GEOLOGICAL DYNAMICS.

CHAPTER V.

Inorganic Geological Dynamics.

Sect. 1.—*Necessity and Object of a Science of Geological Dynamics.*

WHEN the structure and arrangement which men observed in the materials of the earth instigated them to speculate concerning the past changes and revolutions by which such results had been produced, they at first supposed themselves sufficiently able to judge what would be the effects of any of the obvious agents of change, as water or volcanic fire. It did not at once occur to them to suspect, that their common and extemporaneous judgment on such points was far from sufficient for sound knowledge;—they did not foresee that they must create a special science, whose object should be to estimate the general laws and effects of assumed causes, before they could pronounce whether such causes had actually produced the particular facts which their survey of the earth had disclosed to them.

Yet the analogy of the progress of knowledge on other subjects points out very clearly the necessity of such a science. When phenomenal astronomy had arrived at a high point of completeness, by the labors of ages, and especially by the discovery of Kepler's laws, astronomers were vehemently desirous of knowing the causes of these motions; and sanguine men, such as Kepler, readily conjectured that the motions were the effects of certain virtues and influences, by which the heavenly bodies acted upon each other. But it did not at first occur to him and his fellow-speculators, that they had not ascertained what motions the influences of one body upon another could produce; and that, therefore, they were not prepared to judge whether such causes as they spoke of, did really regulate the motions of the planets. Yet such was found to be the necessary course of sound inference. Men needed a science of motion, in order to arrive at a science of the