LE II 3

THE TRIETHYLAMMONIUM FORMATE REDUCTION OF 2-, 3- and 4-ACETYLQUINOLINES

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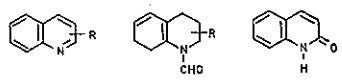
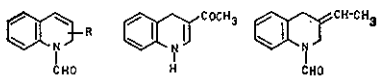
The reductions of ketones Ia — c with triethylammonium formate afforded 1-formyl-C-ethyl-1,2,3,4-tetrahydroquinolines (IIa-c). In addition to these products of reduction of the acetyl group and the pyridine part of the molecule some other products were also isolated. 2-Acetylquinoline (Ia) yields also 2(1H)-quinolone (III) and 1-(2-quinolyl)ethanol (Id). Analogous reduction of 3-acetylquinoline (Ib) gives rise to the product of 1,4-addition, i.e. V, in addition to IId-f, IV, VI and finally IIb, already mentioned. Reduction of 3-acetyl-1,4-dihydroquinoline (V) and 3-acetyl-1-formyl-1,2,3,4-tetrahydroquinoline (IId) carried out separately produced the same products as the reduction of 3-acetylquinoline (Ib). Thus we assume the reduction of Ib proceeds through the 1,4-dihydroproduct V. The reduction of 4-acetylquinoline (Ic) gives rise to 4-ethylquinoline (Ie) and 4-ethyl-1-formyl-1,2-dihydroquinoline (IVb) in addition to IIc.



Ia, R = 2-$COCH_3$
Ib, R = 3-$COCH_3$
Ic, R = 4-$COCH_3$
Id, R = 2-$CH(OH)CH_3$
Ie, R = 4-CH_2CH_3

IIa, R = 2-CH_2CH_3
IIb, R = 3-CH_2CH_3
IIc, R = 4-CH_2CH_3
IId, R = 3-$COCH_3$
IIe, R = 3-$CH(OCHO)CH_3$
IIf, R = 3-$CH(OH)CH_3$

III



IVa, R=3-CH_2CH_3
IVb, R=4-CH_2CH_3

V

VI

LE II 4

MICHAEL TYPE ADDITIONS WITH 2-NITROMETHYLPYRIDINE AND 4-NITROMETHYLPYRIDINE

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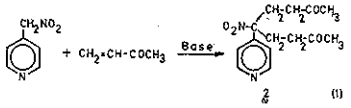
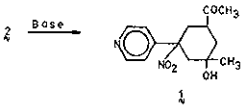
Michael type additions of 4-nitromethylpyridine with one or four equivalents of methyl vinyl ketone in the presence of base afforded as the only product 1-methyl-2-acetyl-4-nitro-4-(4-pyridyl)-1-cyclohexanol (1). Apparently, the cyclic nitro alcohol was formed during the reaction from the original Michael diadduct 2 by an intramolecular aldol condensation (eq 1).

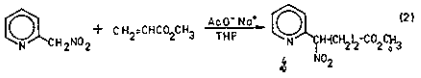


(1)



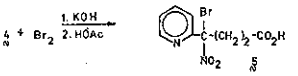
2-Nitromethylpyridine reacted similarly with methyl vinyl ketone to give the cyclic alcohol, 1-methyl-2-acetyl-4-nitro-4-(2-pyridyl)-1-cyclohexanol (3). The structures of compounds 1 and 3 were indicated by their spectral data and by their conversions to monosemicarbazones.

The reaction of 2-nitromethylpyridine with methyl acrylate gave exclusively the monoadduct, methyl 4-nitro-4-(2-pyridyl)-butanoate (4), even when an excess of methyl acrylate was employed (eq 2).



(2)

On bromination in basic medium compound 4 was converted to 4-bromo-4(2-pyridyl)-butanoic acid (5) (eq 3).



(3)

LE II 5

A CONVENIENT METHOD FOR THE PREPARATION OF THIENO[2,3-b]PYRIDINES

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The readily available 2-amino-3-cyanothiophenes were allowed to react with ethyl aminocrotonate to give 80—95 per cent yield of the corresponding 2-[N-(3'-ethoxycarbonyl-2'-propenyl)]-amino-3-cyanothiophenes. The latter compounds were cyclized in the presence of sodium ethoxide to give ethyl 4-aminothieno [2,3-b]pyridine-5-carboxylates, in high yields. The base hydroacids.