X-Ray Study of the Structure of the Alkaloid C-Curarine

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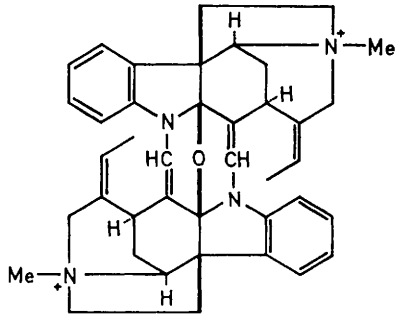
Summary X-Ray diffraction studies of the di-iodide of C-curarine provide an unequivocal structure for the central octacyclic ring and ether bridge.

THE molecular structure of the calabash curare alkaloid, C-curarine (**1**) was first proposed by Nagyvary *et al.*,[1] although the structure of the central octacyclic ring and



(**1**)

ether bridge could not be determined with certainty. Later n.m.r. studies by Grdinic *et al.*,[2] and synthetic work by Fritz and Oehl[3] indicated that the structure shown is probably correct. *X*-Ray diffraction studies in our laboratories now provide unequivocal confirmation of the proposed structure.

C-Curarine di-iodide, $C_{40}H_{44}I_2N_4O$, crystallizes from water–acetone as colourless prisms; space group $P2_12_12_1$; $a = 19{\cdot}172(4)$, $b = 23{\cdot}762(4)$, $c = 8{\cdot}252(2)$ Å; $Z = 4$. Three-dimensional intensity data, a total of 3858 reflections, were measured with a Supper–Pace automated diffractometer. The structure was solved by the heavy-atom technique through the use of successive three-dimensional electron-density syntheses. The fourth and final synthesis shows all 47 atoms, not including hydrogen. The structure was partially refined to R 0·13 by block-diagonal least-squares with isotropic temperature factors. The conformation of the molecule as viewed down the molecular two-fold axis is shown in the Figure.

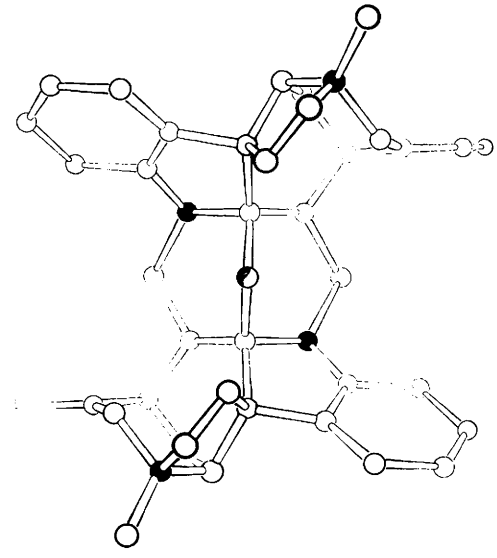


FIGURE. *Skeletal conformation of C-curarine as viewed down te molecular two-fold axis.*

The quaternary N–N distance is 8·50 Å, close to the value (8·80 Å) found for the synthetic curare-like compound, hexamethonium bromide.[4] It seems likely that these compounds exert their curarizing activity in the same manner, by competing with acetylcholine for receptor sites at the neuro-muscular endplates.

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