intermittent." He offered an experimental proof of the sufficiency of the store of heat produced by this internal crushing to cause all the phenomena of existing volcanoes.[166] The slight comparative depth of the volcanic foci, their linear arrangement, and their occurrence along lines of dominant elevation become, he contended, intelligible under this hypothesis. For since the crushing in of the crust may occur at any depth, the volcanic sources may vary in depth indefinitely; and as the crushing will take place chiefly along lines of weakness in the crust, it is precisely in such lines that crumpled mountain-ridges and volcanic funnels should appear. Moreover, by this explanation its author sought to harmonize the discordant observations regarding variations in the rate of increase of temperature downward within the earth, which have already been cited and referred to unequal conductivity in the crust (p. 97). He pointed out that in some parts of the crust the crushing must be much greater than in other parts; and since the heat "is directly proportionate to the local tangential pressure which produces the crushing and the resistance thereto," it may vary indefinitely up to actual fusion. So long as the crushed rock remains out of reach of a sufficient access of subterranean water, there would, of course, be no disturbance. But if, through the weaker parts, water enough should descend and be absorbed by the intensely hot crushed mass, it would be raised to a very high temperature, and, on sufficient diminution of pressure,

---

[166] The elaborate and careful experimental researches of this observer will reward attentive perusal. Mallet estimates from experiment the amount of heat given out by the crushing of different rocks (syenite, granite, sandstone, slate, limestone), and concludes that a cubic mile of the crust taken at the mean density would, if crushed into powder, give out heat enough to melt nearly 3½ cubic miles of similar rock, assuming the melting-point to be 2000° Fahr.