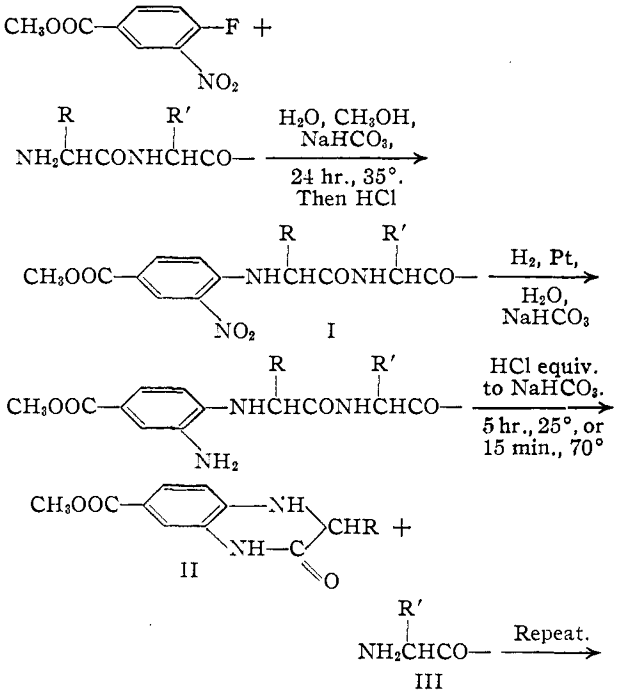

O_3: C, 58.24; H, 4.89; N, 13.59. Found: C, 58.44; H, 4.73; N, 13.31.) From L-alanine, R = CH_3, m.p. 216.5–218°, $[\alpha]^{24}_{D}$ +17° (*c*, 1.1; methanol). (*Anal.* Calcd. for $C_{11}H_{12}N_2O_3$: N, 12.7. Found: N, 13.1). From L-leucine, R = $(CH_3)_2CHCH_2$, m.p. 212–215°, $[\alpha]^{26}_{D}$ +20° (*c*, 1.1; methanol). (*Anal.* Calcd. for $C_{14}H_{18}N_2O_3$: N, 10.7. Found: N, 10.5.) From L-phenylalanine, R = $C_6H_5CH_2$, m.p. 197–201° (transition 190–192°), $[\alpha]^{22}_{D}$ −99° (*c*, 0.5; methanol). (*Anal.* Calcd. for $C_{17}H_{16}N_2O_3$: N, 9.46. Found: N, 9.79). The extension of this degradation to more complex peptides, such as those containing cystine and lysine, may require modification of the present procedure. This is now under investigation.

Using the reaction shown in equation (2), the *o*-nitrophenoxyacetyl group can be removed from N-*o*-nitrophenoxyacetylpeptides by catalytic reduction of the nitro group followed by lactam formation, which is complete in 30 to 120 minutes at 100° in aqueous solution. Similarly, the chloroacetyl group can be removed from N-chloroacetylpeptides by reaction with *o*-phenylenediamine in aqueous solution for 30 to 120 minutes at 100°, the reaction presumably proceeding by way of equation (1). The yields of once-recrystallized peptides prepared from their *o*-nitrophenoxyacetyl and chloroacetyl derivatives, respectively, and identical with authentic samples, were: glycylglycine 73%, 76%; glycylglycylglycine 76%, 68%; glycyl-L-alanyl-L-leucine 65%, 59%; and L-phenylalanyl-L-leucine 70%, 31%. These reactions suggest the use of the *o*-nitrophenoxyacetyl and chloroacetyl groups as protecting groups during peptide synthesis. In preliminary experiments, using the *o*-nitrophenoxyacetyl group and the Curtius azide procedure,[5] L-phenylalanyl-L-leucine ($[\alpha]^{22}_{D}$ −21° (*c*, 1; 1% sodium bicarbonate solution)), identical with material prepared by the carbobenzoxy method, was synthesized in 31% yield[6] (from L-phenylalanine ethyl ester hydrochloride). With the chloroacetyl as the protecting group, glycylglycylglycine was synthesized from glycylglycine in 18% yield using the method of Boissonnas.[7]

[5] T. Curtius, *Ber.*, **35**, 3226 (1902).

[6] C. S. Smith and A. E. Brown, THIS JOURNAL, **63**, 2605 (1941), synthesized D-phenylalanyl-D-leucine from D-phenylalanine in 12% yield by the carbobenzoxy method. B. F. Erlanger and E. Brand, THIS JOURNAL, **73**, 3508 (1951), report yields of 30 to 35% for six dipeptides, which is more representative of the method.

[7] R. A. Boissonnas, *Helv. Chim. Acta*, **34**, 874 (1951).

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RECEIVED DECEMBER 19, 1951

ON A PHOSPHO-TRI-ANHYDRIDE FORMULA FOR THE NUCLEIC ACIDS

Sir:

In a recent issue of this Journal[1] a hypothetical structure for desoxyribonucleic acid is proposed, having as its core a polymer chain of phosphorus atoms held together by oxygen atoms. In formulating a hypothetical structure for a substance one must take care that the structural elements of which use is made are reasonable ones, for which some precedent exists, or one must show that there is an overwhelming necessity for a radical proposal. In the proposed structure for the nucleic acids each phosphorus atom has five oxygen atoms attached to it, three of which bind it to adjacent phosphorus atoms, and two of which are in a hydroxyl group and a sugar ester group, respectively. There is, however, no precedent for a structure in which phosphorus is bonded to five oxygen atoms. Of the scores of phosphorus compounds that have been subjected to complete structural investigation, the phosphorus atom is surrounded by four oxygen atoms in every compound in which it has oxidation number +5.

The proposer of this extraordinary formula for the nucleic acids has not quoted any significant evidence in support of it. The ligation of five oxygen atoms about each phosphorus atom is such an unlikely structural feature that the proposed phospho-tri-anhydride formula for the nucleic acids deserves no serious consideration.

[1] E. Ronwin, THIS JOURNAL, **73**, 5141 (1951).

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RECEIVED JANUARY 24, 1952

THE MOLECULAR WEIGHT OF AMYLOPECTIN[1]

Sir:

Potter and Hassid[2] have reported measurements of the molecular weights of acetylated starch fractions by osmotic methods. We here report the results of light-scattering measurements of one of their acetylated amylopectins, Easter Lily sample L-3-B, in nitromethane solution at 25°. The apparatus and procedures used have previously been

[1] This work was supported by the Office of Naval Research.

[2] A. L. Potter and W. Z. Hassid, THIS JOURNAL, **70**, 3774 (1948).