# COMMUNICATIONS TO THE EDITOR

## GLYOXAL TETRAMETHYL ACETAL. A CORRECTION

*Sir:*

In a recent paper [Grangaard and Purves, THIS JOURNAL, **61,** 428 (1939)] the above compound was considered to be new and the general method used in its synthesis was attributed to Baker and Field [*J. Chem. Soc.*, 86 (1932)]. We have now discovered that Fischer and Taube [*Ber.*, **59B,** 851 (1926)] obtained this tetraacetal in a similar way from glyoxal sulfate and methanol and wish to draw attention to their priority.

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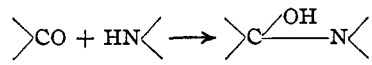
RECEIVED FEBRUARY 15, 1939

## THE STRUCTURE OF PROTEINS

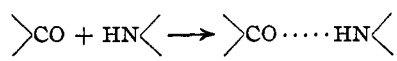
*Sir:*

In view of the current widespread interest in Dr. D. M. Wrinch's "cyclol" theory of protein structure, it seems worth while to point out in print (as the writer has done orally at the Rochester and Milwaukee Meetings of the American Chemical Society and in conversation with Dr. Wrinch, Dr. Langmuir and others) that this theory necessitates distances between atoms, not directly bonded together, which are considerably less than would be expected from known crystal structure data. At these short distances the interatomic repulsions would be tremendous. Distortions of the bond angles might diminish them somewhat, but sufficient distortion would appear to be impossible. Without distortion, taking the C–C and C–N bond lengths as 1.50 Å. and the C–H distance as 1.09 Å., the computed distance between the centers of carbon atoms of R groups in each lacuna is 2.45 Å., and that between a hydrogen of a CH group and a carbon of each of the neighboring R groups is only 1.68 Å. In each of the proposed cage molecule structures, including that suggested and "confirmed" for insulin [D. M. Wrinch and I. Langmuir, THIS JOURNAL, **60,** 2247 (1938)], the calculated distance between hydrogen atoms of different CH groups is but 0.67 Å.

This interatomic distance difficulty can be removed by substituting for the Frank-Wrinch condensation



the formation of an NHO bridge



For example, a basic pattern and cage molecule structures derived from it by folding, corresponding closely to Dr. Wrinch's cyclol models, can be built up by connecting together in this way either diketopiperazine 6-membered, 2-residue rings or 9-membered, 3-residue rings. A third alternative pattern is similarly produced from 18-membered, 6-residue rings (around the lacunae), the corresponding cage structures containing also 12-membered, 4-residue rings (at the "slits"). In this last case, however, there is still some crowding together of non-bonded atoms. Other types of patterns and cage structures containing NHO bridges, less closely related to Dr. Wrinch's, are, of course, also possible.

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RECEIVED FEBRUARY 6, 1939