

periments showed that all actively agglutinating sera except those produced by strain 92, agglutinated newport also, and, in harmony with this result, all suipestifer cultures except 80 and 92 removed this agglutinin.

7896 P

Polyvalency Demonstrated by Antiphages.

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A general procedure was described for the study of the specificity of absorption of bacteriophage by heat-killed bacilli.^{1, 2, 3} Polyvalent phages derived from chicken stool filtrates and propagated either against a strain of paratyphosus A or enteritidis were shown to consist of at least 2 prominent qualitatively different fractions, the one selective for suipestifer strains and another for the typhosus-paratyphosus B group. This effect was readily demonstrated by testing the quality of the residual phage with several serologically different sensitive organisms. The question naturally presented itself as to whether or not antiphages may be employed to indicate the presence in a phage of the several fractions.

Accordingly 4 series of rabbits were injected intravenously with the 2 polyvalent phages for paratyphosus A and for enteritidis and also with the presumably monovalent paratyphosus B and suipestifer phages. After 4 injections of 2 cc. each, potent antiphages, practically lacking in agglutinins were readily obtained in all instances except in the case of the suipestifer phage.

Experiments demonstrating the production of 2 antibodies corresponding to the fractions in the polyvalent phages are given in Table I. The results show that the antisera for the paratyphosus A and enteritidis phages contain potent antibodies which neutralize the action of the typhosus-paratyphosus B fraction of the polyvalent enteritidis phage (Table I A, aertrycke of the paratyphosus B group, as test organism); both antisera also possess antibodies for the suipestifer fraction but to varying degrees of activity. Although

¹ Levine, Ph., Frisch, A. W., and Cohen, E. V., *J. Immunol.*, 1934, **26**, 321.

² Levine, Ph., Frisch, A. W., *PROC. SOC. EXP. BIOL. AND MED.*, 1934, **32**, 339.

³ Levine, Ph., Frisch, A. W., *J. Inf. Dis.*, 1935. In press.

TABLE I.
Dilutions of Enteritidis Phage.

Phage antisera diluted 1:50	A. Test organism—aertrycke					B. Test organism—supesterifer				
	10 ⁻³	10 ⁻⁴	10 ⁻⁵	10 ⁻⁶	10 ⁻⁷	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵	10 ⁻⁶
Paratyphosus B	+±	+++	+++	+++	+++	cl	+++	cl	cl	+++
Paratyphosus A	+	+++±	+++	+++	+++	+++	+++	+++	+++	+++
Enteritidis	+	+++	+++	+++	+++	cl	cl	±	+++	+++
Dysenteriae Shiga (bacillary)	cl	cl	tr	+±	+++	cl	cl	cl	cl	+++

0.5 cc. of given dilutions of phage were mixed with 0.5 cc. of the various sera diluted 1:50; incubation overnight at 37° C.; the following day 0.5 cc. was removed from each of the tubes of the entire set into another series of tubes (B). To series A and B was added 4.5 cc. broth and the test organisms indicated in the table. The turbidity reading recorded was that made 6 hours after the addition of the test organism; cl indicates complete clearing; tr, trace; ±, +, ++, etc., indicate increasing degrees of turbidity.

the antiphage for paratyphosus B contains just as potent neutralizing antibodies as the other 2 antiphages, the former has no inhibiting action whatever on the same phage when *supestifer* is used as the test organism. (Table I B.)

A result practically identical with that shown in Table I A, was obtained when these sera were tested in the same manner with a phage for paratyphosus B even when a strain of typhosus was used as test organism.

The experiments are of general interest from 2 points of view. First, they suggest, as is to be expected, that similar specificities are exhibited by the reaction of phage with the heat-killed bacilli on the one hand and with antiphage on the other.^{4, 5} Second, the use of polyvalent phages with qualitatively specific fractions makes it feasible to study antiphage reactions in such heterologous combinations of reagents as will exclude or minimize interfering agglutinin reactions which may, at times, result from injection of phage containing filtrates. Thus, in our experiments the paratyphosus A antiphage inhibits the action of the enteritidis phage when *supestifer* is employed as a test organism. (Table I B.)

In our opinion, any attempts to classify phages on the basis of specific neutralization must take into account the fact that phages may radically differ in their composition and yet share a particular fraction in common.

7897 C

Colony Differences in Survival of Adrenalectomized Rats.

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There has been much disagreement among investigators concerning the life-span of the rat after adrenalectomy. While the majority of workers prior to 1930 found that 50% or more of their rats survived adrenalectomy, due to the presence of accessory cor-

⁴ Burnet, F. M., *Brit. J. Exp. Path.*, 1933, **14**, 93; *J. Path. and Bact.*, 1933, **36**, 307.

⁵ Andrewes, C. H., and Elford, W. J., *Brit. J. Exp. Path.*, 1933, **14**, 367.