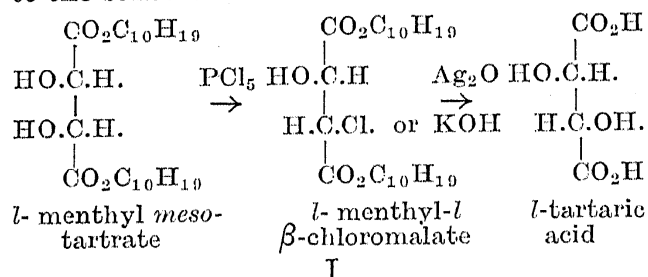


enantiomerides and there is no mention in chemical literature of any attempt having been made so far to achieve such a conversion. It appeared probable that if by any means the disposition of the atoms or groups attached to one of the asymmetric carbon atoms in an internally compensated compound can 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 mesotartrate 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 mesotartrate 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:



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.

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X-Ray Analysis of the Crystal Structure of Dibenzyl.

DIBENZYL crystallises in the monoclinic prismatic class. A preliminary X-ray analysis by Hengstenberg and Mark¹ shows that it belongs to the space group C_{2h}^2 with two molecules in the unit cell; the molecules possess a centre of symmetry. I have made a detailed X-ray analysis of the structure of this crystal, and the positions of the various carbon atoms in the unit cell are as follows: The 6 carbon atoms of each benzene ring form a regular hexagon as in diphenyl²; one of the aliphatic carbon atoms, *viz.*, C, (see Fig. 1) lies on the prolongation of the line joining the atoms 4 and 1, and the other

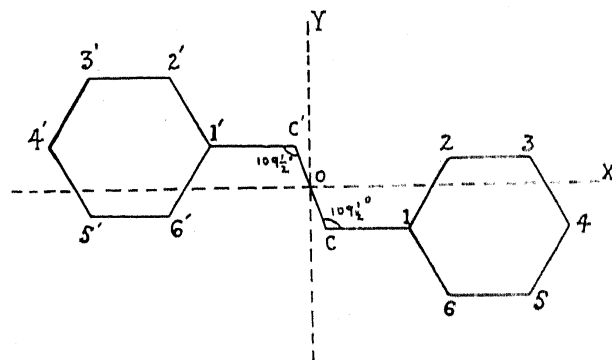


Fig. 1.

on the line joining 4' and 1' (adopting the usual notation). The line joining C and C' makes with each of the above lines (*viz.*, 4-1 and 4'-1'), the usual tetrahedral angle of $109\frac{1}{2}^\circ$. Further, the two benzene rings do not lie in the same plane, but lie in parallel planes slightly separated from each other. Thus in Fig. 1, all the carbon atoms on the right hand side of OY may be supposed to be raised above the plane of the paper by about 0.12\AA , and all the atoms on the left side to be pushed below the plane by the same distance.

In order to define the orientations of the molecules in the unit cell, consider in Fig. 1

¹ *Z. f. Krist.*, 70, 283, 1929.

² *Ind. J. Phys.*, 7, 43, 1932.

the two perpendicular axes OX and OY lying in the plane of the paper and fixed to the molecule. It is found that the OX axes of both the molecules in the unit cell lie in the b (010) plane in the obtuse angle β , making an angle of 32° with the 'a' axis (and 84° with the 'c' axis). The OY axes of the two molecules are inclined at *plus* and *minus* 60° respectively to the b (010) plane.

The orientations suggested here are identical with those deduced by Krishnan and Banerjee³ from their magnetic measure-

ments on this crystal. Their values for the above angles are 32° and $\pm 60^\circ$ respectively.

The details of the analysis will be published shortly in the *Indian Journal of Physics*.

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³ *Nature*, **130**, 313, 1932.

The Kasauli Antivenene.

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AFTER Calmette had prepared a polyvalent antivenene at the Pasteur Institute, Lille, the preparation of a similar antiserum was commenced at the Pasteur Institute, Kasauli, in 1901. By 1902 "1,020 bottles each containing 15 c.c. were distributed all over India". It was soon realised that excepting the venom of the cobra (*Naja*) the different snake venoms produced antivenenes which were strictly specific: Hence the necessity of preparing an antivenene against the Russell's viper in India. In 1905 the Central Research Institute, Kasauli, took over the preparation of the antivenene from the Pasteur Institute and started issuing to the public a combined antivenene against the cobra (*Naja*) and the Viper (*Vipera russelli*). During the following 29 years the details of preparation and standardization of the serum underwent very little change. The large bulk of antivenene which it is necessary to use has always been a disadvantage and various attempts had been made in the past to get over this difficulty by concentrating the serum. This has now been accomplished and during the present year a concentrated antivenene has, for the first time, been issued for general use. The protecting substance of the crude serum has been concentrated four times and the inert blood proteins have been eliminated. The dose of 10 c.c. issued now represents the 40 c.c. dose of the crude serum issued formerly and makes it possible to administer safely the maximum amount of serum needed for a bite of maximum intensity.

The concentration has been brought about by the application of the standard method of concentration of antisera by ammonium sulphate. The protecting substance is

removed from the plasma by a fractional precipitation with the salt. To the oxalated plasma are added 3% of a 4% solution of calcium chloride, two volumes of tap water and about 18% of the total volume so obtained ammonium sulphate, adjusting the specific gravity to 1099. The resulting precipitate (fibrin and euglobulin) is filtered off. To the filtrate is added about 10% more of ammonium sulphate and the specific gravity adjusted to 1133. The resulting precipitate is the pseudoglobulin and with it is associated the protecting substance in the blood of the horses immunised against snake venom. This precipitate is collected, pressed and dialysed. To the dialysate are added 1% of sodium chloride, enough sodium carbonate to give a reading of pH 7.6 and an antiseptic. It is then allowed to stand undisturbed until clear and filtered through a Seitz filter. The finished product is a clear fluid with a greenish or at times brownish tinge. Its protein content is below 16% and the viscosity is about six times that of normal saline.

The details of the procedure will be published shortly in the *Indian Journal of Medical Research*.

The serum is made only against the cobra and Russell's viper. It has no effect against the bite of the "Krait" (*Bungarus*) or "phoorsa" (*Echis*). As a great majority of the deaths from snake bites in India, however, occur from the bites of the first two snakes, making the antivenene polyvalent at this stage would interfere seriously with its ultimate potency against these snakes. It is hoped that in the near future it will be possible to adopt better means of immunisation, obtain more potent sera and mix them to make a polyvalent serum.