Colon bacilli were isolated from the feces of 4 rabbits and their agglutinability with anti-typhoid serum was noted. Each rabbit was then immunized with 4 inoculations of heated typhoid bacilli, followed by 4 injections of living organisms. Intraperitoneal inoculations were made. After this period colon bacilli were again isolated from their feces and tested with anti-typhoid serum. Neither before nor after the series of injections were colon bacilli found which were agglutinated at titres higher than 1-10 with the typhoid serum used.

Staphylococcus aureus was cultivated with *Serratia marcescens,* and *Bacillus megatherium* was associated with the same chromogen, through 9 generations in broth. After that plates were prepared and numerous pink colonies were isolated. In no case was a red chromogen found having any of the characters of either *S. aureus* or *B. megatherium.*

4801

Elective Localization and Cataphoretic Potential of Streptococci.

EDWARD C. ROSENOW AND LLOYD B. JENSEN,

From the Division of Experimental Bacteriology, The Mayo Foundation, Rochester, Minnesota.

Measurements of cataphoretic potential have been made with the Northrop-Kunitz-Mudd apparatus. All suspensions were washed and measured in tested distilled water at 124 volts, 23° C. Determinations of pH of the suspensions were made colorimetrically. The streptococci were grown in tall columns (12 cm.) of glucose-brain broth, in tubes (1.5x20 cm.), for 18 hours at 35° C. Significant, and perhaps characteristic, potentials of green-producing streptococci have been obtained in a considerable number of different diseases, but in this preliminary paper we wish to report only on those obtained in studies of chronic encephalitis and chronic infectious arthritis, together with controls.

Material was obtained from a series of 18 cases of encephalitis and allied conditions. Streptococci obtained from the nasopharynx and from other foci of infection were subjected to tests of potential directly in suspensions and in cultures in glucose-brain broth. Single colonies of green-producing streptococci, obtained originally from the nasopharynx, from other foci of infection, from the stools, and even from the blood, were cultured in glucose-brain broth and sub-

jected to tests of potential in this state. The potential, in these studies, in nearly all of a large number of tests, was *circa* 8.0 (μ/sec). Similar tests of streptococci from a series of 26 cases of chronic infectious arthritis yielded a potential of *circa* 10.6 (μ/sec) in a high percentage of a large number of experiments.

We have used the methods of intracerebral injection and direct injection into the right knee joint, of intravenous injection in rabbits and intraperitoneal injection in mice, in attempts to correlate elective localizing power of the respective streptococci with their cataphoretic potentials.

The streptococci isolated from the brains of animals in which encephalitis developed following injection of material from cases of encephalitis, or from other sources containing "neutrotropic" streptococci, had a potential, chiefly, of *circa* 8.0 (μ/sec). The inflamed joints of animals in which arthritis developed following injection of material from cases of chronic infectious arthritis, or from other sources containing "arthrotropic" streptococci yielded streptococci of a potential, chiefly, of *circa* 10.6 (μ/sec). The potential of other bacteria from these sources was too variable to be of significance.

Dissociation and loss of elective localizing power, with concomitant changes in potential difference of streptococci frequently resulted when media other than tall columns of glucose-brain broth were used even for primary culture. There was also close parallelism between the loss of localizing power of a strain and the number of subcultures, even in glucose-brain broth, especially if subcultures were made only once a day. The condition of latent life, as in suspensions in glycerin, in sealed blood-agar slant, and in meat infusion, has been found often to maintain specific localizing power and concomitant characteristic potentials.

When a primary culture in glucose-brain broth was of but one mobility in the cataphoretic cell, and a graded dose was injected parenterally into rabbits, only one type of lesion usually resulted. If the cocci were of several mobilities in a given culture, several types of lesions might develop in the test animal.

We have used the methods of Shibley, and of Mellon and Grenquist in detecting reactions between antibodies and bacteria by cataphoresis. Seventy serums of patients, in 6 dilutions, to which autogenous streptococci had been added, were tested. Each test was controlled with pooled normal serum, individual normal serum, heterologous patients' serum, distilled water, and saline menstrua and determinations of pH.

Positive serum potentials were obtained in 9 of 26 serums from patients suffering from spasmodic torticollis, in 7 of 30 serums from patients with encephalitis, in 2 of 6 serums from patients with chronic infectious arthritis, in one of 2 serums from patients with chronic ulcerative colitis, in one of 2 serums from patients with corneal ulcer, and in one of 4 serums from patients with localized gastritis or gastric ulcer. In most instances in which positive serum potentials were obtained, agglutination also was obtained. In one serum from a patient with Parkinson's disease following encephalitis whose condition improved remarkably following removal of foci of infection and prolonged use of an autogenous vaccine and serum, the agglutination was marked for neurotropic streptococci in dilutions as high as 1:1000.

No positive serum potentials were obtained with strains from cases of arthritis or from other sources, when the potential difference (μ/sec) was other than 10.0 to 11.0, usually 10.6 (μ/sec). Likewise when organisms obtained from cases of spasmodic torticollis, multiple sclerosis and encephalitis were used, no positive serum potentials were observed with strains other than those with mobilities 7.8 to 8.4, usually 8.0 (μ/sec). This may account, in part, for many of our negative results. As the work progressed, we succeeded in eliminating some, but not all, of the disturbing factors and positive results were obtained more frequently.

4802

Streptococci in the Lesions of Experimental Poliomyelitis in Monkeys.

EDWARD C. ROSENOW.

From the Division of Experimental Bacteriology, The Mayo Foundation, Rochester, Minnesota.

Thorough search for bacteria has been made in stained sections of the central nervous system of 60 monkeys in which symptoms and lesions of varying degree, typical of poliomyelitis, had devel-

[1] Mellon, R. R., and Grenquist, Ernst, *J. Immunol.*, 1926, xi, 161.

[2] Rosenow, E. C., *J. Am. Med. Assn.*, 1921, lxxvi, 1745.

[3] Rosenow, E. C., *J. Infect. Dis.*, 1924, xxxiv, 329.

[4] Rosenow, E. C., Towne, E. B., and Wheeler, G. W., *J. Am. Med. Assn.*, 1916, lxvii, 1202.

[5] Shibley, G. S., *J. Exp. Med.*, 1924, xl, 453; 1926, xliv, 667.