

and non-ignitions were sometimes obtained at pressures which were expected to give ignition.

It was found that the pressure on the release of which ignition occurred became progressively higher as the expansion chamber was shortened. Nevertheless, ignition was obtained with mixtures released directly into free air (for example, with a mixture containing 22.3 per cent of methane in oxygen, and a diaphragm bursting at 1,000 lb. per sq. in.).

A photographic investigation of the ignition of a mixture released from compression has not yet been made; however, ignition probably arose as a result of heat transfer from the air compressed and heated in the shock wave to the contiguous layers of explosive mixture (at first cooled by expansion) that formed the driver piston. There was no perceptible delay before ignition.

It seems possible that Hertzberg and Smith's results were confused by the occurrence, in some experiments, of spontaneous ignition when the diaphragm was ruptured before explosion had spread throughout the mixture in their compression chamber. Shock-tubes designed to operate on this phenomenon, with suitably chosen mixtures, might indeed extend their scope. Energy losses during explosion would be minimized, and the design of the tube itself might be simpler since the stressing of the tube would be less severe.

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Use of Adsorption Columns in the Analysis of Emulsions stabilized with Non-ionic Detergents

DETERMINATION of the constituents of emulsions stabilized with non-ionic detergents has been hitherto restricted by the lack of a satisfactory method of quantitative separation. Following the methods outlined previously¹, a separation of such emulsions has been achieved and shown to be quantitative.

Using columns of 'Bio-Deminrolit' (an intimate mixture of 'Zeokarb 225' and 'De-Acidite FF') of 40-60 mesh, percolation of lanolin/'Lissapol N' emulsions containing up to 1 per cent of sodium chloride gave clear liquors, which on evaporation left no residue. Columns containing powdered animal charcoal as an added adsorbent were equally effective, but although the grease could be removed quantitatively, the 'Lissapol N' was held too firmly for successful solvent elution and, eventually, charcoal was omitted from the columns.

Preparation of the columns involves Soxhlet extraction of the resin with the solvents to be used

for elution. The columns were prepared in the dry state in tubing 1.5 cm. diameter to give a length of approximately 10 cm. when wet. Satisfactory volumes of eluent were found to be 10 ml. for each 1 cm. length of column.

Elution with 50 per cent aqueous ethanol gave quantitative yields of 'Lissapol N', estimated by the method of Oliver and Preston². Subsequent elution with trichlorethylene gave reproducible results for removal of lanolin. These two fractions were also identified with the original materials by their characteristic infra-red absorption spectra.

It would appear that the first step in breaking the emulsion is the removal of stabilizing electrolyte by the mixed resin, followed by adsorption of the grease and detergent. Evidence has been obtained that a chromatographic separation of grease and detergent occurs during elution with aqueous ethanol.

This procedure has been applied to the analysis of 'Lissapol N'/mineral oil (Shell Clavus oil 27) and 'Lissapol N'/vegetable oil (olive oil) emulsions, giving a 100 per cent recovery of 'Lissapol N' in all cases.

The method was further extended to the analysis of a 'Lissapol N'/soap/lanolin emulsion by using two separate columns. The 'Lissapol N' was separated as above on a column of 'Bio-Deminrolit' and eluted with 50 per cent aqueous ethanol. Soap and lanolin were separated and estimated on a column of 'Zeokarb 225'/charcoal, as described in a previous communication. 'Lissapol N' is strongly adsorbed by the charcoal and is not removed when eluting the fatty acid and grease components of the emulsion. A more detailed account of this work will be published elsewhere.

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Electrophoretic Movement of Higher Fatty Acids on Filter Paper

ATTEMPTS at the separation of higher fatty acids by paper chromatography have not, in the main, been successful, although Isherwood and Hanes¹ have studied the problem in relation to a number of straight-chain fatty acids, and Nunez and Spiten² have evolved a technique, using paper impregnated with olive oil, for chromatographic separation of such compounds. Apart from other considerations, the low aqueous solubility and the low dissociation constants of these acids presented the problem of finding an indicator which would be sensitive enough to enable their presence to be detected on paper. It has been found that the methyl red/bromthymol blue indicator of Duncan and Porteous³ permits of the detection of small amounts (for example, about 80 μ gm. of C₁₆) of acids up to C₁₈ on paper. Considerably more care is required, however, in the colour development with the higher acids than with the lower members of the series.

The present work deals with the movement of straight-chain acids from C₁₀ to C₁₈ in ammonia solution, on paper, in a closed vessel under electro-