An alternative biogenetic proposal for the formation of a biphenyl involves aldol type cyclization (a) of an arylpolyketide;[7] such biphenyls probably occur in Guttiferae[8] where the alternative Claisen type cyclization (b) leads to benzophenones which are the precursors of xanthones (Scheme 2).[7]

EXPERIMENTAL

All UV spectra were determined in MeOH, IR spectra as Nujol mulls. NMR spectra were measured in $CDCl_3$ or $(CD_3)_2CO$ on a Varian HA 100 instrument and MS with A.E.I. MS12 and MS9 spectrometers. Column and preparative chromatography were carried out with silica gel (Merck Kieselgel G) or neutral alumina (Woelm).

Extraction of Litsea turfosa. The powdered bark was extracted continuously for 24 hr with hot $CHCl_3$. Evaporation of the solvent left a dark red tar which was poured into dil. H_2SO_4 and stirred vigorously. The aqueous solution was then extracted with $CHCl_3$ which yielded a brown oil *A*. The aqueous solution was basified with dil. NH_4OH and extracted several times with $CHCl_3$. Evaporation of the $CHCl_3$ left a brown solid *B*.

Examination of oil A. TLC of oil *A* showed a white fluorescent spot (R_f 0·38) in C_6H_6–EtOAc (17·3). Preparative TLC followed by recrystallization from EtOH afforded a crystalline solid m.p. 106–7°. λ_{max} (log ϵ): 221 (4·66), 289 nm (3·78). This compound was identified as dehydrodieugenol by direct comparison with a synthetic sample.

Examination of solid B. Solid *B* was chromatographed on a column of neutral alumina eluting with C_6H_6, $CHCl_3$ and MeOH and mixtures of these solvents. Elution was followed by TLC. *Boldine.* TLC of the fractions obtained from $CHCl_3$ and $CHCl_3$–MeOH (1%) elutions afforded boldine m.p. 163–4° (Lit[9] 161–3°) λ_{max} (log ϵ) 219 (4·5), 282 (4·1) and 303 nm (4·1). Its MS gave a molecular ion at *m/e* 327. The base was found to be identical with an authentic sample of boldine (IR, m.m.p.). *Laurolitsine.* TLC of the fractions obtained from $CHCl_3$–MeOH (5%) elutions afforded laurolitsine m.p. 133–5° (Lit.[9] 136°) λ_{max} (log ϵ): 222 (4·38) 283 (4·11), 304 nm (4·09). Its MS gave a molecular ion at 313·1298 (Calc. for $C_{18}H_{19}O_4N$: M 313·1314) and its NMR was assigned as follows: Three one-proton singlets at 3·54 τ (C-3), 3·36 τ (C-8) and 2·44 τ (C-11) and methoxyl absorptions at 6·24 τ (C-10 MeO) and 6·46 τ (C-1 MeO).

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PALLIDINE AND CORYDINE FROM *THALICTRUM DIOICUM*

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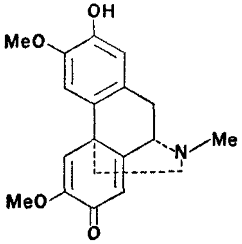
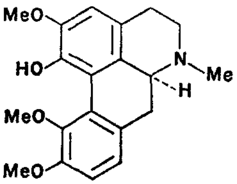
Key Word Index—*Thalictrum dioicum*; Ranunculaceae; isoquinoline alkaloids; pallidine; morphinandienone; corydine; aporphine.

Plant. Thalictrum dioicum L., collected in central Pennsylvania. *Previous work.* None. *Isolation and identification.* The powdered whole plant was extracted with EtOH, and the extracts separated into phenolic and non-phenolic bases. The phenolic bases, on chromatography over silica gel, gave pallidine (I), $[\alpha]_D^{25}$ −19° (c 0·2, CHCl$_3$), λ_{max}^{MeOH} 206, 235 and 283 nm (log ε 4·36, 3·92 and 3·61).[1] A bathochromic shift in alkaline medium indicated the presence of a phenolic function. IR (CHCl$_3$). 3545, 1666, 1640 and 1620 cm^{-1}. NMR (CDCl$_3$). δ 2·44 (s, 3H, N–C$\underline{\mathrm{H}}_3$), δ 3·82 and 3·89 (s, 3H × 2, OC$\underline{\mathrm{H}}_3$), δ 6·30, 6·48 6·67 and 6·87 (s, 1H × 4, Ar$\underline{\mathrm{H}}$). MS. m/e 327 (M, 100), 326 (30), 312 (63), 311 (5), 299 (19), 298 (15), and 284 (50). The O-acetate derivative obtained from treatment with acetic anhydride in pyridine was identical with an authentic sample of pallidine-O-acetate in terms of TLC R_fs and NMR spectra. This is the first report of the isolation of a morphinandienone alkaloid from a *Thalictrum* species.[2]



(I)



(II)

The apparently non-phenolic bases on chromatography over silica gel gave (+)-corydine (II), $[\alpha]_D^{25}$ +204° (c 0·6, EtOH), λ_{max}^{EtOH} 218, 262, 270 and 302 nm (log ε 4·19, 3·72, 3·70 and 3·40); a pattern typical of a 1,2,10,11-tetrasubstituted aporphine. NMR (CDCl$_3$). δ 2·54 (s, 3H, NC$\underline{\mathrm{H}}_3$), δ 3·73 and 3·88 (s, 3H and 6H, OC$\underline{\mathrm{H}}_3$), δ 6·7 (s, 1H C-3H), δ 6·83 and 7·07 (AB_q, J 8 Hz, C-8H and C-9H). MS. m/e 341 (M$^+$, 100), 326 (60), 310 (88), 298 (14) and 283 (8). The alkaloid was identical with an authentic sample of corydine by TLC R_fs and NMR spectra.[3] Although several aporphines have previously been found in *Thalictrum* species, this is the first finding of corydine in this genus.[2]

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