

5. The earliest slate rocks, like all other strata, must have been originally deposited in a position horizontal or nearly so. By subsequent movements, not one but evidently many, they have been raised to all elevations and bent to the utmost extent of contortion: as is shown by the lines of stratification. But there is another kind of division, first brought to light by Professor Sedgwick; that of lines of cleavage and intersecting joints, or called by a general term, structural or divisional planes. These are productive of signal benefit to the arts and convenience of men: but they involve profound geological and mathematical researches, and their causes can be explored only by going into the deepest night of terrestrial antiquity. Those who are the best qualified to form an opinion, impute this structure to an agency (—call it electric, galvanic, magnetic, or chemical,—) connected with the grand and mysterious operations of the terrestrial magnetism, operating upon a scale which we cannot graduate of magnitude and distance, and requiring a proportionate vastness of time for its taking effect; probably the same agency that reigns in the wonderful processes of crystallization, from points of invisible minuteness to formations of indefinable greatness:—or some parts of these phenomena may be imputed to the slow action of the heat from below, producing a general and regular contraction of the argillaceous formations:—or the cause may be sought in the change of cohesion in masses becoming solid from a state of fluidity. The contraction mentioned is founded upon a known property of argillaceous earth: all these causes act quite independently of the stratification: the jointed structure is found to affect the crystalline rocks also: the stratification contains in itself the evidence of having required periods, impossible indeed to be determined by any assignment of figures, but to which, judging from all approximating evidence, our cycles of time afford none but a totally defective measure of comparison. This branch of investigation is indeed one of extreme difficulty; and with which I acknowledge myself to possess but a very imperfect acquaintance. The expectation is with good reason indulged that both the learned Professor just mentioned, and another ornament of the same University, Mr. Hopkins, who has long employed his rare mathematical powers upon the class of problems to which this belongs, will confer upon the whole subject important elucidations, and open its further connexions with the most recondite parts of geological science.*—But the impression which the general

* See Prof. Sedgwick's Remarks on the Structure of large Mineral Masses, in the *Trans. Geol. Soc. Second Ser. vol. III. p. 461.* Mr. Hopkins's Mem. in the *Trans. Philos. Soc. Cambr. vol. VI.* and the brief