Synthesis of 1,2,5,6,10a,10b-Hexahydroindeno[7,1,2-*hij*]quinolizine-3,10-dione: a New Heterocyclic Ring System

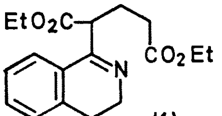
By V. ASKAM* and R. H. L. DEEKS

(*Welsh School of Pharmacy, University of Wales Institute of Science and Technology, Cathays Park, Cardiff* CF1 3NU)

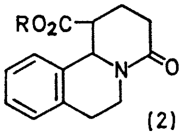
Summary Diethyl 1-(3,4-dihydroisoquinol-1-yl)glutarate is cyclised reductively to give ethyl 4-oxo-1,3,4,6,7,11b-hexahydro-2*H*-benz[*a*]quinolizine-1-carboxylate: this ester and the corresponding acid are further cyclised by polyphosphoric acid forming 1,2,5,6,10a,10b-hexahydroindeno[7,1,2-*hij*]quinolizine-3,10-dione.

peri-CYCLISATIONS of derivatives of 1-carboxyalkyltetrahydroisoquinoline into an aromatic ring activated by methoxy-groups are known.[1] We report a comparable *peri*-cyclisation of a benzoquinolizine derivative into an unactivated nucleus and leading to a previously unreported indenoquinolizine ring system.

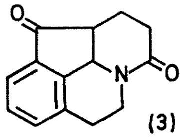
Diethyl 1-(3,4-dihydroisoquinol-1-yl)glutarate (**1**) was prepared by a modification of the method of Agbalyan *et al.*[2] in which dimethylformamide was used as solvent. Hydrogenation at 60° and normal pressure using 5% palladium–charcoal gave ethyl 4-oxo-1,3,4,6,7,11b-hexahydro-2*H*-benz[*a*]quinolizine-1-carboxylate (**2**; R = Et)[†] m.p. 98—100° (ether–40/60 petroleum). The ester was easily hydrolysed to the corresponding acid (**2**; R=H), m.p. 229—230° (water). When heated with polyphosphoric acid at 170° for 10—15 min. both the ester and acid gave 1,2,5,6,10a,10b-hexahydroindeno[7,1,2-*hij*]quinolizine-3,10-dione (**3**), m.p. 188—190° (ethanol) in 70% yield. The structures of this compound and of the acid (**2**; R = H) and the ester (**2**; R = Et) were confirmed by chemical tests and by i.r. and n.m.r.



(1)



(2)



(3)

We thank Biorex Laboratories Ltd., for a research fellowship awarded to R.H.L.D.

(*Received, March 24th,* 1970; *Com.* 421.)

[†] Satisfactory elemental analyses have been obtained for all new compounds.

[1] G. C. Morrison and J. Shavel, *J. Org. Chem.*, 1964, **29**, 2486; K. Bernauer, *Experientia*, 1964, **20**, 380; R. M. Carlson and R. K. Hill, *J. Org. Chem.*, 1966, **31**, 2385; K. Bernauer, *Helv. Chim. Acta*, 1968, **51**, 1119.

[2] S. G. Agbalyan, L. A. Nersesyan, and Zh. A. Khanamiryan, *Armyan. khim. Zhur.*, 1967, **20**, 45.