As regards the colour formation with *p*-dimethylaminobenzaldehyde, it is known that α-amino carbonyl compounds self-condense to form dihydropyrazines or pyrazines. The dihydropyrazine derivative is assumed to form with *p*-dimethylaminobenzaldehyde the chromophore in the Ehrlich reaction.

It may be pointed out that another source of humin-like substances from an amino-acid – hexose mixture arises from D-glyceraldehyde, dihydroxyacetone and methylglyoxal, produced under alkaline conditions from free hexoses. Thus D-glyceraldehyde rapidly combined with L-lysine at 20° C. to give a dark-brown product.

The work described in this paper was carried out as part of the programme of the Food Investigation Organisation of the Department of Scientific and Industrial Research.

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Dec. 12.

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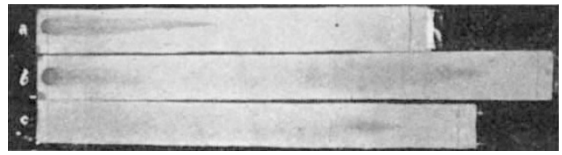
Chromatography of Proteins

WE have been concerned with the chromatographic separation of proteins and have developed a simple method of location of proteins on a paper chromatogram or a cellulose column. We have utilized the fact that acid dyes have an affinity for protein fibres but not for cellulose. The developed chromatogram is treated with an acid solution of a suitable dyestuff, preferably warmed for a few minutes, then rinsed in water, when the proteins appear as coloured spots or streaks on a white background. Amino-acids and peptides are not stained.

The selection of dyestuff is important; one having high affinity for protein fibres and not staining cellulose is necessary. There are very many such dyes; we have had excellent results with Solway Purple, among others. A one- or two-dimensional paper chromatogram, after drying, is immersed in a 0·05 per cent solution of the dye containing 0·5 per cent sulphuric acid in a photographic developing dish, at a temperature of 50–90° C. After rocking the dish for about five minutes, the dye solution is poured off and the paper washed in several changes of warm water and finally dried. The proteins show up as violet-coloured patches on the chromatogram (see accompanying photograph).

This dyeing property can be utilized in various ways. For example, we have studied the movement of proteins along the chromatogram, using different liquids. Also, when the eluate from a column is collected in fractions, a drop of each fraction can be placed on a sheet of filter paper, which is then dried and treated as described. The protein-containing fractions will show coloured spots on the paper.



Blood serum developed with phosphate buffer *p*H 9 containing ammonium sulphate to (*a*) 70 per cent saturation; (*b*) 50 per cent saturation; (*c*) 30 per cent saturation. The line marks the solvent front

In the case of cellulose columns, the column can also be extruded, and small samples taken at intervals along the column from the outside. These samples may be moistened, placed on disks of filter paper, dried and then dyed. Those containing protein will give coloured spots, and the appropriate sections can then be cut out from the column and eluted separately.

The extension of the method to the quantitative estimation of the different protein fractions is being studied.

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Dec. 6.

A Conversion Series for Organosilicon Halides, Pseudohalides and Sulphides

RECENTLY organosilicon *iso*cyanates and *iso*thiocyanates have been prepared by interaction of the corresponding organochlorosilanes, $R_xSiCl_{(4-x)}$, with silver cyanate and thiocyanate respectively[1], and alkyl(*iso* ?)cyanosilanes have been prepared by interaction of alkyliodosilanes with silver cyanide[2]. It has now been found that by boiling triethylhalogenosilanes, triethylpseudohalogenosilanes, and hexaethylthiodisiloxane under reflux with excess of the appropriate silver salt, transformations may be carried out along the series

$$Et_3SiI \rightarrow (Et_3Si)_2S \rightarrow Et_3SiBr \rightarrow Et_3SiNC \rightarrow Et_3SiCl \rightarrow Et_3SiNCS,$$

it being possible to convert a compound to any other on the right of it, either directly or through any of the intervening compounds. A compound cannot be appreciably converted to a compound on the left of it by this method.

Calculation shows some of the reactions concerned to be markedly endothermic, and it seems that neither the overall energy change in a particular reaction, nor the relative solubilities of the silver salts concerned (assuming these solubilities to be in their usual order), govern the direction of the change. It is suggested that the relative strengths of the Si—*X* bonds may determine this direction. Certainly, in those cases in which the bond-energies are known[3], namely, Si—I, 51·1; Si—S, 60·9; Si—Br, 69·3; Si—Cl, 85·8 (k.cal./mole), there is agreement with the experimental series above. The reactions may be considered to bear some analogy to the ionic exchange reactions of organic chemistry; the silicon atom is very susceptible to nucleophilic attack, and it would be expected that the nucleophilic activity of the ions concerned, and hence the direction of the reactions, would be related to the Si—*X* bond-strengths. If the series does, in fact, reflect the order