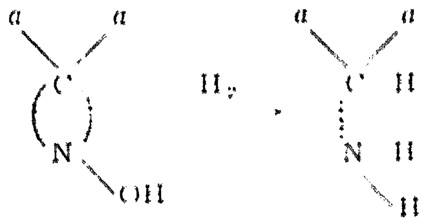
The Space Configuration of Nitrogen in the 3-Covalent State

THE configuration of nitrogen compounds of the ammonia (NH_3) or amine (Nabc) type has been an outstanding problem in stereochemistry. There are two alternatives: (a) the nitrogen atom lies in one plane with the three attached groups, so that the molecule has a plane of symmetry; (b) it does not lie in that plane, in which case the molecule has a spatial configuration.

On the latter hypothesis, compounds of the type Nabc should exist in enantiomorphous forms. This has never been observed. Evidence from physical properties of ammonia or amines, however, clearly supports the view that in these compounds, the nitrogen atom does not lie in one plane with the three attached groups. The object of this note is to furnish an unequivocal answer to this question from stereochemical evidence. The work of Mills[1] on centro-asymmetric oximes and hydrazones has conclusively proved that the doubly linked valencies of nitrogen in the oxime grouping are not coplanar with the singly linked one (I), thus:



(I) (II)

On reduction, an oxime (I) gives the corresponding amine (II). If in the molecule of the oxime, under consideration, the plane containing the doubly linked valencies of nitrogen does not *originally* contain the singly linked valency, carrying the hydroxyl group, the position of the latter linkage will remain unaltered relatively to this plane which now contains two single valencies in the resulting amine (II) in place of the original doubly linked valencies (I). In other words, the three valencies of the nitrogen atom in an amine are not coplanar. Figs. 1 and 2 are photographs of the models of an oxime and the corresponding amine: one of the two large connected spheres (Figs. 1 and 2) represents the carbon atom and the other, the nitrogen atom [illegible]

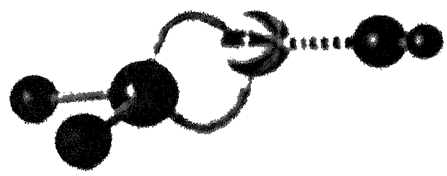


FIG. 1

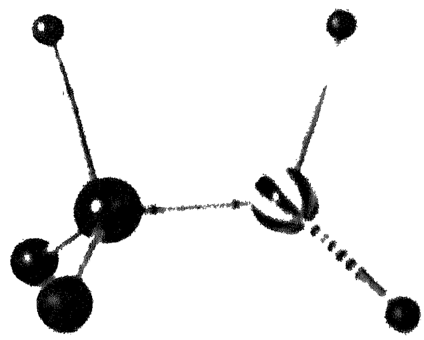


FIG. 2

a smaller sphere representing the oxygen atom is attached, the latter carries a still smaller sphere, representing the hydrogen atom. The striped link, carrying the spheres representing the hydroxyl group, is shown lying outside the plane containing the two links representing the double bond (Fig. 1). It is clearly seen that this link still lies outside the plane containing the two single links, resulting from the double link, in the corresponding model of the amine (Fig. 2). A fuller account of this work will appear elsewhere.

[illegible]
The Chemical Laboratories,
Science College, Patna,
October 26, 1938.

[1] Mills and Bain, J. [illegible] 97 [illegible]

The Endo Enzyme in Tea Fermentation

THE study of the enzyme system responsible for the 'fermentation' of tea, has been [illegible] conducted on the enzyme extracts [illegible] solvents. Both oxidase and [illegible]