the affinity exercised between the elements of which seems to be very slight and their stability remarkably feeble; from which it results that their elements may easily be made to change their chemical condition (Law II.); and also that when they fall into low forms of combination in which the affinity exercised by them will be great, a large quantity of force will be set free (Law III.); and in this fact we have the reason for the great complexity in chemical constitution which obtains in tissues through which much force has to be evolved, that is, whose functional activity is great.*

This being the state of affairs what is next required is, first, another force which shall so act upon the complex bodies as to cause the chemical change, and second. a form of matter, in the passage through which this force set free shall assume the form required; these two conditions we have fulfilled in nerve force on the one hand, and muscular tissue on the other. But any other force may take the place of the nervous as when an isolated muscle is called into action by heat, clecctricity, mehanical irritation, etc.; and again the cell may be in some way so altered that it shall lose its property of directing the force set free into the normal vital channel, and then we shall have another form of force evolved, which in ac. cordance with the rule, in cases of chemical combination, will be mostly or entirely This aberration is seen during life in certain morbid states of the system heat. as in pyrexia (?), and after death of course it always happens; and if the circumstances attending the death be such as to leave the elements in a more than usually unstable condition we shall have a rise in the temperature of the dead body, as is often seen in cases of cholera, yellow fever, etc.+

In health, because it would seem some little chemical change, probably connected with nutrition, must always begoing on, when the muscle is at rest and therefore not liberating any of its proper force, electricity in small quantities, (for the change is small) takes its place; but as soon as the muscle is called upon to give out its proper form of energy, its evolution ceases.[‡]

And on these same principles we shall be able to explain the fact that irritable men of sanguineous temperament, (that is, as I understand it, men the elements of whose tissues are in a less stable condition than obtains in other people) have more of this free electricity than others.

PART III.

To pass now to the third and last division of the subject, namely, the nature of the influence of the physical forces, principally light and heat, upon the living plant or animal in the ordinary state of nature.

And first of heat.

All organized beings are dependent in a greater or less degree upon the temperature of the medium by which they are surrounded; but plants and cold-blooded animals are so to a much greater extent than warm-blooded, from the fact that in

^{*} For it would seem to be a law, to which there are certainly seeming exceptions from the operation of other laws interfering with it, that the more complex a body is, the weaker is the chemical affinity exercised by its elements.

[†] Carpenter's "Human Physiology" p. 410.

[‡] Carpenter's "Human Physiology" p. 425.

^{||} Carpenter's "Húman Physiology" p. 429.