

fluids and secretions of the body possess the agglutinating power to a greater or less degree. It is very marked in the fluid of blisters. It has been found in the tears, also in the fluid of the pericardium, peritonæum, and pleura. It is sometimes present in the urine, but not constantly. The action was very marked in the milk of a nursing woman suffering from typhoid, but was not found in the blood of the infant nursed by the woman. The aqueous humor of immunized rabbits gave the reaction in five cases out of nine. Experiments by Widal seemed to show that the power is exerted by the fibrinogen and globulin of the blood, but is wanting in the albumin. On analyzing the milk of immunized goats, the power was found in the lactoglobulin, also in the casein, but was absent in the lactalbumin. Removal of the albuminoid substances, fibrinogen, globulin, and casein, from the body fluids of a case of typhoid fever, removes the agglutinating power from those fluids. According to Pfeiffer, the agglutinating substances are not antitoxines, but are bactericidal bodies, of the nature of ferments, in active and inactive form in the serum. Nothing is known as to the origin of the bactericidal substances, but Pfeiffer maintains that the leucocytes have no part in the process. Other observers have shown that if the immunizing serum be heated to a certain temperature it loses its bactericidal action without losing its power of agglutinating the typhoid bacilli. It is evident, therefore, that this special reaction is not dependent on the bactericidal property of the serum, but is due apparently to the presence of so-called protective bodies, and it is generally accepted that these protective bodies, the alexines of Buchner, are present to a greater or less extent in normal blood serum. Gruber not only believes that protective bodies are found in normal serum, but maintains that these bodies are the direct agents in killing the bacteria which enter the body. In his opinion, the specific substances which result from immunization simply aid the bactericidal action by destroying the outer covering of the bacteria, thus laying them open to the attack of the alexines of the normal body. Pfeiffer also, early in his experiments, found that normal human serum, in doses of three to eight decigrammes, exerted a protective action in guinea pigs of three hundred grammes weight, counteracting the effect of a fatal dose of typhoid bacilli. He holds, however, that the protective action of normal serum and that of serum from typhoid convalescents are not the same; the former simply immobilizes the bacilli and prevents their increase, if given in adequate dose; the latter destroys the bacilli by causing their dissolution or disintegration. There is, therefore, a qualitative as well as a quanti-