

are added on, as is probably almost always the case in phthisis, the problem is entirely altered. This is specially well shown in the tuberculous disease of bones and joints where the pure infection is so often treated so successfully by surgeons, yet when pyogenic organisms gain entrance to the tissues adequate treatment presents the greatest difficulties.

The bacteria which play the most important role in these mixed infections are the staphylococci, the streptococci, pneumococci and probably also the pneumobacillus of Friedländer and its allied forms. In phthisis these organisms are frequently found in the cavity wall influencing the pathological changes set up there and always about the tuberculous focus in the pneumonic areas, according to Sata in a recent paper in Ziegler's *Beiträge* the important factors in the characteristic catarrhal pneumonia; here they are often present alone or mixed with the tubercle bacilli. Indeed as Sata points out the disease phthisis is usually only at its inception a pure tuberculosis, and the pure tuberculosis of the lungs which is occasionally met with at autopsy is neither clinically nor in its pathological histology to be classed as phthisis.

The significance of these mixed infections in pulmonary tuberculosis, although recognized for a number of years, is only now beginning to bear fruit in the modern methods of handling the disease. Sprengler in one of the early papers on mixed infections in phthisis showed how valuable was the climatic treatment as carried out in Davos Platz, for these secondary infections. The first evidence of improvement was the disappearance of these secondary organisms from the sputum. The exposure of consumptive patients to the air of small, badly ventilated hospital wards, exposed not only to other patients of the same class but to all the varied infections of such a place, with coughing, spitting, talking patients all about them must mean the continued re-infection of lung cavities and pneumonic foci with repeated doses of virulent organisms, which must have a most serious influence on the course of the disease. And although an open air treatment of consumptives in verandahs, balconies and temporary shelters, in towns and cities may be a distinct advance on the handling of these cases in hospital wards, yet here also, the dust laden atmosphere of cities is a menace. One often sees practical evidence of this in the difficulty which many so-called cured consumptives have in returning to the cities after successful treatment in sanatoria.

A discussion of the bacteriology of tuberculosis would hardly be complete without a reference to the ways by which the bacilli gain entrance into the body.

For many years the hereditary transmission of the disease was accepted by the profession to the exclusion of all other methods of in-