Plasma—100 cc.

	20 Normal Male Individuals	14 Tuberculous Male Individuals
Total protein gm.	6.95	7.51
Fibrin gm.	0.26	0.43
Globulin gm.	2.05	2.94
Albumin gm.	4.64	4.11
Blood Sedimentation-Index	12.5	66.4
Incidence of minimal precipitation with alum. sulph. per cent		
0.01	0	0
0.02	0	2
0.03	0	4
0.04	0	6
0.05	0	2
0.06	6	all
0.07	7	all
0.08	2	all
0.09	5	all
0.10	all	all

general biologic reaction in the course of tuberculous disease, a decrease in blood stability (as measured by these properties) becomes apparent and is quantitatively without relationship to the extent of tuberculous involvement.

Clinical and experimental value of the aluminum sulphate flocculation test may be extended by the titration procedure outlined.

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Can Bacteriophage Be Detached From the Carrier-Particles?

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It has been found earlier that residue remaining on the membrane after ultrafiltration of bacteriophage through collodion retains a large proportion of the active agent and does not give it off freely into the filtrate on repeated washing with water. But, if broth is substituted for water in washing, the active agent reappears in the filtrate in high concentration.[1]

This finding suggested at first that passage of broth through the

[1] Bronfenbrenner, J., *J. Exp. Med.*, 1927, xlv, 873.

membrane resulted in coating the filtering bed by the colloids present in the broth, thus rendering it permeable for coarser particles which were held up by the membrane when suspended in water. However, further experiments have shown that preliminary passage of broth through a new membrane similar to that used above failed to increase its permeability to the residual fraction of the phage. On the basis of these findings the results of the earlier experiments were interpreted as indicating that the addition of broth directly to the residue caused detachment (elution) of some of the active agent from the coarser particles and its adsorption on and passage with the finer particles of the broth.

The existence of a method[2] permitting the measurement of the particles which carry phage suggested the means of inquiring into the validity of this tentative conclusion. We determined by this method the size of ordinary broth-phage filtered through Berkefeld filter as being in the average 12 mμ in diameter.[2] Using the same procedure, we now find that particles held back by the membrane after ultrafiltration measure 28mμ in diameter (average). When broth (free from phage) is added to this residue and ultrafiltration repeated, the particles which come through measure 20mμ in diameter (average)—that is, they are smaller than the original particles kept back by the membrane.

All measurements in each of the experiments were carried out in triplicate and the differences recorded, while not very great, seem to be uniformly reproducible (irrespective of the differences in diffusion constants of the different porous plates used) and well outside of the limits of experimental error of the method.

The fact that the average size of the particles carrying phage through the ultrafilter upon the addition of broth to the residue (20mμ) falls just about midway between the average sizes of the particles of broth itself (12mμ) and that of the residue (28mμ) indicated that while some of the coarse particles of the residue may have been carried through as such, at least enough phage has been detached from the coarse particles of the residue and adsorbed on the smaller particles of the broth to influence measurably the average size of particles in the ultrafiltrate.

The significance of these findings lies in the fact that they show that the particles carrying the active principle are not autonomous but that bacteriophage is merely adsorbed on them, and under favorable conditions can be detached from the original carrier particles.

[2] Hetler, D., and Bronfenbrenner, J., PROC. SOC. EXP. BIOL. AND MED., 1929, xxvi, 644.