

Prideaux, Becquerel, and other philosophers, have followed Seebeck in his investigations, and we now know, that for the production of thermo-electric currents it is not requisite that the metals should be dissimilar; and that the intensity of the current is greatly augmented by combining, as in the Voltaic pile, a series of **alternations** of two metals, as platina and zinc, or bismuth and copper. The most delicate thermoscope known, consists of a bundle of 36 short and slender bars of bismuth and antimony, having their alternate ends soldered together. The mere approximation of the hand to such a bundle, if one of the faces be blackened, excites a very perceptible current of electricity.

Heat, either directly or indirectly, plays a very important part in the production of chemical affinity. Many substances will remain in close contact to each other without evincing the slightest disposition to unite, so long as their affinities be not brought into operation by the intervention of heat, or some other force. Thus, the two gases, hydrogen and oxygen, will remain diffused through each other in the same vessel, maintaining a perfect distinctness at ordinary temperatures; but, if any substance in a state of ignition be introduced, their affinities are at once brought into play, chemical union takes place, and the formation of water is the result. In a communication to the Royal Society, Prof. Grove has shewn that water may be resolved into its constituent gases, by plunging into it an intensely ignited piece of platinum, iridium or silica; and Mr. Robertson has found that the temperature at which this is effected is —2386 degrees.

That heat is cor-relatively excited by the other forces can be easily shewn. We have already adduced sufficient proof of the power of motion to originate heat. Chemical affinity, when excited, is invariably attended by the evolution of caloric; or, in other words, is succeeded by the force heat; as when sulphuric acid and water are mixed together, and whilst coal or wood is burning. By transmitting a sufficiently powerful discharge of electricity through a piece of fine wire, it will undergo combustion; and, according to the experiments of Sir Snow Harris, metals are heated by the electric discharge, in a distinct ratio to their conducting powers. Light commonly produces heat, and so forth.

We might thus take up the phenomena of magnetism, light, electricity, &c., and point out instances in which these forces operate in producing, or are succeeded by, the several other physical forces. Enough, however, has been said to give our readers an insight into the nature of the relations of different modes of force, and the peculiarities of the views propounded by the originators of the Cor-relation Theory.

We shall now examine into the relations existing between the physical and vital forces. Vital forces may be defined, simply:—Forces