

carve out hollows representing valleys, cutting through inclined strata at various angles with the line of dip and line of bearing: by this means, he may gain a more correct idea of the varied phenomena of stratification, both in mountains and valleys, than the most elaborate descriptions can convey.

The appearance of contorted stratification, in the calcareous mountains of the Alps, is frequently, an optical illusion. Strata, which have originally enfolded a mountain like the coats of an onion, have fallen off in curved lines, leaving waving edges, overlapping each other, as represented Plate II. fig. 5. Suppose indented sections were made in the side of an onion, the edges of the different indented rinds would present similar contortions.

Inequalities in the general curvature of the beds may have occasioned them to break off in this manner. The *Montagne de Tuille*, near Montmelian, in Savoy, of which a plate is given in the third volume of Saussure's *Voyages dans les Alps*, offers an instance of this apparent contortion, which Saussure considers as almost inexplicable. I examined this mountain from various stations with much attention, and am convinced that the contortions are only illusory, and are not like the real contortions, which the lower beds of transition limestone, in this country, frequently present on a small scale. In certain situations in the Alps, however, the strata have evidently been raised by some violent convulsion, and have been bent by the resistance which they have offered to the moving cause. Of this a remarkable instance may be seen in the Baltenberg mountain, at the head of the lake of Brientz, of which I have given a description and drawing in the second volume of my *Travels in the Tarentaise*.

The strata of secondary rocks belonging to the same formation, frequently preserve nearly the same thickness for a considerable extent, and are arranged conformably over each other, except in situations where their regularity has been disturbed by rents or fractures. In these secondary conformable strata, the order in which they succeed each other indicates their relative ages; but this rule cannot be extended to all classes of rocks.

No inference can at first appear more legitimate than this:—"The rock which supports another must be older than that which rests upon it, if their original position has not been changed." But this conclusion, when examined with attention, will fairly admit of doubt, with respect to those rocks which are crystalline like the primary. These were either formed by chemical affinity from a state of solution, or by crystallization from a state of fusion:—If by the latter mode, all the different beds may have been arranged at the same time, and the upper and lower rocks may have a cotemporaneous origin. If a mass of melted matter, from a furnace, cool slowly, the internal and external parts will vary, both in their physical and chemical properties; but it cannot, on this account, be said that the lower part is older than the upper. But, strata deposited by water were,