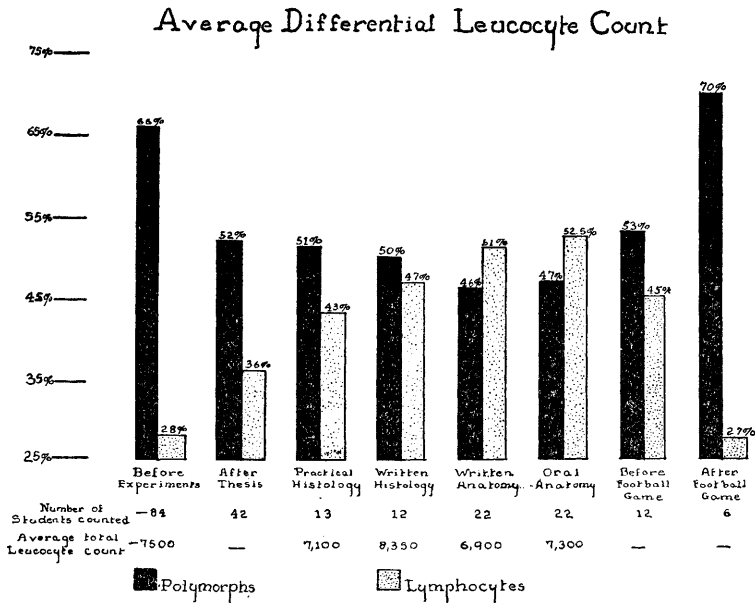




Camp³ and others suggests a complex reaction of the nervous system.

Summary. Emotional states produce a marked relative lymphocytosis in healthy persons.

7671 P

Note on Absorption of Phage by Heat-Killed Bacilli.

PHILIP LEVINE AND ARTHUR W. FRISCH.

From the Department of Pathology and Bacteriology, University of Wisconsin, Madison.

Investigations on the Salmonella were carried out employing the method recently described by us¹ for studying the specificity of absorption, particularly from polyvalent phages, by heat-killed bacilli. In principle the method depends on the fact that the absorption of phage by heat-killed bacilli is largely irreversible and consequently the residual phage may be studied both qualitatively and quantitatively without removing the absorbing organisms.

² Muller, E. F., *Proc. Soc. Exp. Biol. and Med.*, 1925, **22**, 95.

³ Camp, W. J. R., *J. Lab. and Clin. Med.*, 1927, **13**, 206.

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

TABLE I.

Tests with anti-*B. Paratyphosus A* phage. Test Organism—*B. aertrycke*.

	Dilutions of Phage					
	10-3	10-4	10-5	10-6	10-7	10-8
Absorbed with heat-killed <i>B. aertrycke</i>	+++±	++++	++++	++++	++++	++++
<i>B. Suipestifer</i> (European)	+±	+++±	++++	++++	++++	++++
<i>B. Suipestifer</i> (American)	Cl	Cl	Cl	Cl	+++	++++
Saline	Cl	Cl	Cl	Cl	Cl.	++++

The turbidity reading recorded was made 6½ hours following the addition of the test organism.

Cl. indicates complete clearing; ±, +, +±, ++, etc., indicate increasing degrees of turbidity.

In general, it was possible with this procedure to differentiate some of the following groups, for instance, the *suipestifer* group which absorbed specifically the homologous phage and also the *suipestifer* fraction¹ of the polyvalent anti-paratyphosus A phage. However, some of the *suipestifer* strains, particularly those of the European type, were characterized by a capacity to absorb actively also other fractions, for example, the paratyphosus B fraction of the polyvalent anti-paratyphosus A phage when *B. aertrycke* (of the paratyphosus B group) was used to test for residual phage. (Table I.) This same type of *suipestifer* absorbed the anti-paratyphosus B phage to a moderate degree, but less intensely than the paratyphosus B group of organisms, while other *suipestifer* strains showed no absorption.*

The paratyphosus A group of organisms and also some of the European *suipestifers* employed were the most active absorbers of the anti-paratyphosus A phage when the homologous strain was the test organism. The distinction between these could be made readily since the paratyphosus A strains failed to absorb actively the anti-*suipestifer* phage.

In contrast to the ease with which differences within the *suipestifers* could be demonstrated, was the failure to distinguish the typhosus-enteritidis group from the *aertrycke*-paratyphosus B group, since in the several combinations of phages and test organisms available, both groups absorbed equally well. (Presumably this observation is in harmony with the findings recorded by Furth and Landsteiner,² that some anti-sera of the 2 groups gave weak to moderate precipitin reactions also with the heterologous extract.) Nevertheless, extracts of the 2 groups could be differentiated by

* From other experiments evidence was obtained to indicate the existence of still further differences in the *suipestifer* group, apparently not connected with the biochemical types.

² Furth, J., and Landsteiner, K., *J. Exp. Med.*, 1929, **49**, 727.

phage, since greater specific inhibition of the anti-paratyphosus B phage was obtained depending upon the group of the test organism employed.³

A discussion of the significance of the observations made and their bearing on the nature of bacteriophage specificity is reserved for future publication.

7672 C

Observations on Phage Inhibition by Bacillary Extracts.

PHILIP LEVINE AND ARTHUR W. FRISCH.

*From the Laboratories of the Department of Pathology and Bacteriology,
University of Wisconsin, Madison.*

The specific inhibition of bacteriophage by bacillary extracts recently described by us^{1, 2} and confirmed by Kligler and Olitski,³ Burnet,⁴ and Gough and Burnet⁵ may be employed to study the chemical properties of these complex cellular products with the aid of various manipulations such as fractionation and hydrolysis.

In a previous communication,² the observation was made that crude saline extracts of *B. aertrycke* boiled in N/2 alkali, still retained their phage inhibiting capacity and, consequently, it seemed desirable to study in detail the sensitivity of these substances to alkaline and acid treatment before attempting purification. For this purpose, a crude saline extract of *B. aertrycke* was employed and tested for phage inhibition before and after boiling in N/2 sodium hydroxide for 5 minutes* and subsequent neutralization. Such alkali treated extracts showed marked increase in phage inhibiting capacity although they gave a precipitin titre that was slightly lower than that of the untreated material. This observation, therefore, indicated that the degree of inhibition of phage did not run parallel to the precipitin titre of the crude extract. Striking confirmation of

³ Levine, Ph., and Frisch, A. W., *J. Exp. Med.*, 1934, **59**, 213.

¹ Levine, Ph., and Frisch, A. W., *Proc. Soc. Exp. Biol. and Med.*, 1933, **30**, 993; **31**, 46.

² Levine, Ph., and Frisch, A. W., *J. Exp. Med.*, 1934, **59**, 213.

³ Kligler, I. J., and Olitski, L., *Brit. J. Exp. Path.*, 1934, **59**, 213.

⁴ Burnet, F. M., *J. Path. and Bact.*, 1934, **38**, 285.

⁵ Gough, G. A. C., and Burnet, F. M., *J. Path. and Bact.*, 1934, **38**, 301.

* Under such conditions an inactive precipitate appeared which was removed after neutralization.