

degrees, and the muscles become painfully contracted; if reduction be made further, the muscles become rigid, but they are relaxed by gentle warmth and the motion is restored.

The *local effects of cold* are chiefly observed on the extremities, where the circulation is least active.

The first stage of frost-bite is generally ushered in by a feeling of stiffness and numbness of the part,—it looks pale, has a bluish tint, and is slightly shrunken. Let the cold be continued, sensibility and motion are lost, the part becomes much shrunken, perfectly hard, and white, or presents a mottled appearance. If the part is exposed to a *very low* temperature the sensibility and circulation may be arrested in so sudden a manner as to be unknown to the sufferer.

I need not dwell upon the *constitutional effects of cold* further than to remark that when the body is exposed to severe and long-continued cold, the blood recedes from the surface, rapidly settles in the internal organs, the nervous fluid ceases to be generated, the brain becomes oppressed, stupor appears, and gradually creeps on, till the person is overwhelmed by drowsiness, which, if yielded to, ends in coma and death.

The application of intense cold in a solid form, may cause the "complete and immediate death" of the surface with which it is brought in contact, and form an eschar, similar to that produced by a burn. And it is asserted by some writers, that the action of cold applied *through the atmosphere* will produce the same effect. In other words, that a part of the body may be so "*frozen and killed*" by *atmospheric exposure* that reaction or inflammation *cannot* take place. This I believe to be an error. The temperature required to produce such a result, would necessarily be fatal to the individual exposed to it. I contend that the vitality of the part is *suspended* not *killed*, and that a certain amount of reaction invariably takes place, as is evidenced by the appearance of more or less swelling, pain, heat, and redness within a short period after the removal of the frost. Experience teaches us that a part may be frozen to such an extent that it is stiff, colourless and apparently lifeless, yet, when the frost is properly extracted, it will resume its natural functions.

Professor Syme tells us that "a frost-bitten part *is not dead*, and "when freed from the influence of the cold it regains its power of "action."

Erichsen, page 169, in the last edition of his work, states that "In "the next degree of cold the vitality of the part is completely destroyed; "all sensibility and motion in it are lost, it becomes shrunken and livid; "but though its vitality may have been annihilated by the immediate