

inserted at or near the epiphyseal line, exposure to cold and wet, are undoubtedly predisposing factors.

The rôle played in infectious diseases and the exanthemata is at present a subject of pathological discussion. With some, measles, scarlet fever, and small-pox are looked upon as predisposing factors, lowering the general resistance, and thus allowing streptococci and staphylococci circulating in the blood, to gain a foothold in the bone. Areas of necrosis are frequently present in the bone-marrow, a suitable nidus for bacterial growth, both in small-pox and in typhoid fever. In typhoid fever, as well as pneumonia, there is indubitable bacteriological evidence to show that these organisms are not only pathogenic, but also pyogenic.

Fränkel, in his extensive studies on the changes in the bone-marrow in acute infectious diseases, has made clear to us what had been the source of much speculation,—the origin of infection in obscure cases of suppurative osteomyelitis. This investigator has shown that distinct inflammatory changes are present in the bone-marrow in infectious disease, and are due to the same infective agent that produced the general disease, and also that this localization of bacteria does not always produce sufficient reaction in the bone-marrow to be recognized clinically, even when the patient recovers; nevertheless such focal collections, although they may remain quiescent for long periods of time, become active pathologically when the tissue harbouring them has been irritated or been subjected to trauma. Undoubtedly, in the majority of cases, bacteria so deposited in the bone-marrow are destroyed.

Keen, in 1898, pointed out the development of osteomyelitis "at very long periods after the original attack of typhoid fever," in which pure cultures of the typhoid bacillus were obtained from the pus, and refers to such a case reported by Buschke, where seven years had elapsed before the development of the bone disease. The author expressed himself at that time as follows: "Instances showing the accumulation of the bacilli in the bones and their persistence for months and even years after the fever, explain the otherwise curious fact that the cases of periostitis, osteomyelitis and abscesses in bones occur at such long periods after the fever, and so much later than most of the other surgical complications and sequels of typhoid. Why in some cases . . . though the bacilli are present, they do not produce any of these disorders of the bone, we do not know. Probably it is due to the fact that the general health is such that their deleterious tendency and influences are successfully vanquished."

Bloodgood, in a recent *resumé* of the literature on this subject, draws