

“ action of the cold, it is not until the part has become thawed that  
 “ gangrene usually manifests itself; it then appears to do so, by the  
 “ *violence of the reaction induced*, the part rapidly assuming a black  
 “ colour, becoming dry, and separating eventually, as all other mortified  
 “ parts do, by the formation of a line of ulceration around it.”

A portion of the body may have its heat so rapidly abstracted by the evaporation of a spray of ether or rhigoline, as to freeze it, and render it insensible under the surgeon's knife, but in a few minutes reaction takes place, and it regains its natural condition.

The extent of freezing required to produce such reaction or inflammation, that the part must of necessity mortify, cannot readily be arrived at; though we may reasonably conclude that upon the severity and *duration* of the application of cold, depends the amount of subsequent inflammation.

We know that the congelation of water is only the commencement of an operation that is infinite: it is formed into ice at  $32^{\circ}$ ; let that piece of ice be retained in the atmosphere in which it was frozen, and it will receive and retain extra cold, and thus the temperature of the ice falls to that of the air, until it may sink to 40 degrees below zero, and its hardness will increase proportionally.

We also know that nerve substance is composed of 80 per cent. of water, 7 of albumen, and the remainder is fatty matter and salts. May we not expect the same phenomena to take place in the tissues and nerve-substance of the body, that are developed in the piece of ice? Suppose the water of the nerve-substance to be crystallized. May not the ice thus formed continue to receive and retain cold, increase in hardness, and, consequently so disorganize the nerve that when its water is liquified it cannot resume its natural functions.

Dr. Benjamin, W. Richardson (whose experiments upon this subject are highly instructive) classifies the changes developed by cold and during recovery in the following order.

*1st. stage, or starting point.* Natural condition. Temperature  $96^{\circ}$  Fahr: Sensibility perfect.

*2nd stage. Preaction.* Enervation: removal of nerve force. Increased vascularity. Increased temperature. Exalted sensibility.

*3rd stage.* Inertia. No vascularity, no nerve force, no blood. Temperature  $16^{\circ}$  Fahr. Perfect insensibility. Solidification of water of tissues.

*4th stage. Reaction.* Returning vascularity of paralysed vessels. Increased vascularity. Increased temperature. Exalted sensibility. Resolution of water of tissues. Evervation continued.