transformation products formed by the gland are being separated and identified.

THE WORCESTER FOUNDATION FOR EXPERIMENTAL BIOLOGY, SHREWSBURY, MASSACHUSETTS, AND THE DEPARTMENT OF PHYSIOLOGY, TUFTS COLLEGE MEDICAL SCHOOL, BOSTON, MASSACHUSETTS
OSCAR HECHTER
ROBERT P. JACOBSEN
ROGER JEANLOZ
HAROLD LEVY
CHARLES W. MARSHALL
GREGORY PINCUS
VICTOR SCHENKER

RECEIVED JULY 29, 1949

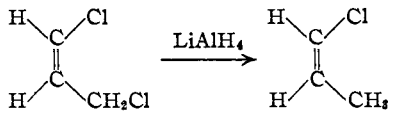
THE CONFIGURATION OF THE 1,3-DICHLOROPROPENES

Sir:

Considerable interest has been shown[1] in the structure of the two isomeric 1,3-dichloropropenes and there has not been complete agreement as to which isomer should be assigned the *cis* configuration and to which the *trans* configuration. This difference of opinion has been caused, in part, by the lack of an unequivocal proof of structure. The configuration of each of the two isomers of 1,3-dichloropropene has now been determined by chemically transforming each isomer into a compound the configuration of which has been established.

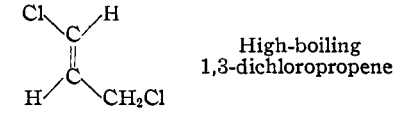
The low boiling isomer of 1,3-dichloropene (b. p. 57.5° (150 mm.), $n^{25}D$ 1.4652, d^{25}_4 1.2048) was refluxed for four hours with sufficient lithium aluminum hydride in isopropyl ether[2] to replace one chlorine atom with a hydrogen atom. By this treatment there was obtained a 50% conversion with a 46% yield of *cis*-1-chloropropene-1 having the following constants: b. p. 32.5° (749 mm.), $n^{20}D$ 1.4054 (lit.[3] b. p. 32.0–32.2° (747 mm.), $n^{20}D$ 1.4053). Similar treatment of the high boiling isomer of 1,3-dichloropropene (b. p. 112.2° (760 mm.), $n^{25}D$ 1.4712, d^{25}_4 1.2139) gave a 56% conversion with a 50% yield of *trans*-1-chloropropene-1, b. p. 37.2° (750 mm.), $n^{20}D$ 1.4048 (lit.[3] b. p. 36.7° (747 mm.), $n^{20}D$ 1.4054). In neither reaction was there any indication of the formation of a mixture of *cis*- and *trans*-1-chloropropene-1.

From these experimental data it follows that the low boiling isomer of 1,3-dichloropropene has the following configuration



Low-boiling 1,3-dichloropropene — *cis*-1-Chloropropene-1

while the high boiling isomer has the remaining configuration



High-boiling 1,3-dichloropropene

This assignment of configuration is in agreement with that proposed by Andrews and Kepner[1b] and not that proposed by Hatch and co-workers.[1a,c]

This method of ascertaining configuration is also being applied to other allylic chlorides which yield compounds of known structure upon replacement of the allylic chlorine atom by a hydrogen atom.

DEPARTMENT OF CHEMISTRY, THE UNIVERSITY OF TEXAS, AUSTIN, TEXAS
LEWIS F. HATCH
ROBERT H. PERRY, JR.

RECEIVED JULY 16, 1949

PREPARATION OF ADRENAL CORTICAL HORMONES

Sir:

We have made certain observations in the partial synthesis of adrenal cortical hormones which show that it is possible to introduce the 17α-hydroxy group in 11,20-diketo steroids. In addition we have studied the preparation of the dihydroxyacetone side-chain as exemplified by Reichstein's Compounds S and P. Since the reactions appear to be generally applicable, it is possible to prepare adrenal cortical hormones of both the 11-keto series such as Kendall's Compound E and its 11-desoxy analog, Reichstein's Compound S, both of current interest in their medical application.

When the dienol acetate derived from 3α-hydroxypregnane-11,20-dione (m. p. 200–201°; $[\alpha]^{33}D$ +105° (chloroform); $C_{27}H_{38}O_6$, calcd.: C, 70.71; H, 8.35; found: C, 70.80; H, 8.21) is treated with perbenzoic acid according to the procedure of Kritchevsky and Gallagher[1] the reaction product after saponification yielded 3α,17α-dihydroxypregnane-11,20-dione, m. p. 198–201°; $[\alpha]^{32}D$ +66° (acetone). The monoacetate of this compound, m. p. 202–204°, $[\alpha]^{34}D$ +81° (acetone), upon oxidation with chromic anhydride yielded 3α-acetoxyetiocholane-11,17-dione identical in all respects with the known compound. The enol of the 11-keto group therefore either does not react or reacts to such a negligible extent that isolation of the desired product in good yield is easily possible. This establishes the formation of a 17α-hydroxy derivative from a 20-keto steroid with an 11-keto group.

The preparation of the dihydroxy acetone side-chain characteristic of the most active adrenal hormones is illustrated by the reactions leading to the formation of Reichstein's Compounds P and S. Bromination of 3α-acetoxy-17α-hydroxyallopregnan-20-one with one mole of bromine yielded the 21-bromo derivative, m. p. 184–187°; $C_{23}H_{35}O_4Br$, calcd. Br, 17.76; found: Br, 17.47. Hydrolysis

(1) (a) Hatch and Roberts, THIS JOURNAL, **68**, 1196 (1946); (b) Andrews and Kepner, *ibid.*, **69** 2230 (1947); (c) Hatch, Gordon and Russ, *ibid.*, **70**, 1093 (1948); (d) Smith and King, *ibid.*, **70**, 3528 (1948); (e) "Data Sheet" on the 1,3-dichloropropenes published by Shell Chemical Corporation, 8/4/47.

(2) Nystrom and Brown, *ibid.*, **70**, 3738 (1948).

(3) Kharasch, Englemann and Mayo, *J. Org. Chem.*, **2**, 288 (1938).

(1) Kritchevsky and Gallagher, *J. Biol. Chem.*, **179**, 507 (1949).