

at the first stroke 17 degrees Fahrenheit of heat were evolved, at the second 7 degrees, whilst the third produced but 2 degrees; thus proving the truth of that which we have already stated, viz.: the amount of heat generated bears a certain proportion to the amount of resistance offered to motion.

Excitation of electricity may be readily produced by rubbing a stick of sealing-wax with a silk cloth, or a dry glass tube with brown paper, or woollen cloth covered with an amalgam of tin and zinc; but, as yet there has been no determination of the ratio in which electricity has been developed in different bodies by retarded motion. "As a general rule," says Prof. Grove, "it may be said that the development of electricity is greater when the substances employed are broadly distinct in their physical and chemical qualities, and more particularly in their conducting powers; but up to the present time, the laws governing such development have not been even approximately determined."

The electric spark; the flame produced by the rapid and forcible friction of two sticks, are examples of light produced by the retardation of motion.

The manner in which the force motion is succeeded by chemical affinity is exemplified in the lighting of a match and the explosion of a gun cap. The former is prepared with phosphorus, and the latter contains fulminate of mercury; and the ignition of the one, and the explosion of the other, are owing to the destruction of the existing chemical combinations and the formation of new ones. The ammoniacal oxide of silver, and the chloride of nitrogen, violently explode upon the slightest touch.

Thus we see that motion, when it ceases to exist as such, originates, according to various determining circumstances, one or more of the physical forces; and the "correlation" existing between them may be easily established, by shewing that the different physical forces are capable of reciprocally exciting the force of motion. Thus, then, the vibration of the pendulum; the divergence of the electrometer; the propulsion of a cannon ball, and the deflection of the magnetic needle, are all movements produced by the operation of physical forces.

According to Dr. Black's theory of latent caloric, which has too often been looked upon as an important truth in thermotics, instead of a mere hypothesis, all bodies contain a certain amount of heat existing within them in a dormant or latent condition; that is, independently of the heat by which the senses are affected, and which is detectable by the thermometer in its passage from one substance to another, there is heat in all bodies inappreciable to the senses, undetectable by the thermometer, and supposed to be chemically combined with them. Thus, if equal