the amount of activity observed in the various body fluids. The values in Fig. 2 were observed following the administration of 15 mc.e. of radio-sodium to the second patient. The abscissa indicates the intervals of time following injection, and the ordinates the degree of activity.

The difference between the activity of the sample of radio-sodium just before administration and the initial activity measurement of the patient is felt to be due to the absorption of the gamma rays by the patient's body. In Fig. 1 it will be noted that a relatively large proportion of the radio-sodium was eliminated in the sweat, while in the second case the activity of the sweat was too small to be determined. This can possibly be explained by the fact that the first patient had frequent drenching sweats.

The interval between the actual and theoretical decay curves in each experiment is felt to represent the quantity of radio-sodium lost through the various channels of elimination. This view is borne out by the fact that the quantities excreted by each subject correspond approximately to the difference between the two curves in Figs. 1 and 2. In each instance the activity of the feces was too feeble to be measured.

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Sedimentation of Erythrocytes in Solutions of Albumin, Fibrinogen and Peptone.*

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Fahraeus[1, 2] has shown that the most rapid sedimentation of erythrocytes takes place in solutions of fibrinogen, and the least rapid in solutions of albumin. He concluded that an increase in the serum globulin and fibrinogen "stands in direct causality" with the rapidity of sedimentation. Westergren[3, 4] stated that there exists a definite

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1 Fahraeus, R., *Acta Med. Scand.*, 1921, **55**, 1.

2 Fahraeus, R., *Physiol. Rev.*, 1929, **9**, 255.

3 Westergren, A., Theorell, H., and Widström, G., *Z. f. d. g. exp. Med.*, 1931, **75**, 668.

4 Westergren, A., Juhlin-Dannfelt, C., and Schnell, R., *Acta Med. Scand.*, 1932, **77**, 469.

positive correlation between the plasma or serum proteins and the rate of sedimentation of erythrocytes. Zárday and Farkas[5] modified normal whole blood by the addition of normal fibrinogen and globulin, and found that the sedimentation rate was increased in proportion to the amounts added. When, instead, they added normal albumin they found that the rate of sedimentation was decreased. Coburn and Kapp[6] reached similar conclusions and added that "albumin inhibited sedimentation almost completely."

Using a modification of the Linzenmeier[7] technique, Lucia and co-workers[8, 9, 10] found that, *in vitro*, a consistent relationship cannot be established between the sedimentation rate and the globulin content of various solutions of serum globulin. They also showed that, *in vivo*, the sedimenation rate is *apparently* accelerated as the globulin content of the serum increases, and is retarded as the albumin content increases; and that a cause-and-effect relationship between the quantity of the various serum proteins and the rate of sedimentation cannot be said to exist.

Groups of human subjects with normal and with rapid sedimentation rates were chosen for this study. From each patient a 20 cc. sample of venous blood was withdrawn and oxalated. A sedimentation test was done directly on this sample, using the Linzenmeier technique. The remainder of the sample was separated by centrifugalization, and the corpuscles washed with 3 changes of Locke's solution. Then 0.2 cc. of washed corpuscles were resuspended in 0.8 cc. of each of the following menstrua: plasma, Locke's solution, and varying concentrations of albumin, fibrinogen and peptone in plasma and in Locke's solution. The resulting hematocrit values were 20%, or 2.15± million corpuscles per cmm. All sedimentation experiments were done using the Friedlander tube and recording the time necessary for the column of erythrocytes to drop 18 mm. The albumin and fibrinogen were prepared by electrodialysis.† In all resuspension experiments the syringes were rinsed in 10% solution of potassium oxalate.

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[6] Coburn, A. F., and Kapp, E. M., *J. Clin. Invest.*, 1936, **15**, 715.

[7] Linzenmeier, G., *Arch. f. Gynaekologie*, 1920, **113**, 608.

[8] Lucia, S. P., and Brown, J. W., PROC. SOC. EXP. BIOL. AND MED., 1934, **32**, 189.

[9] Lucia, S. P., Gospe, S. M., and Brown, J. W., PROC. SOC. EXP. BIOL. AND MED., 1935, **33**, 356.

[10] Lucia, S. P., Blumberg, T., Brown, J. W., and Gospe, S. M., *Am. J. Med. Sci.*, 1936, **192**, 179.

† This material was prepared by Dr. D. M. Greenberg of the Department of Biochemistry.

In 2 experiments in which a solution of beef-blood serum-albumin was suspended in Locke's solution, in percentages varying from ½ to 3, the sedimentation time was either unaltered or slightly prolonged as compared with a control. A portion of the same albumin solution suspended in plasma also retarded the sedimentation time progressively as the content of albumin increased, and in direct proportion to the increased volume of diluent added to the plasma.

In 2 experiments in which a solution of human blood serum-albumin was suspended in Locke's solution, the sedimentation time was prolonged regardless of the concentration of albumin. The same product suspended in plasma markedly and progressively prolonged the sedimentation time as the quantity of albumin was increased. These experiments were corrected for the degree of dilution of the plasma.

In 4 experiments, in which powdered electrodialyzed human blood-serum-albumin was dissolved in Locke's solution, in percentages varying from 1 to 5, sedimentation time was progressively and significantly shortened as the quantity of albumin was increased. In 4 experiments in which the same product was dissolved in plasma, it prolonged the sedimentation time as the quantity of albumin was increased.

In 5 experiments in which a 1% solution of beef-blood serum-fibrinogen was suspended in Locke's solution in concentrations varying from 0.2 to 1.0%, the sedimentation time was unaltered. In 2 of 5 experiments in which the same product was suspended in plasma, the sedimentation time appeared to be prolonged though not to a significant degree.

In 2 experiments in which Witte's peptone was suspended in Locke's solution in concentrations varying from 1 to 10%, the sedimentation time was prolonged irregularly but not significantly. In 2 experiments in which this product was suspended in plasma, the sedimentation time was prolonged but not to the same degree as it was in the controls in which plain Locke's solution was used.

In several experiments, talc or kaolin suspended in plasma failed to alter the sedimentation time.

In 3 experiments in which dog-bile in concentration of 1:50 to 1:3,200 was suspended in plasma, the sedimentation time was prolonged as the concentration of the bile increased.

Summary. Beef-blood serum-albumin, when suspended in Locke's solution or in plasma, prolonged the sedimentation time of human erythrocytes. A solution of human-blood serum-albumin suspended in Locke's solution and in plasma prolonged the sedi-

mentation time. A sample of powdered human-blood serum-albumin shortened the sedimentation time when it was suspended in Locke's solution, and prolonged it when suspended in plasma. A solution of beef-blood serum-fibrinogen suspended in Locke's solution and in plasma did not significantly affect the sedimentation time. Witte's peptone suspended in Locke's solution or in plasma prolonged the sedimentation time insignificantly. Talc or kaolin were without effect on the sedimentation time. Dog-bile suspended in plasma prolonged the sedimentation time.

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Propylene Glycol: Rate of Disappearance from the Blood Stream.

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The increasing use of propylene glycol as a solvent for various pharmaceutical preparations[1] and coloring extracts,[2] and its possible use as a food, indicates the need for a better understanding of the actions of this alcohol. The known production of oxalic acid in the metabolism of ethylene glycol[3, 4] has been responsible for the substitution of propylene glycol for the former, since oxalic acid is not a possible metabolite of the latter.[5] The properties, general actions, and acute and chronic toxicities of propylene glycol have been investigated by Seidenfeld and Hanzlik[5]; toxicity was unusually low.

The concentration of propylene glycol in the blood was determined by treating the protein-free filtrate with a solution of potassium dichromate in strong sulphuric acid, and estimating the amount of reduced dichromate iodometrically. From this value was subtracted the amount of oxidizable material normally present in the blood, a variable which remains relatively constant in fasting animals. In urine, the glycol was estimated directly by using an aliquot portion

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[5] Seidenfeld, M. A., and Hanzlik, P. J., *J. Pharm. Exp. Therap.*, 1932, **44**, 109.