Lines of Fracture .- Mr. Martin, in his work on the geology of Western Sussex, published in 1828, threw much light on the structure of the Wealden by tracing out continuously for miles the direction of many anticlinal lines and cross fractures; and the same course of investigation has since been followed out in greater detail by Mr. Hopkins. The geologist and mathematician last mentioned has shown that the observed direction of the lines of flexure and dislocation in the Weald district coincide with those which might have been anticipated theoretically on mechanical principles, if we assume certain simple conditions under which the strata were lifted up by an expansive subterranean force.*

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His opinion, that both the longitudinal and transverse lines of fracture may have been produced simultaneously, accords well with that expressed by M. Thurmann, in his work on the anticlinal ridges and valleys of clevation of the Bernese Jura. + For the accuracy of the map and sections of the Swiss geologist I can vouch, from personal examination, in 1835, of part of the region surveyed by him. Among other results, at which he arrived, it appears that the breadth of the anticliual ridges and dome-shaped masses in the Jura is invariably great in proportion to the number of the formations exposed to view; or, in other words, to the depth to which the superimposed groups of secondary strata have been laid open. (See fig. 71, p. 55, for structure of Jura.) He also remarks, that the anticlinal lines are occasionally oblique and cross each other, in which case the greatest dislocation of the beds takes place. Some of the cross fractures are imagined by him to have been contemporaneous with others subsequent to the longitudinal ones.

I have assumed, in the former part of this chapter, that the rise of the Weald was gradual, whereas many geologists have attributed its elevation to a single effort of subterranean violence. There appears to them such a unity of effect in this and other lines of deranged strata in the southeast of England, such as that of the Isle of Wight, as is inconsistent with the supposition of a great number of separate movements recurring after long intervals of time. But we know that earthquakes are repeated throughout a long series of ages in the same spots, like volcanic eruptions. The oldest lavas of Ætna were poured out many thousands, perhaps myriads of years before the newest, and yet they, and the movements accompanying their emission, have produced a symmetrical mountain; and if rivers of melted matter thus continue to flow upwards in the same direction, and towards the same point, for an indefinite lapse of ages, what difficulty is there in conceiving that the subterranean volcanic force, occasioning the rise or fall of certain parts of the earth's crust, may, by reiterated movements, produce the most perfect unity of

* Geol Soc. Proceed. No. 74, p. 363, 1841, and G. S. Trans. 2 Ser. vol. 7.

+ Soulèvemens Jurnssiques. 1832.