This material had an optical rotation of $[\alpha]^{24}_D$ +33° (c 0.5, 0.1 N NaOH) compared to the Swiss authors' value of $[\alpha]^{20}_D$ +29.3 in 0.1 N NaOH. The amount of the 6-isomer in this material was less than 1% measured by the growth stimulation of *C. fasciculata*, and after oxidation with permanganate the only major product observed by paper chromatography was 2-amino-4-hydroxypteridine-7-carboxylic acid.[2,4]

It is of interest to note the relationship between the optical configuration about the asymmetric carbon atoms in the polyhydroxyalkyl side chain of these pteridines and their activity in supporting the growth of *C. fasciculata*. Only the compounds containing two adjacent carbon atoms with the L-configuration are highly active—namely, biopterin,[3] I and V. It is not required that one of these carbon atoms be attached to the pyrazine ring, and the presence of other carbinols, either primary or secondary, is without appreciable effect. The biological significance of this configurational specificity is not understood at this time.

Acknowledgment.—The authors are indebted to Mr. L. Brancone and staff for the microanalyses.

PEARL RIVER, N. Y.

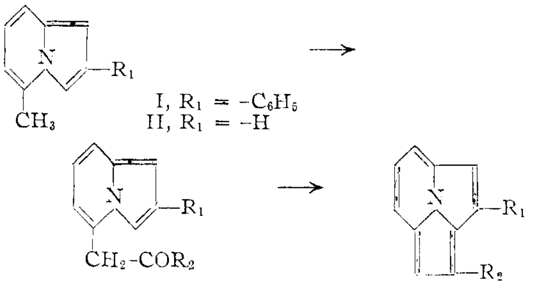
COMMUNICATIONS TO THE EDITOR

CYCLAZINES. THE SYNTHESIS OF A NEW CLASS OF AROMATIC COMPOUNDS[1]

Sir:

We wish to report the synthesis of a new class of aromatic compounds having the general structure shown by IX, for which we propose the trivial name, cycl[3,2,2]azine.[2] The general procedure employed in these syntheses is illustrated below.

When 2-phenyl-5-methylpyrrocoline, I (m.p. 83–83.5°. Found: C, 87.16; H, 6.65), prepared by the Chichibabin procedure,[3] was treated with n-butyllithium followed by N,N-dimethylbenzamide, ketone III (m.p. 125–127°. Found: C, 84.92; H, 5.83) resulted. Heating III in glacial acetic acid gave VII (yellow crystals, m.p. 143.5–144°. Found: C, 90.09; H, 5.22; N, 4.79; mol. wt., 295). Similarly, substitution of dimethyl formamide for dimethylbenzamide in the reaction sequence gave the aldehyde IV, which was cyclized directly to give VIII (yellow crystals, m.p. 98–99°. Found: C, 88.12; H, 5.27). As evidence for the proposed structures, it was found that treatment of 5-methylpyrrocoline,[4] II (b.p. 124° at 34 mm. Found: C, 82.00, H, 7.15, N, 10.93) with n-butyllithium and dimethylbenzamide gave V (m.p. 111–112°. Found: C, 82.15; H, 5.73) which cyclized to give VIII, identical in all respects with the sample previously described. Finally, repetition of the reaction sequence using 5-methylpyrrocoline and dimethylformamide gave VI, which on cyclization yielded the parent cycl[3,2,2]azine, IX (yellow crystals, m.p. 65–66°. Found: C, 84.93; H, 5.30; N, 9.87).



I, R_1 = $-C_6H_5$
II, R_1 = $-H$

III, $R_1 = R_2 = -C_6H_5$
IV, $R_1 = -C_6H_5$; $R_2 = -H$
V, $R_1 = -H$; $R_2 = -C_6H_5$
VI, $R_1 = R_2 = -H$

VII, $R_1 = R_2 = -C_6H_5$
VIII, $R_1 = -H$; $R_2 = -C_6H_5$
or
$R_1 = -C_6H_5$; $R_2 = -H$
IX, $R_1 = R_2 = -H$

In contrast to the behavior of pyrrocolines, the cyclazines show unusual stability toward air, light and heat. Also, they show a complete lack of basicity; the ultraviolet absorption spectrum, characteristic of the system, is unaffected by added acid. These observations are in general accord with the predictions of simple molecular orbital theory.[5]

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(1) Aided in part by the Office of Ordnance Research, Army Ordnance Contract No. DA-30-115-ORD-723.

(2) In this proposal of nomenclature, the word cyclazine would be reserved for the general case of a conjugate, unsaturated cycle held planar by three covalent bonds to an internal nitrogen atom. The various possible cyclazines which then arise through having cycles of different size or different points of attachment to nitrogen can be distinguished by placing in brackets numerals which correspond to the number of atoms on the cycle between points of fusion, *i.e.*, IX becomes cycl[3,2,2]azine.

(3) A. E. Chichibabin, *Ber.*, **60**, 1607 (1927).

(4) The preparation of 5-methylpyrrocoline, which has been accomplished by two independent routes, will be described in the full publication.

(5) These calculations will be presented in the full publication.

(6) National Science Foundation Predoctoral Fellow, 1956–1958.

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RECEIVED MARCH 21, 1958

A ONE-STEP TRANSFORMATION OF ACETOPHENONE INTO BENZALDEHYDE[1]

Sir:

By means of a new method, acetophenone has been transformed in one step into benzaldehyde. There does not appear to be another known method for a one-step degradation of an acyl substituent

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(1) Financial assistance under a National Institutes of Health Grant No. H-2295(c) and Contract No. DA-01-009-ORD-428 with Office of Ordnance Research, U. S. Army, is gratefully acknowledged.