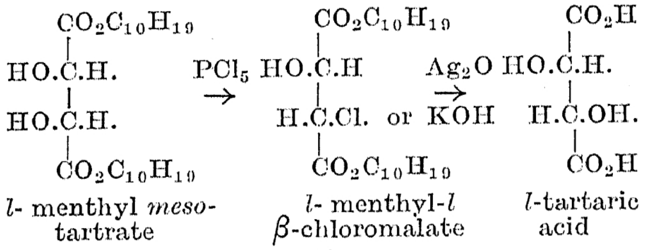
Conversion of *Meso*tartaric Acid into an optically active form by Walden inversion under asymmetric conditions.

ORGANIC compounds, containing asymmetric centres in their molecule, but inactive due to internal compensation, are generally supposed to be non-convertible into the active enantiomerides and there is no mention in chemical literature of any attempt having been made so far to achieve such a conversion. It appeared probable that if by any means the disposition of the atoms or groups attached to one of the asymmetric carbon atoms in an internally compensated compound can be altered, the resulting compound might show optical activity. But any such alteration, tried under normal conditions, by which the internal compensation can be disturbed provides a scope for the production of both the *d*- and *l*-forms in equimolecular proportions giving rise to a racemic product. Just in accordance with this concept, it was found that ethyl *meso*tartrate by the action of phosphorus pentachloride (Anna Rao and Guha, *Ber.*, 1934, **67**, 741) gave diethyl *dl*-β-chloromalate.

To overcome this difficulty, it was planned to study Walden inversion process on *meso*-tartaric acid under asymmetric conditions. If, in place of the ethyl ester, optically active ester groupings are introduced, it is hoped that, under the influence of the active ester groupings there would be formed an excess of one of the two antipodes from which an active product would arise after the ester groups have been knocked out.

An experimental verification of this conception has now been made. *l*-Menthyl *meso*tartrate has been taken as the starting material. The halogenation has been conducted by means of phosphorus pentachloride and hydroxylation by means of silver oxide or alcoholic potash. It has been found that during hydroxylation, the ester groups are also split up and the end product yields a small amount of *l*-tartaric acid according to the scheme:



$$\begin{array}{c} CO_2C_{10}H_{19} \\ | \\ HO.C.H. \\ | \\ HO.C.H. \\ | \\ CO_2C_{10}H_{19} \end{array} \xrightarrow{PCl_5} \begin{array}{c} CO_2C_{10}H_{19} \\ | \\ HO.C.H \\ | \\ H.C.Cl. \\ | \\ CO_2C_{10}H_{19} \end{array} \xrightarrow[\text{or KOH}]{Ag_2O} \begin{array}{c} CO_2H \\ | \\ HO.C.H. \\ | \\ H.C.OH. \\ | \\ CO_2H \end{array}$$

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The identity of the compound (I) has been confirmed by reducing it in an alcoholic solution by means of aluminium-mercury couple, and hydrolysing the reduction product by potash whereby an acid showing *laevo*-rotation is obtained. There is no theoretical possibility of any optically active acid other than malic acid being formed in this process.

P. C. GUHA.
V. ANNA RAO.

Department of Organic Chemistry,
Indian Institute of Science,
Bangalore,
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