have the advantage that they are less sensitive to the effect of neglecting diffusion, and are therefore likely to correspond more closely to experimental values.

In Fig. 1 theoretical weight average and median velocities for the trailing and leading peaks are shown and experimental points for the leading peak taken from the paper of Timasheff and Townend (ref. 5, Fig. 7) are added for comparison. It will be seen that there is a reasonable degree of correlation between the theoretical sedimentation curves based on data from light scattering, and the sedimentation velocities actually observed.

It is desirable to prepare families of curves in order to determine the sensitivity of the curves to adjustment in the parameters γ and g . This is now being undertaken with the aid of a digital computer.

A comparison of the theoretical and experimental velocity of the slow peak is not possible in the present instance because some 10 per cent of non-aggregating impurity in the lactoglobulin *A* masks the slow peak in the experimental schlieren patterns⁵.

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Determination of Parathion

IN chemical determination of parathion (*O,O*-diethyl-*O-p*-nitrophenyl phosphorothioate) and closely related compounds according to Averell and Norris¹, the nitro-group is reduced by zinc and hydrochloric acid, followed by diazotization and coupling of the primary aromatic amine thus produced. The method has become extensively used², but, to our knowledge, the descriptions available comprise only reduction with zinc and hydrochloric acid or similar heterogeneous systems.

p-Nitrophenol can be determined by an indophenol test after reduction to *p*-aminophenol with titan-III-chloride³. As a determination, according to the method of Averell and Norris, could be carried through with titan-III-chloride as reducing agent in a homogeneous system, the following procedure was elaborated.

The test solution is presupposed to be a neutral alcohol-containing solution, to 5 ml. of which are added: 50 μ l. of titan reagent (2 min.); 200 μ l. of about 8 *N* hydrochloric acid (2 min.); 100 μ l. of about 3.2 per cent sodium nitrite (4 min.); 500 μ l. of about 2 per cent sulphamic acid (3 min.); 500 μ l. of about 1 per cent *N*-1-naphthyl ethylenediamine dihydrochloride; alcohol and water to make 10 ml.

The details of the procedure are such that semi-automatic Lang-Levy constriction pipettes could be used. These permit addition of reagents at intervals of 10 sec., so that a series of twelve analyses can be

dealt with in 2 min. The reagents and reaction times (stated above in brackets) followed the methods of Averell and Norris^{1,2} as well as Terp⁴ (determination of procaine). The procedure has been tested to such an extent as to allow a convenient and reproducible technique to be established; but the reagents and reaction times make no claim to be optimal.

The titan reagent consists of 1 vol. of a 15 per cent solution of titan-III-chloride, 1 vol. of 2 *M* acetic acid and 2 vol. of 2 *M* sodium acetate; the amount mixed is such as to correspond with only one or two sets of analyses. In the circumstances, the reduction is performed in a weak acid solution, which is intensely greyish so long as the reducing titan is present in excess. (An old titan solution can be regenerated by adding a piece of zinc a few minutes before the dilution with acetate buffer; deposits of titan compounds can be removed with hydrochloric acid and hydrogen peroxide.)

The amount of nitrite is somewhat larger than usual as some of it serves to remove the excess of titan. The hydrochloric acid should be added before the nitrite solution in order to avoid precipitation of titan compounds.

If the analysis is performed in a purely aqueous system, the colour develops fairly slowly, with absorption maximum at 555 m μ . Alcohol accelerates the colour development, but at alcohol concentrations of about 80 per cent and higher in the test solution, a different red colour is produced (a single observation implies the hydrochloric acid concentration to be too low in such cases). Usually the test solution should contain 20–70 per cent alcohol, and the final dye solution 30–50 per cent. The absorption maximum is now at 560 m μ . The colour seems to have become fully developed in the course of 10–20 min. and remains constant at least until the next day. The molar absorptivity is of the order of 46,000 $M^{-1}cm^{-1}$. This is higher than the value found by Blinn *et al.*⁵, possibly due to the presence of alcohol. Highly coloured solutions can be diluted with 50 per cent alcohol containing hydrochloric acid to prevent the dye from changing to yellow⁵. The stated quantities of reagents allow total amounts of up to 300 μ gm. parathion being determined. In these cases the dye solution was made up to 100 ml. with the alcohol–acid–water mixture.

Using the method described here, the reduction time has been reduced from 10–20 min. (on boiling water bath) to 2 min. (at room temperature). Furthermore, the reduction with titan is performed in a homogeneous system, so that removal of the reducing agent by filtration or otherwise is avoided. Both processes contribute towards a considerable shortening of the process of analysis. Moreover, the somewhat simpler titan procedure opens up possibilities of performing the analysis on very small volumes.

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