mococci is considered, the degree of protection demonstrated possibly assumes a greater magnitude, even though the number of fatal doses against which protection was obtained is not so high numerically as in streptococcal or meningococcal infections. The results of these experiments with mice justify a therapeutic trial of *p*-aminobenezenesulfonamide in human Type III pneumococcal infections.

Conclusions. The oral administration of *p*-aminobenzenesulfonamide is capable of prolonging, and in some cases of saving, the lives of mice infected subcutaneously with approximately 10 minimal lethal doses of highly virulent Type III pneumococci.† ‡

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Influence of Deuterium Oxide on Growth and Morphology of Lactobacilli.

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The biological interest in deuterium oxide or heavy water cannot be overlooked because all living cells require water for growth. Barnes[1] reported that *Spirogyra* showed some unusual and interesting effects when grown in low concentrations of deuterium oxide and that these concentrations had a stimulating effect on the growth of *Euglena.* Harvey and Taylor[2] recorded that when luminous bacteria were incubated in tubes containing mixtures of heavy water and ordinary water, the amount of oxygen used by the bacteria was in proportion to the percentage of heavy water in the mixture. Also the luminescence of the bacteria was diminished when exposed to low concentrations of heavy water. Richards[3] observed the growth of *Saccharomyces cerevisiæ* in weak concentrations of deuterium oxide which he claimed accelerated growth and development, as opposed to its lethal effect in higher concentrations.

† The authors wish to acknowledge the technical assistance of Miss Louise Peebles.

‡ After this paper went to press our attention was called to the paper by Rosenthal in *Public Health Reports,* 1937, **52**, 48, which reported results similar to ours.

1 Barnes, T. C., *Science,* 1934, **79**, 370.

2 Harvey, E. N., and Taylor, G. W., *Science News Letter,* 1934, **25**, 200.

3 Richards, O. W., *Am. J. Botany,* 1933, **20**, 679.

In order to obtain data on the reaction of other microbiologic forms, we conducted experiments on the growth and morphology of 8 strains of lactobacilli exposed to various concentrations of this water-compound. We are obligated to Professor H. V. Moyer of the Department of Chemistry for the deuterium oxide.

The heavy water was mixed with Difco dehydrated whey broth so that the broth contained concentrations of 0.13, 0.7, and 5.0% deuterium oxide. The control broth was prepared with distilled water which was devoid of all deuterium oxide. The various lots of broth, in 10 cc. portions, were sterilized in sealed glass tubes at 15 pounds pressure for 20 minutes.

In studying the effect of deuterium oxide, 4 cultures each of *L. acidophilus* and *L. bulgaricus* were used. Each culture was inoculated into the various lots of experimental medium, using 0.1 cc. of an actively growing broth culture for each tube. The cultures were incubated at 37°C. At 12-hour intervals for a 60-hour period, 1 cc. was withdrawn from each tube and pour plates were prepared with tomato-juice agar, using dilutions of 1:1000, 1:10:000 and 1:100,-000 of the cultures. After incubation at 37°C. for 48 hours, the plates were examined and the colonies counted.

Examination disclosed that the various concentrations of deuterium oxide in whey broth did not have any appreciable effect on the rate of multiplication of the 8 strains of lactobacilli. The colonies on the plates were examined under low power and failed to show any difference in size or general appearance. The colonies on the plates implanted from the lower dilutions of deuterium-oxide broth were small while those on the higher dilution-plates were somewhat larger, but the differences in the sizes of the colonies were comparable to those in the control medium.

An attempt was made to study the effect of deuterium oxide on the morphology of the 8 lactobacillus cultures, using the same periods of incubation and concentrations of deuterium oxide in broth. Gram-stained preparations did not reveal any remarkable morphologic differences from the control cultures. However, at the end of the 40-hour interval, 3 of the cultures of *L. acidophilus* showed marked granulation and were gram-negative in the 5.0% concentration of deuterium-oxide broth; at the end of the 60-hour incubation period, this granulation was not evident.

The results show that the various concentrations of deuterium oxide in whey broth produced no significant effect on the growth or morphology of the bacteria studied.