canine anaphylactic shock. Apparently identical reactions of the urinary bladder are produced by the intravenous injection of histamine.

The bladder contraction in canine anaphylactic and histamine shock is not secondary to the preceding fall in arterial blood pressure. Reduced arterial blood pressure causes the opposite effect, a slight decrease in bladder tone.

The anaphylactic bladder reaction does not take place in dehepatized dogs. With intravenous injections of routine doses of foreign protein the bladder tone remains unchanged throughout the test (five minutes). In contrast with this finding, dehepatization does not abolish the typical bladder reaction to histamine.

We therefore believe that the bladder contraction in canine anaphylactic shock is caused by the sudden formation or liberation of internal hepatic products (hepatic anaphylotoxins), having a histamine-like effect on the urinary bladder. If the blood-free anaphylactic liver is perfused with Locke's solution containing specific foreign protein, the perfusate becomes suddenly opalescent, even milky.

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The nature of the substances adsorbed on the surface of the fat globules in cow's milk.

(Preliminary Report).

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It is possible to account for the emulsion character of the fat in milk and cream both on theoretical grounds, because of the abundant presence of hydrophilic colloids in milk plasma, and on

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experimental grounds, because milk plasma (skim milk) readily stabilizes emulsions of oils and fats foreign to milk. However, a number of investigators, beginning with Danilewski and Radenhausen,[1] have attempted to isolate the emulsifying substance from milk. Storch[2] concluded, as the result of extensive experiments, that a special substance, a mucin-like protein, is involved. Völtz and Abderhalden[3] and Völtz[4] decided against the existence of a special substance because of the wide variety of products of varying proportions isolated by them. More recently Bredenberg,[5] who, like Völtz, gives a very complete review of the literature, concluded that a mixture of protein, mucous and fatty substances, including calcium soaps, constitutes the so-called membrane around the fat globules.

By using for the most part physical methods of isolation and purification, except for the fractionation of the final product by solvents, we have secured the following results. When cream was repeatedly diluted with distilled water and recovered by centrifugal separation until the washings no longer give a Fehling's and biuret test, the cream was still a highly stable emulsion. This cream, however, readily formed butter on churning, the buttermilk from which had the appearance of dilute skim milk. A similar fluid was obtained by gently washing the melted butter with warm water until the melted fat rose as a clear liquid.

We have assumed that both the buttermilk and butter washings contained the substances which adhered most closely to the surface of the fate globules in the original cream. Minute fat globules were also present, which were not removed readily, even by the supercentrifuge. In addition, the raw material in the buttermilk had a high ash content, chiefly calcium and phosphorus. The calcium was largely removed by dialysis against distilled water and entirely so by dialysis against water at pH = 4.6, the phosphorus being reduced at the same time to 0.97 per cent of the dry substance.

On the assumption that fat and inorganic salts are the chief

[1] Danielewski, A., and Radenhausen, P., *Forschung a.d. Gebiet der Viehhaltung, H.* 9, Bremen, 1880.

[2] Storch, E., 36 *Beretning fra dan Kgl. Vet.-og Landbohöjskoles Lab for landökonomiske Försög,* 1897.

[3] Völtz, W., *Pfluger's Arch,* 1904, cii, 373.

[4] Abderhalden, E., and Völtz, W., *Z. physiol. Chem.,* 1909, lix, 59.

[5] Bredenberg, G. A., *Abhandl. Agr. Wiss. Gesell. Finland,* No. 4 1912, 1.

"impurities" present, we found that the emulsion-stabilizing substances adhering to the fat globules in cow's milk apparently consist of a single globulin-like protein free from phosphorus[6] and a mixture of phosphatides of as yet undetermined nature. No glycoprotein was found, the residual traces of sugar in the protein fraction being removed by the solvents which free it from phosphorus. The phosphatides comprised by far the greater part of the total raw material in our experiments. The yield of phosphorus-free protein, which still contained several per cent of other impurities, never exceeded 15 per cent of the total raw material in the buttermilk and butter washings.

The mixture of substances, including the fat globules which resisted mechanical separation, had a gold number of 10 both before and after freeing from calcium by dialysis. In each case this value was changed to 0.5 by boiling the gold sol after the addition of the colloidal mixture and before the addition of the electrolyte. The results make it unlikely that the inorganic impurities in the buttermilk played any part in stabilizing the original cream emulsion.

The occurrence of both hydrophilic and hydrophobic colloids on the surface of the fat globules seems to offer an explanation both for the stability of the cream emulsion and for the relative ease with which the oil-in-water type of emulsion is inverted to a stable water-in-oil type of emulsion which occurs in churning cream to butter.

The detailed report of these experiments will appear later.

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Studies in tuberculosis immunity. I. Diagnostic and sensitizing properties of some new derivatives of tuberculin.

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This study, preliminary to a series of investigations in tuberculosis immunology, represents an attempt to prepare from tuberculin an active principle which may be of value in the early diagnosis of tuberculosis, particularly in connection with a wider

[6] The freeing of the protein from its phosphorus impurities was attended with great difficulty.