injected in the series in which thirty minutes or more elapsed between injection and removal of the fluid, we recovered an average of 25.7 cc. of fluid from 32 shocked animals, and 25.3 cc. of fluid in 38 control animals.

Since in our experiments we can exclude the possible factor of changed osmotic pressure of the serum in shocked animals as an influence upon the osmotic pressure of the fluid introduced into the peritoneal cavity, we believe that these experiments give what seems to be direct evidence that in anaphylactic shock the permeability of cells or cell membranes is definitely affected.

At the present time then, while it is probable that in animals in anaphylactic shock there is a changed activity of the permeability of the cells or cell membrane (that is, the peritoneum) we cannot state whether this change is in relation to organic or inorganic substance, to crystalloids or to colloids. Certainly the changed permeability does not affect the sodium chloride, and apparently from a limited number of experiments it does not affect the phosphates. It seems, therefore, more likely that permeability in relation to certain organic substances, either in dissolved or colloid state, may be affected.

## 12 (2244)

## A note on the antigenic properties of the filtrate of typhoid saline vaccine.

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It was recently shown by Perlzweig and Steffen[1] that the immunizing antigen of the pneumococcus may be extracted from the bacterial cells by 70 per cent alcohol, physiological salt solution and by water. They found that the supernatant fluid of old

[1] Perlzweig, W. A., and Steffen, G. I., PROC. SOC. EXP. BIOL. AND MED., 1923, xx, 378, and *J. Exp. Med.*, 1923, xxxviii, 163.

pneumococcus saline vaccines when filtered through a Berkfeld candle conferred active immunity upon mice after several subcutaneous injections. Such filtrates also produced type-specific precipitates with homologous immune sera. The agglutinin production was not studied.

In view of these findings experiments were begun on the antigenic properties of the supernatant fluids of other vaccines. In a preliminary way the following was performed with typhoid vaccine:

The contents of a number of 0.5 and 1 cc. vials of a commercial triple typhoid (T. A. B.) saline vaccine, date of expiration February 13, 1923, bacterial content 1,000 million typhoid and 750 million of each paratyphoid A and B, were thoroughly mixed by shaking, a total volume of 30 cc. being collected. 15 cc. of this mixture were removed and are designated below as "whole vaccine". The remaining 15 cc. were centrifugalized at high speed until the supernatant fluid was clear. This fluid was carefully decanted and filtered through a Berkfeld (N) candle. Two rabbits were then injected intravenously with the whole vaccine and two with the filtrate, and the agglutinin and precipitin titres of the rabbit sera determined.

The dosage and titres are tabulated below:

| | Rabbits immunized with whole vaccine. | | | | | Rabbits immunized with filtrate of supernatant fluid. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Date 1923 | Dose injected | Aggl't'n titre Rb.A. | Rb.B. | Precipitin titre Rb.A. | Rb.B. | Dose injected | Aggl't'n titre Rb.C | Rb.D. | Precipitin titre Rb.C. | Rb.D. |
| Apr. | 18 bleeding | 0 | 0 | 0 | 0 | bleeding | 0 | 0 | 0 | 0 |
| " | 18 0.5 cc. | | | | | 0.5 cc. | | | | |
| " | 25 1.0 cc. | | | | | 1.0 cc. | | | | |
| May | 2 1.0 cc. | | | | | 1.0 cc. | | | | |
| " | 9 bleeding | 1:1280 | 1:5120 | | | bleeding | 1:640 | 1:640 | | |
| " | 15 1.0 cc. | | | | | 1.0 cc. | | | | |
| " | 22 1.0 cc. | | | | | 1.0 cc. | | | | |
| " | 29 bleeding | 1:1280 | 1:2560 | 1:160 | 1:160 | bleeding | 1:320 | 1:2560 | 1:160 | 1:160 |

It is evident from these figures that it is possible to obtain in the sera of rabbits immunized with the Berkfeld filtrate of a typhoid saline vaccine almost as high agglutinin and precipitin titres as in the sera of rabbits treated with the whole vaccine. This shows that at least two of the antigens, the agglutinogen and preciptinogen, of the typhoid bacillus are soluble in and can be extracted by dilute salt solution. That these antigens are in all probability distinct from the higher protein constituents of

the bacterial cell may be deduced from the assumption that such proteins were coagulated by the heating of the vaccine in the process of manufacture and also by the fact that the supernatant filtrate used in this experiment gave a barely perceptible biuret reaction, and it contained only 0.5 mg. of nitrogen per 100 cc. as compared with 29.3 mg. nitrogen per 100 cc. of the whole vaccine. A more extensive immunological and chemical study of the water soluble antigen of the typhoid bacillus will be reported at a later date.

After the described experiment had been performed the interesting study by Nichols and Stimmel[2] appeared reporting the production in guinea pigs of some active immunity against infection with the "mutton" strain of *B. aertrycke* by injections of the supernatant fluid of T. A. B. vaccine. This finding lends further support to the theory that the immunizing agent of bacterial vaccines is a water soluble substance which is simpler in character than the proteins of the cell.

## 13 (2245)

### Toxicity of atropin on rats.

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According to most textbooks of Pharmacology, the rat is very resistant to the effects of atropin. Wilberg[1] in an original monograph on the subject of the toxicity of atropin for various animals states that on subcutaneous injection the fatal dose of atropin for rats is 0.75 gm. per kilo weight while a dose of 0.70 gm. per kilo may be followed by recovery. On intraperitoneal injection the same author states that the fatal dose for rats is

2 Nichols, H. J., and Stimmel, C. O., *J. Exp. Med.*, 1923, xxxviii, 283.

1 Wilberg, *Biochem. Z.*, 1914, lxvi, 389.