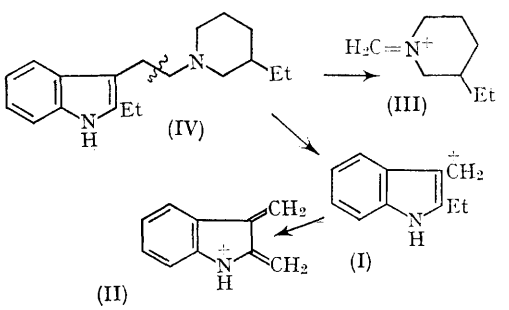
Isolation and Structure of an Indole Alkaloid of Biogenetic Interest from *Tabernamontana Cumminsii*

By P. A. CROOKS, B. ROBINSON,* and G. F. SMITH

(*Departments of Pharmacy* and Chemistry, University of Manchester, Manchester* 13)

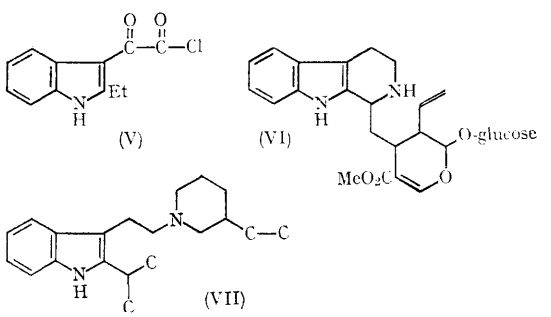
THE ether-soluble bases (14·2 g.) obtained from the leaves of *Tabernamontana cumminsii* were subjected to column chromatography on alumina (grade H). Preparative t.l.c. of the ether eluate on alumina with ether–light petroleum (30–40°) (3 : 1 v/v) as solvent led to the isolation of several alkaloids, one of which was obtained as an oil (1·9 mg.).

This alkaloid, $C_{19}H_{28}N_2$,† has a u.v. spectrum with λ_{max} (ethanol) 292, 285, and 227; λ_{min} 289·5 and 250—251 mμ (log ε 3·86, 3·88, 4·57, 3·84, and 3·42) which is characteristic of an indole chromophore. Its mass spectrum has a molecular ion peak at *m/e* 284, and intense peaks at *m/e* 158, 143, and 126 (base peak) which are attributed to the ions (I), (II), and (III) respectively. These data lead to (IV) 2-ethyl-3-[2-(3-ethylpiperidino)-ethyl] indole as the possible structure of the alkaloid, ions (I) and (III) being formed by cleavage of the aminoethyl side-chain in (IV) as shown, and ion (II) arising from further fragmentation of (I).



This postulation has been verified by synthesis. 2 Ethylindole[1] was condensed with oxalyl chloride to afford (V), which reacted with 3-ethylpiperidine to give the corresponding amide which on reduction with lithium aluminium hydride gave (IV) as an oil (picrate, m.p. 137—138°). The synthetic product has u.v. and mass spectra and t.l.c. characteristics [R_F 0·98, 0·66, and 0·30 on alumina plates in ether, ether–benzene (1 : 1 v/v), and ether–light petroleum (b.p. 30—40°) (2 : 5 v/v)] identical with the natural base.

In view of the demonstration that strictosidine (VI)[2] is converted in *Vinca rosea* into vindolinine[3] and into all the main indole alkaloid skeletal types,[4] it seems likely that compounds of the skeletal type (VII) are intermediates in the conversion of strictosidine *via* a *Strychnos* type skeleton into *Aspidosperma* and *Iboga* types.[5]



The alkaloid (IV) is of particular biogenetic significance as it can be regarded as a derivative of a biogenetic intermediate, having the skeleton of (VII), which has been trapped by loss of its critical functional groups. This is the first demonstration of the natural occurrence of monomeric alkaloids of this skeletal type, although the secamines, which are dimers composed of two units of (VII), were the first alkaloids of this class to be isolated.[6]

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† Since only a small amount of alkaloid was available, this molecular formula was determined by accurate mass measurement.

[1] F. Piozzi and M. R. Langella, *Gazzetta*, 1963, **93**, 1382.
[2] G. N. Smith, *Chem. Comm.*, 1968, 912; R. T. Brown, G. N. Smith, and K. S. J. Stapleford, *Tetrahedron Letters*, 1968, 4349.
[3] R. T. Brown, G. N. Smith, and K. S. J. Stapleford, unpublished results (1968).
[4] A. R. Battersby, personal communication (1968).
[5] E. Wenkert, *J. Amer. Chem. Soc.*, 1962, **84**, 98.
[6] D. A. Evans, G. F. Smith, G. N. Smith, and K. S. J. Stapleford, *Chem. Comm.*, 1968, 859.