down of deoxyribonucleic acid (DNA) at pH 4.6 and 30° C is accompanied by a contraction of only 2 ml/eq., and that no initial dilatation occurs (Fig. 1, curve 2). The experiments were made in the way described by Chantrenne, Linderstrøm-Lang and Vandendriessche [1] for the study of RNA-breakdown, *viz.* combined dilatometry and titration of liberated acid groups.

In view of these findings it is natural to correlate the observed difference in behavior between the RNA and the DNA with their main difference in structure, *viz.* the presence or absence of an OH group at position 2′. Since according to Brown and Todd [3] and Brown, Dekker and Todd [4] an intermediate 2′—3′ (cyclic) phosphate is formed in the breakdown of RNA, an investigation was made of the volume change accompanying the enzymatic degradation of ammonium uridine-2′—3′-phosphate. As shown in Fig. 1, curve 3, one titratable group is liberated in this substance by the action of ribonuclease and a contraction of 15 ml/eq. is observed. A similar investigation of cytidine-benzyl phosphate b, which according to Brown and Todd should give rise to cytidylic acid and benzyl alcohol with intermediary formation of cytidine-2′—3′ (cyclic) phosphate, led to results that may be qualitatively represented by curve 1, Fig. 1. Due to lack of material simultaneous estimations of volume change and release of acid groups could not be carried out. The curve for the relation between volume and time matched however closely those found for RNA showing a rapid initial increase in volume (*ca.* + 4 ml/mole at the maximum) followed by a slower fall. This diphosphate ester therefore behaves almost exactly as RNA, and it is therefore suggested that the initial increase in volume, observed in experiments with RNA and cytidine-benzyl-phosphate b is due to the formation of a 2′—3′-phosphate, while the contraction of about 15 ml/eq. equally characteristic of the degradation of RNA, uridine-2′—3′ phosphate and cytidine-benzyl-phosphate b is due to the opening of an ester bond in the cyclic phosphate. On this basis the experiments on DNA (Fig. 1, curve 2) are easily explained too since the absence of an OH group at position 2′ excludes the intermediary formation of cyclic phosphate so that the hydrolysis of the ester bond is uncomplicated and therefore is followed by the normal contraction of about 2 ml/eq.

From these results it would then appe ar that the formation of cyclic phosphate is accompanied by a dilatation of *ca.* 15—2 =13 ml/mole, an astonishingly high value for so small a molecular group. It is to be hoped that a theoretical investigation of this phenomenon may throw light upon the structural details of the cyclic phosphates.

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Note on the Stepwise Degradation of Peptides *via* Phenyl Thiohydantoins

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A procedure for the stepwise degradation of peptides *via* phenyl thiohydantoins has earlier been described by us [1]. In this

method the phenylthiocarbamyl (PTC) peptide in nitromethane solution is split by hydrogen chloride. However, the solvent properties of nitromethane restrict the method to short peptides. In order to extend the range several workers [2,3,4] have employed water as a solvent but unfortunately the cleavage in aqueous acids does not proceed smoothly. We therefore wish to point out that acetic acid has favorable properties as a solvent in this reaction.

Anhydrous acetic acid saturated at room temperature with dry hydrogen chloride (approx. 2 *M*) brings about a rapid and complete cleavage of PTC-peptides. The fission in this medium of 0.01 *M* solutions of PTC-alanylglycine [1] and PTC-leucylglycine [1] at 37° C was followed by amino nitrogen determinations [5,6]. The reaction was found to be complete in less than 3 minutes.

Acetic acid with a small content of water dissolves large peptides and even many proteins. The effect on the reaction caused by the addition of water (from 5 % to 30 %) to the above mentioned medium (*i. e.* acetic acid-hydrogen chloride) was therefore studied. However, the presence of water did not appreciably increase the length of time required for complete cleavage.

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Molar Refractions and Parachors of Some Organic Phosphoryl Compounds

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A comparison has been made of the calculated and observed values of the molar refractions and the parachors of some organic phosphoryl compounds. At this institute molar refractions of some phosphoryl compounds have earlier been determined by Holmstedt [1].

Apparatus and Experiments. The density was determined by a pyknometer and the refractive index in a refractometer of Bellingham and Stanley's design. The surface tension was measured by means of a stalagmometer. The flow velocity of the liquid was regulated so that the number of drops per minute did not exceed fifteen. All determinations were performed at 20° C.

Calculations. The observed molar refraction was obtained from the Lorenz-Lorentz formula $MR = \frac{M(n^2-1)}{D(n^2+2)}$, and the parachor according to the formula $P = \frac{M\sqrt[4]{\gamma}}{D-d}$, where M = molecular weight, n = refractive index, γ = surface tension, D = density of the liquid and d = density of the vapour over the liquid (d is here extremely small compared with D and can therefore be ignored).

In Table 1 two series of calculated molar refractions are given. One is based on Jones, Davies and Dyke's [2] values for atomic refractions of phosphorus and oxygen, and the other on those of Kabachnik [3]. In both series Vogel's [4] values were used for the other atomic group refractions, with the exception of the values for chlor-