

*fibrous* or white substance enters into the composition of the nervous centres—connects the different centres, and forms exclusively the nervous chords which are distributed to all parts of the body.

So long as no stimulus is applied to a nerve, the *vis nervosa* remains in abeyance; or, in other words, so long as the nervous matter is not acted on by forces physical or mental, there is no development of nervous force. In the conditions necessary to produce muscular contraction, putting aside for the present mental agency, we have an exhibition of the dependence nervous force has on most of the physical forces for its origination. When a heated substance is applied to a nerve of any extremity of the body, the arm for instance, nervous power is generated, and the impression is conducted to the brain by sensitive fibres; or, according to the latest view, a *state of polarity* is induced in the molecules of the nerve at the point touched by the heated body, which is rapidly propagated along the course of the nerve and the brain; the mind takes cognizance of it—a mandate is instantly sent along motor fibres to the part, and contraction of the muscles necessary to remove the limb from the vicinity of the irritation ensues. Motion or mechanical irritation—chemical affinity—electricity and magnetism, will be followed, when similarly applied, by a like manifestation of the *vis nervosa*. It is interesting to remark that the nervous force employed in muscular contraction, is converted into muscular force; and this again into motion, heat, chemical affinity and electricity, thus establishing a perfect *correlation* between the *vital* and *physical* forces. With every muscular contraction motion must of necessity take place. Becquerel and Breschet found with the thermo-multiplier that when the biceps muscle was forcibly contracted, *one* degree of heat was generated; and when the contractions were continued for some time the heat increased to *two* degrees. There is always a loss of substance or disintegration of tissue with each muscular act, which substance is resolved into its original constituents; and as no chemical change can occur without a disturbance of the electrical equilibrium, chemical affinity and electricity, must be generated.

Of all the physical forces electricity seems to exhibit the most complete correlation with the nervous force. The analogy between the two is so marked, many distinguished philosophers have felt convinced of their identity. Sir John Herschel remarks, "If the brain be an electric pile constantly in action, it may be conceived to discharge itself at regular intervals, when the tension of the electricity reaches a certain point, along the nerves which communicate with the heart, and thus to excite the pulsations of that organ." Mr. Abernethy threw out the suggestion that it might be the *materia vite*, the true vital principle. And it is related of Napoleon, that when Chaptal exhibited to him the voltaic bat-