

larger vessels, when the parts supplied by them maintain thereafter a feeble existence or perish. In certain fractures, a spicula of bone crushes through the trunk of a large artery, and thereby so impedes the circulation to parts beyond that the surface tissues may part with their vitality.

In another class, violence favors the development of gangrene by impairing the vitality of the parts on which it falls; vessels are torn open, nerves lacerated and muscles severely contused. Therefore, an injury, *per se*, is an active cause of gangrene, varying in its effects, according to circumstances.

But in a large member, force is only the proximate cause. The deep parts are opened; a stagnant congested state of the circulation exists over the seat of injury, inflammatory changes have begun. The tissues are but feebly resistant to eccentric influences, and changes of decomposition commence; toxic elements have penetrated from without. There is undoubtedly a septic infection; bio-chemical or microchemical changes are in operation. Whether, indeed, the entrance of some specific germ is the first step in gangrenous changes, or it is brought about through chemical influences stimulated into activity through the action of the atmosphere on feebly vitalized tissues is immaterial.

Modern bacteriological studies would seem to prove that infection of pathogenic germs is alone responsible for the primary pathological changes; but it is well known that the atmosphere plays an important role, as does also the general condition of the patient; above all, in diabetes and in tubercular subjects.

The symptoms which indicate the approach of traumatic gangrene in a limb in serious injuries are general and local. With the onset of those inflammatory changes which precede the sloughing or devitalization of the tissues, a well-marked chill, is experienced, the temperature rises and the pulse quickness; the appetite is lost and thirst is urgent. General debility is marked and the patient sleeps little. These are the usual concomitant disturbances noted, though there are occasional instances in which gangrene sets in, in the most subtle, insidious manner. The day before, the limb may have presented all the signs of a healthy vitality, but, after an interval of twenty-four, or forty-eight hours, on removing the dressings, we are appalled to find an extensive area cold, insensitive and dead. Such cases, however, are very rare indeed; and if we investigate them we discover, as a rule, that some oversight has been committed, that nature's danger signal, great pain, was blunted or destroyed by over-dosing with morphine; that the case was injudiciously treated, or neglected, until too late.

Of the local subjective symptoms, there is one whose significance is of more importance than all the others combined. That symptom is *pain*, not of a moderate, intermittent description, but