upon gastric samples removed periodically from human subjects following gelatin meals.

The beaker experiments indicated that digestion with pepsin has no influence on the protective colloid value of gelatin. That digestion actually occurred was determined by precipitation with trichloracetic acid and subsequent determination of non-precipitable nitrogen, as well as by observing the gradual loss of viscosity and power to form gels. The digestion of a 10 per cent gelatin solution furnishes a striking example. The blank upon cooling set to a firm gel, while the digested mixture remained completely fluid. The gold number of the unchanged gelatin was 0.007, while that of the digested gelatin was 0.006. Evidently the peptic digestion products of gelatin possess essentially the same protective value as does the original gelatin.

In the *in vivo* experiments, the protective value of the gastric contents suffered a progressive decrease, due to the dilution caused by secretion and evacuation. However, the rate of diminution of protective colloid value together with the *in vitro* observations above noted would suggest that gelatin reaches the duodenum with its gold number essentially unchanged.

This is a preliminary report

[1] Taylor, W. W., "The Chemistry of Colloids," p. 129.

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Rôle of Viscosity in Milk Modification.

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A few years ago Brennemann[1] reported a notable study concerning the coagulation of cows milk in the stomach, in the course of which he had occasion to study the influence on curd formation of a number of different types of milk modifications. He states "that nearly all of the numerous devices that are used in infant feeding in adapting cow's milk to the infant are directed, consciously or unconsciously to modifying this curd so that it will be fine, soft, and flocculent as is that of breast milk." Brennemann[1] found "that starch concoctions very radically influence the coagulation of milk in the stomach, and that the soluble carbohydrates, dextrins, milk sugar, cane sugar, and maltose have no appreciable influence." Col-

loid enthusiasts are prone to explain the clotting of milk and the influence of different milk modifiers in inappropriate colloid terms. Alexander[2] first used colloid terminology in explaining milk clotting and since then many writers have ascribed to "colloidal protection" the influence of such modifiers as gelatin, tapioca, starch, barley gruel, gum arabic, etc. Palmer and Richardson[3] have indicated certain fallacies in Alexander's original claims, but do not offer any alternative theory to account for the commonly observed influence of such milk modifiers.

In a series of experiments, including both *in vitro* and *in vivo* observations, we have found no relation whatever between protective colloid value, as measured by gold number, and influence upon the nature of the milk curd. We have, however, found a direct correlation between the *viscosity* of the modified milk and the fineness of curd produced, and feel warranted in concluding that the term "protective colloid" is not strictly applicable in this connection. The important property, which is involved in producing fine, soft, flocculent curds, appears to be viscosity rather than protective colloid value. For this reason a modifier which best maintains its viscosity unimpaired at body temperature, and under the conditions of gastric digestion may be expected to be most efficacious for the purpose. Tapioca was used as an example of farinaceous material of relatively low protective colloid value (measured by gold number) but of high viscosity. It proved to be an efficient means of obtaining fine soft curds.

This is a preliminary report.

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[1] Brennemann, J., *Arch. of Ped.*, Vol. xxxiv, Feb., 1917.

[2] Alexander, J., *J. Am. Chem. Soc.*, 1910, xxxii, 680-687.

[3] Palmer, L. S., and Richardson, G. A., *Colloid Symposium Monograph*, 1925, iii, 112-134.

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Identity of Precipitin and Complement Fixing Substances in Syphilitic Sera. I.

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Whether or not different types of antibodies are identical is still one of the classical questions in immunology. In this country, Zinsser[1] is the outstanding champion of the "unitarian" hypothesis.