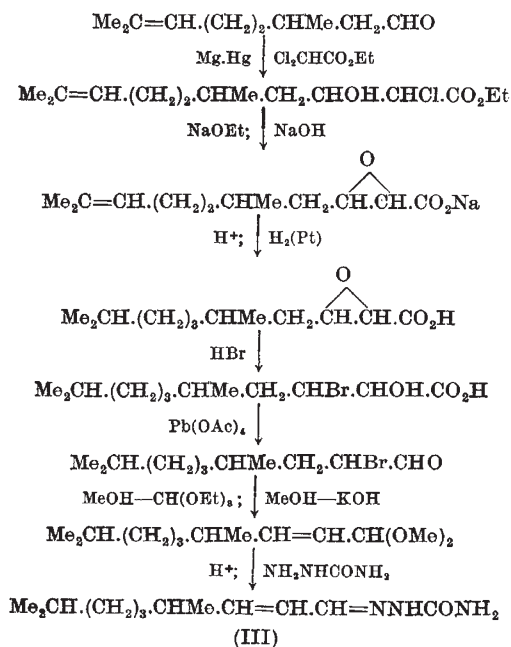
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Absolute Configuration of Cholesterol

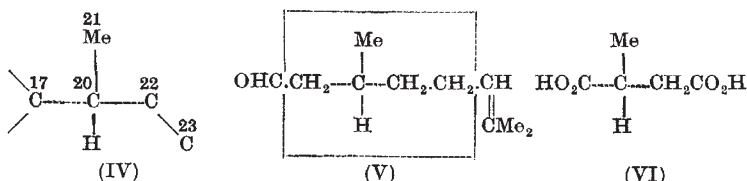
IN the course of more extensive work on degradation of cholesterol, we have made a stereochemical correlation which seems to justify an interim report.



Ozonolysis of cholest-14-en-3 β -ol (I) and pyrolysis¹ of the product at 210–220° in cyclohexane gave, as one fragment, an α -unsaturated aldehyde (II) which formed a crystalline, levorotatory semicarbazone. We have been able to synthesize this semicarbazone (III) from (+)-citronellal by the following process:



The semicarbazone from cholesterol had a melting point of 133° (somewhat variable owing to polymorphism), $[\alpha]_D^{20} - 24 \cdot 5^\circ$ ($c = 1$, dioxan). The semi-



carbazone from citronellal had a melting point of 133°–135°, $[\alpha]_D^{20} - 22^\circ$ ($c = 1$, dioxan). There was no depression of melting point on admixture. The infra-red spectra (in potassium bromide) were identical. X-ray diffraction photographs of single crystals confirmed the essential identity of the two specimens, though there was a difference in gross crystalline habit, possibly due to slight racemization of one specimen. We are obliged to Mrs. O. Kennard for this comparison and to Dr. R. K. Callow for the infra-red spectra.

The aldehyde (II) contains $C_{(20)}$ of cholesterol as the sole asymmetric centre, and the spatial relationship of $C_{(20)}$ with the other asymmetric centres of cholesterol is known, mainly from the crystallographic analysis of cholesteryl iodide². Briefly, if the absolute configuration of the ring system in steroids is represented correctly by the conventional projection (as in (I), for example), then the absolute configuration about $C_{(20)}$ is represented by (IV)³.

On the other hand, (+)-citronellal (V) has been degraded to (+)-methyl-succinic acid in the sense indicated by the dotted lines⁴. The latter acid, according to Fredga's evidence⁵ obtained from a study of 'quasi-racemates', belongs to the D-glycer-aldehyde stereochemical family and has the configuration (VI). If this assignment is accepted, it follows that the assignments (V) and (IV) are also true and that the conventional projection of the steroid molecule really represents the absolute configuration. This confirms the conclusions drawn by Mills⁶ from optical rotation differences and by Prelog⁷ from the stereochemical course of asymmetric syntheses.

A detailed account of this work will be published elsewhere.

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¹ Cf. Achtermann, T., *Z. physiol. Chem.*, **225**, 141 (1934). Laucht, F., *Z. physiol. Chem.*, **237**, 236 (1935), for analogous work with ergosterol.

² Carlisle, C. H., and Crowfoot, D., *Proc. Roy. Soc., A*, **184**, 64 (1945).

³ Cf. Klyne, W., *Chem. and Indust.*, 426 (1951).

⁴ Cf. Birch, A. J., *Ann. Reports Chem. Soc.*, **47**, 192 (1950). Intermediate stages are isopulegol, pulegone and β -methyladipic acid.

⁵ Fredga, A., and Leskinen, E., *Svedberg Memorial Volume*, 261 (1944); *Ark. Kemi, Min. Geol.*, **19 B**, No. 1 (1944).

⁶ Mills, J. A., *J. Chem. Soc.*, 4976 (1952); *Chem. and Indust.*, 218 (1953).

⁷ Prelog, V., *Helv. Chim. Acta*, **36**, 308 (1953). Prelog, V., et al., *Helv. Chim. Acta*, **36**, 320, 325 and 1178 (1953).

Structure of Bacitracin A

IN a recent letter, Porath¹ reported that bacitracin A with an activity of 60 units/mgm. could be obtained by chromatography on charcoal. From an analysis of the peptides formed by hydrolysing this material with 6 N hydrochloric acid for 72 hr. at 37°, he tentatively suggested a partial structure for the molecule.

We have studied the products of hydrolysis of a sample of commercial bacitracin (Commercial Solvents Cor-