chiefly the nature of the agencies by which such changes can be effected; the results achieved, in so far as they constitute part of the architecture or structure of the earth's crust, will be discussed in Book IV. At the outset, it is evident that we can hardly hope to detect many of these processes of subterranean change actually in progress and watch their effects. The very vastness of some of them places them beyond our direct reach, and we can only reason regarding them from the changes which we see them to have produced. But a good number are of a kind which can in some measure be imitated in laboratories and furnaces. It is not requisite, therefore, to speculate wholly in the dark on this subject. Since the early and classic researches of Sir James Hall, great progress has been made in the investigation of hypogene processes by experiment. The conditions of nature have been imitated as closely as possible, and varied in different ways, with the result of giving us an increasingly clear insight into the physics and chemistry of subterranean geological changes. The following pages are chiefly devoted to an illustration of the nature of hypogene action, in so far as that can be inferred from the results of actual experiment. The subject may be conveniently treated under three heads-1, the effects of mere heat; 2, the influence of the co-operation of heated water; 3, the effects of compression, tension, and fracture.

§ 1. Effects of Heat

The importance of heat among the transformations of rocks has been fully admitted by geologists, since it used to be the watchword of the Huttonian or Vulcanist school at the end of the 18th century. Three sources of subterranean