percentage of thick whites from the 2 groups was not substantially different when calculated for the entire period.

Due to differences in the calcium content of the 2 salts studied, it was necessary to use more than 3 times as much gluconate as carbonate to maintain an equal calcium level. The use of calcium gluconate in such amounts as were used in this study is likely to be impractical from a cost standpoint, but it would be desirable to determine whether or not the gluconate has a supplemental effect when the major part of the calcium in the ration is furnished by calcium carbonate or some other source of calcium. The level of vitamin D was decidedly lower than the optimum level and it is possible that the birds could function as well as they did under the conditions of this experiment, if lower levels of calcium were used in the presence of ample vitamin D.

The number of birds involved in the egg production studies was quite small but the differences observed in shell, shell ash and calcium level of the egg contents seem to be significant.

Summary. Calcium carbonate and calcium gluconate seem to function with equal efficiency as sources of calcium for the growing chick when equivalent amounts of calcium are supplied. With the laying hen the calcium gluconate seems to function slightly more efficiently than the carbonate, as evidenced by increased egg shell, shell ash, and an increase of calcium in the egg contents.

7001 C

The in vivo Action of Staphylococcus Bacteriophage in Presence of Staphylococcus Antitoxin.

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In a previous report[1] it was shown, as it has been by others, that normal rabbit serum in broth inhibits the action of staphylococcus bacteriophage on staphylococci. However, when rabbit serum, immune to staphylococcus toxin was used in the place of normal serum, the bacteriophage remained active and subcultures taken from the higher concentrations of bacteriophage were sterile. This finding suggested that a combination of staphylococcus antitoxin

[1] Burky, E. L., *J. Immunology*, 1933, **24**, 513.

and bacteriophage might be an efficient therapeutic agent in the treatment of staphylococcus infections. The results of such therapy, which will be reported elsewhere in detail, were discouraging. However, an effect was obtained which seems to show an *in vivo* action that parallels the previously observed *in vitro* action.

Nineteen rabbits were injected in the right marginal ear vein with 1 cc. per kilo of a 48 hour broth culture of *Staphylococcus aureus,* strain Fs. Blood cultures were obtained from the left marginal ear vein 24 hours later. Six rabbits were then injected in the right ear vein with staphylococcus antitoxin (10 cc.) and bacteriophage (2 cc.). Six rabbits were injected with bacteriophage alone (2 cc.). The bacteriophage was active against strain Fs in dilutions of 1×10^{-9}. The remaining 7 rabbits were kept as controls. This procedure was repeated daily until the 5th day when all of the treated animals, except one treated with bacteriophage alone, were dead. A similar mortality occurred in the untreated animals.

Three of the animals treated with bacteriophage and antitoxin and 4 of the rabbits treated with bacteriophage alone were alive 72 hours after the injection of the bacteria. The blood cultures taken at this time and shown in the photograph were typical of the results

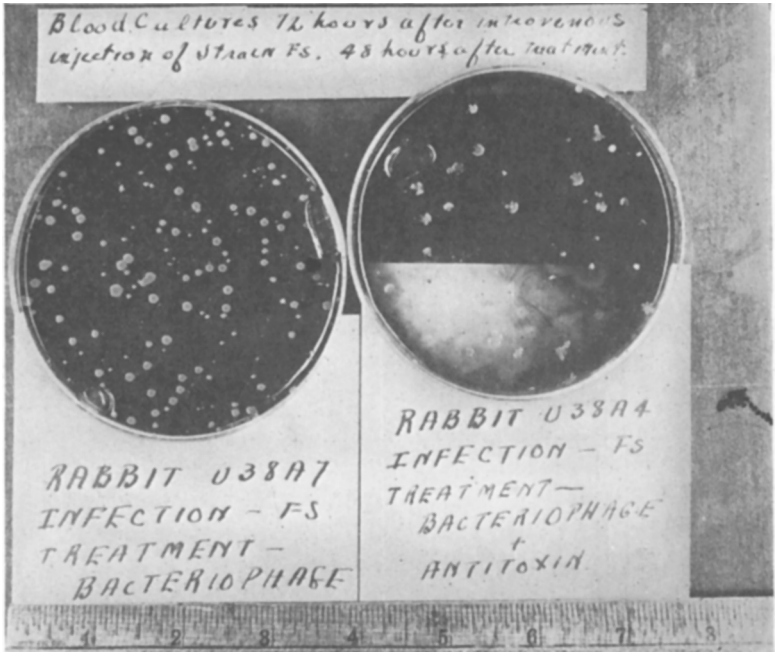

FIG. 1.

obtained. The blood cultures of the animals treated with bacteriophage alone showed no evidence of the bacteriophage. The blood cultures of those treated with antitoxin and bacteriophage showed phaged colonies.

The presence of bacteriophage in these colonies was determined by subcultures on plain agar slants and in broth tubes. The plain agar subcultures showed the characteristic ragged growth. The broth tubes were filtered after 24 hours' growth and bacteriophage was found in the filtrates by the serial dilution method previously described[1] Bacteriophage could not be found in the colonies from the rabbits treated with bacteriophage alone or with antitoxin alone. There was no change in the colonial form of the staphylococci recovered from the animals treated with antitoxin alone.

From these results it is apparent that the antitoxin has some effect on the bacteriophage that allows it to survive and act on the staphylococci in the presence of normal rabbit blood. No explanation of this phenomenon can be offered at this time.

7002 P

Structure and Function of the Yolk-sac Placenta in Mus norwegicus albinus.

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Although the relative functions of the yolk-sac and allantoic placentas in rodents are still uncertain, the following considerations indicate that the former has greater importance than is generally recognized. Goldmann[1] observed that the highly colloidal acid-azo dyes do not enter the chorionic villi of the rat placenta, but pass through Reichert's membrane and are stored superficially in the "yolk-sac epithelium." Brunschwig[2] has demonstrated that the yolk-sac is the route of entrance of iron salts into the 9-day blastocyst. Furthermore, the present experiments show that the neutral red accumulation in the yolk-sac epithelium exceeds that in any other embryonic tissue when an early blastocyst is placed in a solution of the dye. Also, when embryonic loci of from 11 to 13 days'

[1] Goldmann, E. E., *Beiträge z. klin. Chirurg.*, 1912, **64**, 1.

[2] Brunschwig, A. E., *Anat. Rec.*, 1927, **34**, 237.