poliomyelitis virus was accomplished by means of the "E B" medium in conjunction with the "V B" medium for subplants, further study will be necessary to establish the possible dependence of either one upon the other. For the recultivation of organisms from monkeys that had been successfully inoculated with the culture, the "V B" medium by itself was generally found satisfactory. However, the questions of adaptation of the strain, its multiplication, and maintaining of its virulence and infective power may be modified profoundly by the sequence of events taking place in the different culture mediums over varying periods of time. These matters must be left for future investigation.

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Agglutination of Streptococcus Hemolyticus by Rheumatoid Arthritis Sera: Thermal Characteristics of the Reaction.

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It has been reported[1, 2] that the majority of sera obtained from cases of rheumatoid arthritis agglutinate hemolytic streptococci in high dilutions at 55°C. Weaver[3] reported that scarlatinal streptococci were agglutinated at room temperature and at 37°C. by sera from cases of pneumonia, typhoid fever and erysipelas at about the same dilutions as by scarlet fever sera. Cultures heated to 60°-62°C. for one hour were no longer agglutinated by such sera. Sera similarly treated also lost their capacity to agglutinate. Tillett and Abernethy[4] recently reported that hemolytic streptococci may be agglutinated by sera obtained from various acute bacterial infections and that the agglutinability is destroyed by heating cultures to the thermal death point.

In the study of the rheumatoid arthritis reaction comparative

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1 Nicholls, E. E., and Stainsby, W. J., *J. Clin. Invest.*, 1931, **10**, 323.

2 Dawson, M. H., Olmstead, Miriam, and Boots, R. H., *J. Immunol.*, 1932, **23**, 187, 205.

3 Weaver, G. H., *J. Infect. Dis.*, 1904, **1**, 91.

4 Tillett, W. S., and Abernethy, T. J., *Bull. Johns Hopkins Hosp.*, 1932, **50**, 270.

tests were performed at 37°C. and at 55°C., both with living cultures and cultures killed by heating at 55° for 1-2 hours. Similar tests were carried out on sera obtained from (1) a wide variety of other pathological conditions including many acute febrile diseases, (2) normal individuals, (3) rabbits immunized against streptococcus hemolyticus.

The results of these tests are summarized as follows: Some normal human sera agglutinate living cultures of *Streptococcus hemolyticus* at 37°C. Little, if any, agglutination occurs at 55°C. and the reaction is almost entirely abolished by heating the cultures at 55°C. for one hour. Heating the serum at 55°C. for half an hour diminishes its capacity to agglutinate. Sera from certain acute febrile diseases, *e. g.*, typhoid fever, may agglutinate living cultures in high dilutions at 37°C. but only slightly at 55°C. The reaction is destroyed or greatly diminished by heating the culture at 55°C. for one hour. Agglutination is also greatly diminished by heating the sera at 55°C. for half an hour. The rheumatoid arthritis sera that agglutinate hemolytic streptococci react in a different manner. Such sera agglutinate equally well at 37°C. and at 55°C. Heating either the serum or the culture at 55° has little, if any, effect on the reaction. Immune rabbit sera react in the same manner as rheumatoid arthritis sera except that the agglutinins withstand a slightly higher degree of heat.

Similar tests have been carried out with sera from cases of subacute bacterial endocarditis and strains of streptococci isolated from the blood-stream of such cases. The tests indicate that these sera react in the same manner as rheumatoid arthritis sera in respect to the thermostability of agglutinins and agglutinogens.

Considerable difficulty has been encountered in obtaining uniform and consistent results with cultures grown in various lots of plain broth. Certain lots of broth were found to yield growths which were unsuitable for differential tests.

Conclusion. The agglutination reaction with *Streptococcus hemolyticus* and rheumatoid arthritis sera differs from that which occurs in certain febrile human sera in respect to its thermal characteristics. The agglutinating property in rheumatoid arthritis sera withstands heating at 55°C. and reacts with heat-killed suspensions.