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THE SYNTHESIS OF ORTHO-ISOPENTENYL PHENOLS

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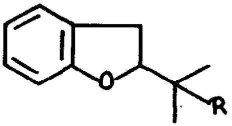
Some natural products contain o-isopentenylphenol groups, the synthetic methods for which are unsatisfactory except with some polyhydric phenols.[1] We have investigated new syntheses, particularly with a view to preparing (6) required as a biosynthetic intermediate. Appropriate chromenes and dihydrofuranobenzenes can be made by standard methods and should undergo ring-fission by metal-ammonia reduction to the desired grouping.

Compounds (1; R = OAc or Cl), both obtained from (1; R = OH) itself ultimately derived from coumarin, on reduction with Li in ammonia gave (2). The chromene (3) also derived from coumarin[2] also produced (2), the properties of which agree with those reported[3] and expected. In particular the p.m.r. spectrum accords with the structure: τ ($CDCl_3$) 8.29d (6H, J 1.3 c.p.s.) CMe_2; 6.70d (2H, J 7.5 c.p.s.) $ArCH_2$; 4.72m (1H) CH=C; 4.68s (1H) OH, removed by D_2O; 2.9-3.4m (4H) ArH. The 3,5-dinitrobenzoate had m.p. 85°

The action of 3,3-dimethylacrylyl chloride and aluminium chloride on ethyl p-hydroxyphenylacetate gave after hydrolysis (4), reduced and dehydrated to (5), m.p. 93-95°, the spectra of which accord with the structure, e.g. τ 8.61 (6H) CMe_2, 4.43d (1H, J 10 c.p.s.) (C=CH); 3.72d (1H, J 10 c.p.s.) ArCH=C. Lithium-ammonia reduction of (5) gave the desired (6), m/e 220, $C_{13}H_{16}O_3$, with appropriate spectra.

Dimethylchromene and related cyclic ethers, when found in natural products probably represent oxidation products of an initial o-isopentenylphenol, e.g.[4] An efficient method of reconversion into hypothetical precursors would therefore be useful in biosynthetic investigations. Robustic acid (7) was reduced with sodium (2 equivalents) in liquid ammonia to (8; R = Me) m.p. 200-207°, $C_{22}H_{22}O_6$, τ (acetone - d_6): 8.29d (6H, J 6 c.p.s.) CMe_2; 6.66d (2H, J 6.7 c.p.s.) $ArCH_2$; 6.26s (3H) 4' - OMe; 6.06s (3H) 5 - OMe; 4.8m (1H) CH=C; 3.38s (1H) H - 8; 3.19d and 2.64d (4H, J 8.3 c.p.s.) H - 2', 3', 5', 6'. The use of more metal and a longer time gave (8; R = H) m.p. 186-188°, m/e 368, with appropriate spectra.

Scandenin can be similarly reduced and further results will be reported elsewhere with Dr. A. Pelter.



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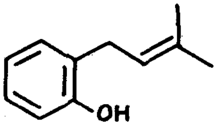

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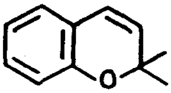

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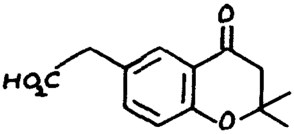

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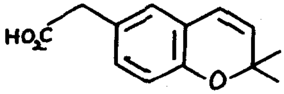

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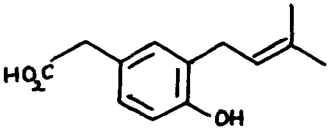

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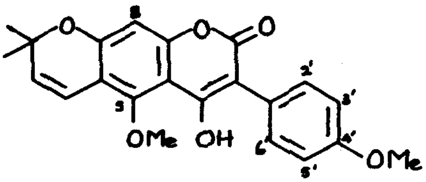

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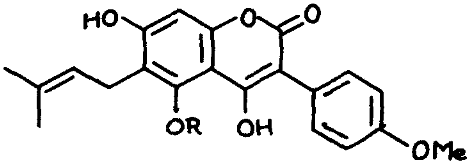

(8)

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