respect the close affinity of *D pruinosa* and *D leichhardtii*[3] is substantiated 3α-Tigloyloxytropane has been reported previously from the roots only of *Datura* although it is a known constituent of the aerial parts of some *Scopolia*,[4] *Solandra*,[5] *Duboisia*[6] and *Anthocercis*[7] species The isolation of littorine and cuscohygrine is consistent with their recently reported[8] occurrence throughout the genus

EXPERIMENTAL

Cultivation Seedlings raised under glass, Nottingham, and subsequently transferred to open land Collection at the flowering and fruiting stage

Extraction of alkaloids Powdered plant material, $Ca(OH)_2$ and H_2O (5 1 2) allowed to stand for 1 hr and then exhausted with Et_2O, solvent removed from extract

Fractionation of alkaloids Aerial parts The basic residue from the extraction was submitted, in Et_2O, to kieselguhr supporting $N\text{-}H_2SO_4$ (2 1) Pigments were eluted with Et_2O, $CHCl_3$-soluble alkaloidal sulphates with $CHCl_3$, and other bases were recovered in $CHCl_3$ from the extruded column made alkaline with NH_4OH Subsequent fractionation of bases was effected on kieselguhr at pH 6 8 (typically kieselguhr 25 g, 0 5 M-phosphate buffer solution 12 5 ml) with light petrol b p 40–60° (elution of apohyoscine, tigloidine, apoatropine), Et_2O (elution of hyoscine, norhyoscine and 3α-tigloyloxytropane), $CHCl_3$ (elution of littorine, atropine and noratropine) and ammoniacal $CHCl_3$ (elution of tropine and ψ-tropine) as eluants Repeated chromatography was often necessary to purify individual alkaloids Roots The ether extract was fractionated (kieselguhr 10 g, 0 5 M-phosphate buffer solution, pH 6 8, 5 ml) and the alkaloids eluted as above, 3α,6β-ditigloyloxytropane and 3α,6β-ditigloyloxytropan-7β-ol were obtained in the initial light petrol eluate and were separated on kieselguhr at pH 5 6 Cuscohygrine was isolated from the ammoniacal $CHCl_3$ fraction

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(24*S*)-ETHYLCHOLESTA-5,22,25-TRIENE-3β-OL FROM FOUR *CLERODENDRON* SPECIES

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Key Word Index—*Clerodendron* sp , Verbenaceae, (24*S*)-ethylcholesta-5,22,25-triene-3β-ol

Plants Clerodendrum indicum L (Syn *Clerodendron siphonanthus* R Br), *C infortunatum* L , *C phlomides* L. and *C neriifolium* Wall (voucher specimen Nos 14/72, 15/72, 2/72 and

11/71 respectively, deposited at Jipmer) *Uses.* Medicinal [1] *Previous work* Flavonoids of leaves [2-4]

Present work A systematic examination of the C_6H_6 extractives of the leaves of all the above *Clerodendron* species revealed the presence of a sterol, this was separated by adsorption chromatography over neutral Al_2O_3 using light petrol, C_6H_6 and $CHCl_3$ in different proportions successively, the C_6H_6 eluate yielded colourless needles, $C_{29}H_{46}O$, m p 151–153°. Its acetate, m p 147–148°, had the following spectral characteristics ν_{KBr}^{max} 1728 (ester), 1640 and 882 (=CH_2) and 957 cm^{-1} (trans disubstituted double bond) NMR (δ values) 0 70 (*s*, 3H, $C_{18} \rightarrow$ Me), 0 83 (*t*, *J* 7 Hz, 3H, $-CH_2-C\underline{H}_3$) 0 99 (*d*, *J* 6 Hz, 3H, $-CH-C\underline{H}_3$), 1 03 (*s*, 3H, $C_{19} \rightarrow$ Me), 1 63 (*s*, 3H, $C_{27} \rightarrow$ Me), 2 02 (*s*, 3H, –O–CO–Me), 4·03 (*m*, 1H, C_3–H), 4 69 (*s*, *br*, 2H, $>C=CH_2$), 5 23 (*m*, 2H, –CH=CH) and 5 40 (*m*, 1H, C_6–H) The parent compound was identified as (24*S*)-ethylcholesta-5,22,25-triene-3β-ol and the identity was confirmed by direct comparison, m m p and co-TLC ($AgNO_3$ impregnated silica gel) with an authentic specimen

Comment The title compound was isolated for the first time as a natural product by Bolger *et al* from *Clerodendrum campbellii*[5] and subsequently by Joshi and Kamat from *Enhydra fluctuans* (Compositae) [6] The present report of its occurrence from four more *Clerodendron* species suggests that this sterol may be considered as a possible chemotaxonomic marker of the genus *Clerodendron*

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ZYGACINE AND ZYGADENINE: THE MAJOR ALKALOIDS FROM *ZYGADENUS GRAMINEUS*

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Key Word Index—*Zygadenus gramineus*, Liliaceae, ceveratrum alkaloids, zygacine, zygadenine

Plant Zygadenus gramineus–Liliaceae *Source* Antelope Range Experimental Station, Buffalo, South Dakota (voucher specimen is deposited in the College of Pharmacy).

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