Tetrahedron Letters No.28, pp. 3243-3245, 1966. Pergamon Press Ltd.
Printed in Great Britain.

RESOLUTION OF (±)-TROPINONE OXIME(1,2)

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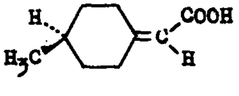
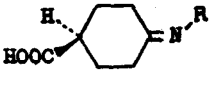
(Received 23 April 1966; in revised form 17 May 1966)

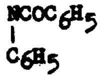
In his prediction regarding allenes, van't Hoff(3) was the first to conceive molecular asymmetry due to a geometrical configuration. But much before the first laboratory verification of the allene case by Maitland and Mills(4), the work of Perkin, Pope and Wallach(5) provided experimental validation of 'geometrical enantiomerism' in the resolution of similarly constituted alkylidenecycloalkane, 4-methylcyclohexylideneacetic acid (I). A number of doubly bonded nitrogen derivatives - oximes, semicarbazones, and phenylhydrazone derivatives (II) - have also been resolved.(6)



I

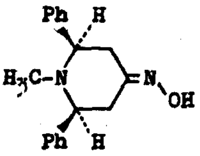


II

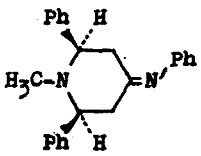


R = OH, $NHCONH_2$, $N(C_6H_5)COC_6H_5$

Similarly, geometrical enantiomerism may occur in an oxime of a ketone of the type A^R—CO—A^S, where A is a dissymmetric group. This type of molecular isomerism was designated as 'geometrical enantiomorphic isomerism' by Lyle and Lyle(7) who provided the first such recorded illustration by showing the oxime of *cis*-2,6-diphenyl-1-methyl-4-piperidone to be racemic, for it could be resolved. Now, Lyle and



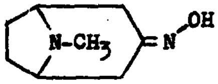
III



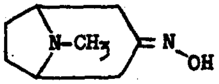
IV

Tyminisky(8) have proven the absolute configuration of the oxime (III). The reaction of the oxime tosylate with phenylmagnesium bromide has given(9,10) optically active compound IV.

We report a new example of geometrical enantiomerism. In tropinone C_1 and C_5 are asymmetric, but the molecule is optically inactive by internal compensation. However, the oxime should be racemic (Va and Vb), and this we have confirmed by resolving the (-)-tropinone oxime.



Va



Vb

Tropinone was obtained in the usual way(11,12) and converted to its oxime(13), m.p. 114°, which showed no optical rotation. The ether solution of the oxime was treated with equimolar quantity of (+)-10-camphorsulphonic acid in ether-methanol to obtain the camphorsulphonate salt, m.p. 233° (dec.). The methanol-ether solution of the salt (8.2g) was seeded with a crystal of the similar crop obtained earlier and left overnight in the cold. The needles (4.28g) which separated were repeatedly crystallized from methanol-ether and then methanol to give finally 0.32g of the salt, m.p. 238° (dec.), $[\alpha]_D^{20}$ + 17.08° (c., 1.17 in MeOH), (Anal calcd for $C_{18}H_{30}N_2O_5S$:

C, 55.96; H, 7.76; N, 7.24 %. Found: C, 55.59; H, 8.03; N, 7.10 %).

The aqueous solution of the resolved oxime salt (0.25g) was basified with potassium carbonate, saturated with sodium chloride, extracted with ether, worked, and the residue crystallized from petroleum ether to yield 0.075g of the oxime, m.p. 108-9°, $[\alpha]^{20}_{D}$ -21.65° (c., 1.38 in MeOH), (Anal calcd for $C_8H_{14}N_2O$: C, 62.30; H, 9.15; N, 18.17 %. Found: C, 62.47; H, 9.26; N, 18.02 %).

Attempts to obtain dextrorotatory isomer of the oxime were not successful.

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1. This work was supported by a grant from the University Grants Commission, New Delhi.

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