

allied to chitin. The presence of similar substances accounts for the staining characters of the related forms of the group of *Mycobacteria* and may possibly have an important bearing on the peculiar type of inflammatory reaction which is characteristic of the whole group.

The bacillus, although somewhat more resistant to adverse conditions than some of the more delicate organisms, is, at the same time, comparatively easily destroyed by bactericidal agents. Direct sunlight for about twenty-four hours will kill it almost certainly and Theobald Smith has shown that a temperature of 60° C for fifteen minutes is fatal to it, when suspended in bouillon or milk, whilst an exposure to 70° C is only necessary for ten minutes to achieve the same result. Drying slowly kills the bacilli in sputum, first apparently lowering the virulence.

The problem of the isolation of the toxins of the bacillus and their chemical nature presents the most difficult problem with which we have to deal in attempting to explain the pathogenic phenomena associated with the disease. One of the results of the first attempts was the production of Koch's original tuberculin. Although this extract of the bacilli must be considered a specific product on account of the characteristic temperature reaction which results from its injection into tuberculous animals, yet it is exceedingly doubtful if it presents the true toxin of the organism. The method of manufacture is altogether too gross, the prolonged boiling necessary, too certainly destructive to any substances which we now recognize as toxins, to expect that such a product could be the original poison present within and about the bacilli.

A much more probable representative is the newer tuberculin R of Koch, which was obtained by mechanical trituration of the bacilli and a similar substance has been obtained by Hahn, who triturated the bacilli with quartz sand and then subjected them to enormous pressure, obtaining a clear extract which he called tuberculoplasmin.

The tendency of tuberculous lesions to assume a local character—I mean local in regard to the distribution of the bacillus, and the fact that Prudden and Hodenpyl and following them many others observers succeeding in producing histologically typical tubercles by the injection of dead bacilli (although in the majority of experiments without caseation) points to the fact that the specific poison of the organism is so intimately associated with its protoplasm that it is not liberated until the bacillus begins to disintegrate and renders it probable that it is of the nature of a nucleoprotein.

At the same time it is not necessary to conclude that this toxic substance is in itself specially resistant, since Hahn's tuberculoplasmin is destroyed by a temperature of 60° C., but the disintegration of the organism and the consequent liberation of the toxin is hindered by the