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SYNTHESIS OF LYCORINE-TYPE ALKALOIDS
I. 1-DESOXY-LYCORIN-7-ONE

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Lycorine Ia is the most frequently occurring alkaloid of the genus *Amaryllidaceae*,[1] and it occupies a central position among the lycorine-type alkaloids since several other alkaloids have been related chemically to it. This compound has despite of several efforts not yet been totally synthesized.[3-7] Dihydrolycorine,[8] 1-desoxy-lycorinone,[9] dihydrocaranone,[10] and clividine[11] are the closest approaches to date.

I wish to report the synthesis of some lycorine derivates, Ib,c (one of which is 1-desoxylycorin-7-one) and IIa,b. These compounds are suited for further elaborations to naturally occurring *Amaryllidaceae* alkaloids.

By use of Li-di-isopropylamid-HMPT in THF[12] it was possible to deconjugate methylsorbate III to pure IV, b.p.$_{17}$ 66-68° which with 3,4-methylenedioxy-β-nitrostyrene V gave the Diels-Alder adduct VI,[3] m.p. 115-118°C. Selective reduction with zinc and sulfuric acid in methanol/chloroform solution gave the hydroxamic acid VII, m.p. 150-152°C which, somewhat unexpectedly, on further reduction with lithium aluminium hydride afforded the hydroxylamine VIII, m.p. 122°C, as a major product. Reduction with iron powder and sulfuric acid in methanol gave the amine IX as a yellow oil which was treated directly with ethyl chloroformiate and cyclized with phosphorous oxychloride to the lactame X, m.p. 196-198°C, m.w. 269, M^+. UV (EtOH): λ_{max} 223 nm (ϵ 28400), 305 (6320). IR (KBr): 1645(s) cm^{-1}, 1616(m). NMR ($CDCl_3$): δ 7.47(s), H_8; 6.67(s), H_{11}; 5.98(s), H_{12}; 5.88 (br.s), $H_{2,3}$; 4.21(dd), J = 11.4, 7.4 cps, H_{11b}; 3.9-1.3(m), 8H. Epoxydation with *m*-chloroperbenzoic acid in methylene chloride and oxydative rearrangement of the epimeric epoxide mixture (m.p. 205-209°C from ethanol) with phenyl selenide[13] gave several products, amongst which Ib,c and IIa,b (total yield from the epoxide ~ 30%; I/II ~ 3:1) were separated by preparative TLC on silica ($CHCl_3$ + 6% MeOH).

The major component of the 1-desoxylycorin-7-one epimers Ib,c, m.p. 225-229°C, showed the following peaks in NMR ($CDCl_3$): δ 7.42(s), H_8; 6.8(d), J = 1 cps, H_{11}; 6.02(s), H_{12}; 5.73(m), H_3; 4.6(s), OH; 4.52(m), H_2; 4.0-1.5(m), 8H. MS: 285 M^+, 267, 266, 241, 240, 226, 175.

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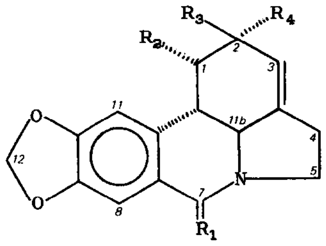

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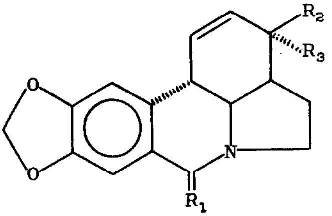
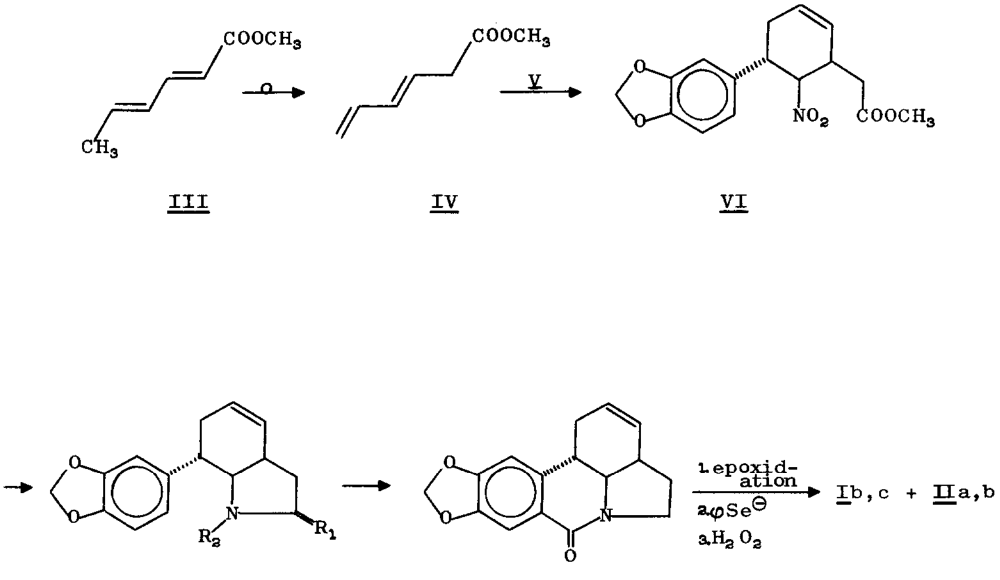


II

Ia $R_1 = H_2$, $R_2 = OH$, $R_3 = OH$, $R_4 = H$
Ib $R_1 = O$, $R_2 = H$, $R_3 = OH$, $R_4 = H$
Ic $R_1 = O$, $R_2 = H$, $R_3 = H$, $R_4 = OH$

IIa $R_1 = O$, $R_2 = H$, $R_3 = OH$
IIb $R_1 = O$, $R_2 = OH$, $R_3 = H$



III IV VI

X

VII $R_1 = O$, $R_2 = OH$
VIII $R_1 = H_2$, $R_2 = OH$
IX $R_1 = H_2$, $R_2 = H$

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