

the other, then, by intense and long-continued pressure, heat, and chemical changes that took place in consequence of infiltrations among the strata themselves, by degrees they became changed into hard masses, consisting of shale, sandstone, conglomerate, or limestone, as the case may be. But these have not always remained in the condition in which they were originally consolidated, for it has often happened that disturbances of a powerful kind took place, and strata originally flat have been bent into every possible curve.

For long it was the fashion to attribute most of the disturbances that the outer part of the earth has undergone to the intrusion of igneous rocks. The inclined positions of beds, the contortions of stratified formations in mountain chains, and even the existence of important faults—in fact, disturbance of strata generally—were apt to be referred to direct igneous action operating from below. Granite and its allies, from the time of Hutton, were always, without exception, included in the ordinary list of igneous rocks, and some writers of deserved reputation still do so. In connection with this subject, gneiss, and other kinds of metamorphic rocks were, and by some are still, supposed to be exclusively the effect of the direct intrusion of granite among previously unaltered strata.

As a general rule highly metamorphosed rocks occur in regions where the strata have been greatly disturbed. Such rocks, when the *metamorphism* is extreme, consist of gneiss, which may be micaceous, hornblendic, or chloritic; and of mica-schist, chlorite-slate, talc-slate, hornblende-rock, crystalline limestone, quartz-rock, and a number of others, which it is not necessary for my present purpose to name. In Scotland, Ireland, Norway, Canada, &c., limestones, calcareous