

enter on those changes which lead to their subsequent necrosis and replacement by new tissue. The sum of such local reaction is necessarily greater when the tuberculous tissue is widely distributed, and therefore the comparatively insignificant reaction when the affection is merely local. The circumstance that Koch's lymph is not rendered inactive by sterilization shows it is not a toxalbumin; these toxic bacterial albumins lose their activity at about 60° c. Nor does it belong to the ptomaines or toxins, which are rather of the nature of nerve poisons; but it is more probably the protein of the tubercle bacillus itself, which in infected tissues gives rise to those processes of irritation which lead to the epithelioid and giant cells and the tubercles, and which, introduced in greater quantity, originates the more profound changes which lead to the necrosis of the affected parts.

Buchner has published some interesting researches lately on the nature of the bacterial products which lead to inflammation and pus formation. He believes that it is not the metabolic products of the bacteria which are so active in this respect as the protein of which they are composed. He has shown that by isolating the protein of *bacillus pyocyaneus* and introducing it in capillary tubes under the skin of rabbits, that this protein has a remarkable attractive "chemotoxic" action on leucocytes, which flock towards and into the open end of the tube, and he explains the inflammatory process due to invasion of bacteria in this way. Gluten-casein also, a body allied to the proteins of bacteria, which is certainly harmless when introduced into the alimentary canal, has the same attraction for leucocytes when introduced below the skin.

Heinz sends from the Pharmacological Institute in Breslau a suggestion as to a drug capable of increasing phagocytosis, and possibly therefore of helping in the elimination of the tuberculous tissue necrosed under the Koch treatment. He found that cinnabar introduced into the body cavity of Guinea-pigs was transported very much more rapidly to the spleen in animals which had been treated with potassium iodide than in those which had not been so treated, and that this is due to the increased activity and number of leucocytes.

Like Buchner, Neacki and Sahli also call attention to the fact that the disturbance following the injection of the Koch lymph recalls that following the introduction of an enzyme or pepsin-like body into the blood, and state that Hammerschlag had already succeeded in procuring from large masses of tubercle bacilli a toxic protein. They suggest that possibly in addition to the process of phagocytosis, the animal organism may possess another weapon against bacterial vegetation, viz., the formation of a local stream of active enzymes towards the invaded part.

That the blood-serum of immune animals possesses some such ingredient which is deleterious to the pathogenic bacteria to which they are immune, and also to the toxic products of these, seems to be thoroughly established by the recent work of Behring and Kitasato on immunity from tetanus and diphtheria.

Extremely interesting results have been arrived at by these gentlemen and by Prof. Frankel, of Königsberg. The latter believes that among the metabolic products of the *bacillus diphtherie* there are two albumins, one of which the toxalbumin, which is responsible for the pathogenic action of the bacillus, is destroyed at temperatures between 55° and 60° c., while another, which still exists unaltered in cultures heated to 65-70° c., confers immunity on animals into which it is introduced, both against virulent cultures of the bacillus, and against subcutaneous introduction of the pure toxalbumin. He demonstrates this by comparing the action of virulent cultures with those which have been filtered or heated up to 55° c. (and which, therefore, contain a mixture of two albumins), and with those which have been heated to 65-70° (in which, therefore, the toxalbumin has been rendered inactive). Frankel finds that cultures of the latter sort have no therapeutic value, *i. e.*, that when introduced into the body *after* a virulent culture, they do not interfere with the short course of the experimental diphtheria; in fact, the introduction of the immunity-conferring albumin would appear rather to reduce the power of resistance of the organism. Of course where the disease runs a longer course, it is quite possible that this method of combating the ravage of the bacillus would have a greater chance of success. Behring shows, in