

fluid matter which they contained in their minute pores, as before described (p. 35), and in part to the permeation of sea-water while they were yet submerged.

At the western extremity of the Pyrenees, great curvatures of the strata are seen in the sea cliffs, where the rocks consist of marl, grit, and chert. At certain points, as at *a*, fig. 78, some of the bendings of the

Fig. 78.

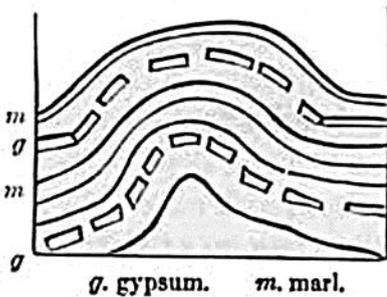


Strata of chert, grit, and marl, near St. Jean de Luz.

flinty chert are so sharp, that specimens might be broken off, well fitted to serve as ridge-tiles on the roof of a house. Although this chert could not have been brittle as now, when first folded into this shape, it presents, nevertheless, here and there at the points of greatest flexure small cracks, which show that it was solid, and not wholly incapable of breaking at the period of its displacement. The numerous rents alluded to are not empty, but filled with chalcedony and quartz.

Between San Caterina and Castrogiovanni, in Sicily, bent and undulating gypseous marls occur, with here and there thin beds of solid gypsum interstratified. Sometimes these solid layers have been broken into detached fragments, still preserving their sharp edges (*g g*, fig. 79), while the continuity of the more pliable and ductile marls, *m m*, has not been interrupted.

Fig. 79.

*g.* gypsum. *m.* marl.

I shall conclude my remarks on bent strata by stating, that, in mountainous regions like the Alps, it is often difficult for

an experienced geologist to determine correctly the relative age of beds by superposition, so often have the strata been folded back upon themselves, the upper parts of the curve having been removed by denudation. Thus, if we met with the strata seen in the section fig. 80, we should

Fig. 80.



naturally suppose that there were twelve distinct beds, or sets of beds, No. 1 being the newest, and No. 12 the oldest of the series. But this section may, perhaps, exhibit merely six beds, which have been

folded in the manner seen in fig. 81, so that each of them is twice repeated, the position of one-half being reversed, and part of No. 1, originally the uppermost, having now become the lowest of the series. These phenomena are often observable on a magnificent scale in certain regions in Switzerland in precipices from 2000 to 3000 feet in perpendicular height. In the Iselten Alp, in the valley of the Lutschine, between