Synthesis of 3-Oxo-10a,1-dihydropyro[3,4,5-ij]6-oxoquinolizine

During the course of work on the synthesis of alkaloidal compounds possessing quinolizidine ring, 1,3-bis(ethoxycarbonyl) and 1-cyano-3-ethoxycarbonyl-8-methoxy-methyl-4-oxoquinolizines (Ⅲ) were synthesized by the route shown in Chart 1. On boiling these compounds with hydrochloric acid, a compound (Ⅲ), formed by the saponification of ethoxycarbonyl group in 3-position and decarboxylation, and 3-oxo-10a,1-dihydropyro[3,4,5-ij]6-oxoquinolizine (IX) were obtained. In this case, saponification of ethoxycarbonyl or nitrile group in 1-position is accompanied by the elimination of methanol from that and methoxymethyl group in 9-position and a 8-lactone (IX) is formed. Formation of a lactone from methoxyl and carboxyl groups has never been found as yet and it is considered that the bonds in 1- and 9-positions are in the same direction in these 4-oxoquinolizine compounds and easily form a six-membered lactone.

2-Methyl-3-hydroxymethylpyridine (I) (b.p. 125~127°; picrate, m.p. 166~168°) was obtained by the reduction of ethyl 2-methylnicotinatex1 with LiAlH4 in ether. (I) was chlorinated with SOCl2 and boiled with MeONa in MeOH, affording 2-methyl-3-methoxymethylpyridine (Ⅱ), b.p. 107~110° (picrate, m.p. 140~141°).

Reaction of (Ⅱ) and CO(OEt)2 in the presence of KNH2 afforded ethyl 3-methoxymethyl-2-pyridylacetate (Ⅲ), b.p. 148° (picrate, m.p. 116~118°), while application of H2O2 to (Ⅱ) in glacial AcOH with warming gave 2-methyl-3-methoxymethylpyridine 1-oxide (Ⅳ), b.p. 135~138°; m.p. 56~60° (picrate, m.p. 92~95°).

$$\text{CH}_2\text{OH} \xrightarrow{i) \text{SOCl}_2} \text{CH}_2\text{OMe} \xrightarrow{ii) \text{MeONa}} \text{CH}_2\text{OMe} \xrightarrow{\text{CO(OEt)}_2} \text{CH}_2\text{OMe} \xrightarrow{\text{KOH}} \text{CH}_2\text{CN} \xrightarrow{i) \text{SOCl}_2} \text{CH}_2\text{OMe} \xrightarrow{ii) \text{NaCN}} \text{CH}_2\text{CN}$$

(Ⅴ)

EtOCH=C(CO(OEt))2 → MeOH2C R1 \[ R2 \]

(Ⅶ)

HCl → MeOH2C R1 \[ R2 \]

Chart 1.

(Ⅳ) was boiled with Ac2O to form 2-acetoxyethyl-3-methoxymethylpyridine, b.p. 135~138° (picrate, m.p. 132~135°), which was saponified by boiling with KOH in EtOH, and 2-hydroxymethyl-3-methoxymethylpyridine (Ⅴ), b.p. 120~125° (picrate, m.p. 127~128°), was obtained. Chlorination of (Ⅴ) with SOCl2 afforded 2-chloromethyl-3-methoxymethylpyridine (picrate, m.p. 112~114°) and this was boiled with NaCN in MeOH, affording 2-cyanomethyl-3-methoxymethylpyridine (Ⅵ), b.p. 110~115° (picrate, m.p.

Studies on Azulenes: S-Guaiazulene-aldehydes

Although several communications on azulenes having ring-substituted aldehyde group have recently been encountered,1-5 no detailed report has been made on the synthetic procedure for direct introduction of aldehyde group into azulene rings and properties of the products obtained.

In the course of our studies on azulenes, it was found that an aldehyde group could be substituted directly into S-guaiazulene (I) in a good yield by Friedel-Crafts type substitution reaction and the results will be recorded.

A solution of (I) in o-dichlorobenzene was added dropwise into a mixed solution

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5) W. Treibs: Ibid., 90, 761 (1957).