interpretation from the preliminary publications have resulted from the more detailed study.

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Control of the Staining Procedure after Paper Electrophoresis

When quantitative techniques are attempted for the analysis of serum proteins separated by electrophoresis on filter paper, it is recognized that the staining procedure, followed by removing the surplus stain, constitutes sources of error. In order to get more satisfactory reproducibility we apply on each paper strip (after electrophoresis but before staining) 0·02 ml. of a 0·05 per cent solution of polyethylenimine (Badische Anilin und Sodafabrik, Ludwigshafen (Germany)) in water. This polybase, $-[-CH_2-CH_2-NH_2-]_n-$, has the advantage of being stained by naphthalene black 12 *B* as well as by sudan black; therefore it can be used equally well as a reference substance for protein staining and lipoprotein staining. The molecule (mol. weight approx. 30,000–40,000) of the polybase (called 'Polymine') is of linear build and possesses such an affinity for cellulose that the stained spots cannot easily be eluted but must be estimated by direct-reading colorimetry. The paper strip *a* (see Fig. 1) shows the separation of normal serum

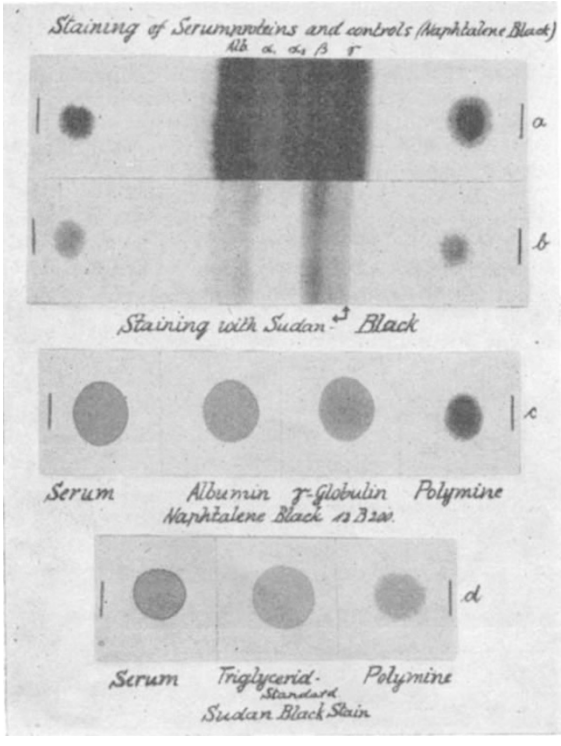

Fig. 1

Table 1

	Volume (ml.)	Amount (γ)	Planimeter reading	First standard deviation
Stained with naphthalene black				
Serum, dil. 1 : 40	0·02	35	0·92	1·8
Albumin, human	0·02	30	0·90	1·7
γ-Globulin, human	0·02	30	0·83	1·6
'Polymine' (0·05 per cent)	0·02	10	1·00	2·0
Stained with sudan black				
Serum, dil. 1 : 1	0·02	150 (lipids)	1·25	1·7
Triglyceride-standard	0·02	80	1·20	1·5
'Polymine' (0·05 per cent)	0·03	15	1·00	2·7

proteins (Whatman paper No. 1, *p*H 8·6, 10 V./cm.) and a spot of 0·02 ml. 'Polymine' standard on each side. Strip *a* has been stained with naphthalene black and strip *b* with sudan black. It is well known that in pathological sera the uptake of dyes is variable; in such cases the 'Polymine' standard can serve as a reference because the solubility interrelationships between dye, solvent and polybase are constant.

On paper strip *c* the staining of some proteins with naphthalene black is compared with the staining of the 'Polymine' standard on the right. Paper strip *d* is stained with sudan black; in the middle section there is a drop of 0·02 ml. of triglyceride standard, containing 60 γ of triolein and 20 γ of tristearate, which we have used[1] as reference for lipoprotein staining. The spot on the left of it is a drop of 0·02 ml. of normal serum diluted 1 : 1 with sodium chloride (physiol.). The dye uptake of such a drop gives a fair measure of the total lipids of the serum. Table 1 shows the mean results of twenty-five spots of each substance, as read in the electronic densitometer Model 525 of the Photovolt Corp.

The different diffusion (spread) of the spherical colloids (proteins) and the linear colloid ('Polymine') is noticeable.

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A New Solvent for Quantitative Paper Chromatography of Sugars

Many mobile phases are found in the paper chromatography of sugars; but the separation of sucrose, fructose and glucose is somewhat difficult, because their R_F values are very near each other[1]. The separation is enough for identification purposes, but it is not good enough for elution or photometric readings, because the sugars are still partly mixed. The solvent suggested below divides the sugars quite well with the following R_F values (at 20° C.): sucrose, 0·17; glucose, 0·26; mannose, 0·30; arabinose, 0·32; fructose, 0·32; xylose, 0·33; ribose, 0·41.

The solvent, which was studied for non-volatile organic acids[2], is: normal propyl alcohol, 50 c.c.; benzyl alcohol, 72 c.c.; water, 20 c.c.; 85 per cent formic acid, 20 c.c. It must be freshly prepared. The photometric readings give with this solvent a graph of well-separated curves, so that errors due to the computation of common areas are eliminated.

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