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A Wedge-Photometer for Quantitative Comparison of Ultramicroscopic Particles.

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In the course of our investigations of the effects of antiseptics and neoarsphenamine on egg albumin and on the colloids of the plasma, it became evident that although the substances tested altered the appearance of egg albumin solutions from the bubble-like picture of lyophillic colloids to the star- and comet-like appearance given by the lyophobic colloids, no such intense change was observable when these drugs were added to oxalated rabbit's plasma, or injected intravenously. It did appear, however, that the bubble-like particles of the plasma became definitely brighter in the presence of the drug. In order to obtain a method for objective recording ot this fact, we have devised a wedge-photometer, which is applicable to a variety of investigations of colloidal phenomena.

The hollow wedge-shaped chamber of an ordinary wedge-colorimeter is removed from the colorimeter, the opening at the top is sealed with plastein into which a rubber stopper is fitted, and the chamber is filled with a dilute suspension of a colloid. For this purpose we have found a diluted non-water-proof American India Ink very satisfactory. The wedge chamber which we used was from a home-made colorimeter 30 cm. long, 2.5 cm. wide and 2.5 cm. thick at its thickest portion.

In observing the ultramicroscopic particles the photometer wedge was slid across the ocular of the ultramicroscope until the particles being studied just became invisible. The particles were observed at the instant of their maximum brightness. The distances read off on the wedge were then recorded, and the observation was repeated with the second colloid with which the particles first observed were being

compared. The illumination (small automatic feed carbon arc), magnification, etc., were kept constant. To exclude the subjective factor, the observations were always checked by 2 observers, whose readings coincided within 0.5 cm.

The amount of light reflected is indicated by the thickness of the wedge of opaque fluid necessary to obliterate the particle from view, *i. e.*, by the readings on the wedge, in centimeters.

The apparatus described enables us to compare the appearance of a series of lyophillic colloids with one another under standardized conditions, and should be useful for a considerable number of investigations, particularly for investigation of the degree of hydration of the particles.

We are using it in the investigation of the effects of antiseptics and of various drugs upon blood plasma. Investigations of the blood plasma in various pathological conditions, and of the effects of hydrating and dehydrating agents upon protein and lipoid suspensions, are in progress.

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Effects of Neoarsphenamine and of Mercurochrome Upon the Ultramicroscopic Appearance of the Blood Plasma.*

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In a previous communication[1] we have shown that the addition of a great variety of antiseptics to solutions of purified egg albumin *in vitro* causes the appearance of the albumin particles to change from the bubble-like picture given by egg albumin and other lyophillic colloids, to the punctate, star-shaped and comet-like picture given by lyophobic colloids. We have assumed that this may be regarded as evidence of aggregation and probably also of dehydration.

The conditions observed with blood plasma are, however, somewhat different. The proteins of plasma are probably not like the particles of egg albumin in sodium chloride, naked protein, but certainly represent a better state of dispersion, which is probably in part due to the presence of the plasma lipoids. Under the ultra-

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[1] Wright, H. N., and Hirschfelder, A. D., PROC. SOC. EXP. BIOL. AND MED., 1929, xxvi, 790.