BULLETIN DE L'ACADÉMIE
POLONAISE DES SCIENCES
Cl. III — Vol. II, No. 8, 1954

CHEMISTRY

On the Structure of Some Aliphatic Nitro-Compounds

by

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Communicated at the meeting of May, 17, 1954

It has been shown previously [1], that some aliphatic nitro-compounds do not show a clear absorption maximum in ultra-violet light near to $\lambda = 270\ m\mu$., which is characteristic for a nitro-group.

It has been suggested that this may be due to the formation of hydrogen bonds, which would form six-member rings, composed of the nitro-group and hydroxyl- or amino-group.

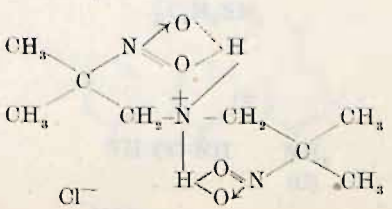
However, it was unexplained why, in order to suppress the absorption maximum of a nitro-group, two hydroxyl-hydrogen atoms and only one hydrogen atom of an amino-group are necessary. It was suggested that this might be due to the strong electron-repelling property of the amino-group combined with the electron-attracting property of the nitro-group.

This would be in accordance with the present interpretation of the nature of hydrogen bonds which can be regarded as partly electrostatic [2].

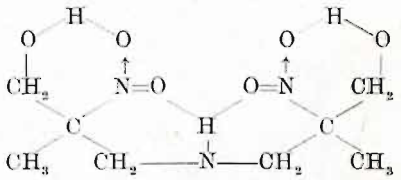
Independently of this explanation, it seems possible also to give another interpretation, based on the results of the structural X-ray analysis of aminoacids, particularly of glycine [3]. These experiments lead to the conclusion that a hydrogen atom belonging to an amino-group can be bound with two oxygen-atoms by means of two hydrogen bonds, i. e.

Thus, the structure of the hydrochloride of (VIII) and of the free base (X), which do not show a maximum in ultra-violet light, could be written as shown below — (VIII b) and (X a):

(VIII b)



(X a)



It can be shown, with the help of atomic models, that in the structure (VIII b) the length of the hydrogen bonds is smaller than 2 Å and that in the structure (X a) it is smaller than 1.5 Å.

In this case it would not be necessary to suppose two limiting structures, as shown in the preceding paper [1], for compound (X).

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