

The base of these strata passes down conformably into the Devonian system, with which, alike by palæontological and petrographical characters, it is closely linked. The Carboniferous rocks of the north of France and of Belgium have undergone considerable disturbance. A remarkable fault ("la grande faille" of this region) resulting from the rupture of an isoclinal syncline, and the consequent sliding of the inverted side over higher beds, runs from near Liège westward into the Boulonnais, with a general but variable hade toward the south. On the southern side lie lower Devonian strata, below which the Carboniferous Limestone and even Coal-measures are made to plunge. Bores and pits near Liège at the one end, and in the Boulonnais²²² at the other, have reached workable coal, after piercing the inverted Devonian rocks. By continuing the boring the same coals are found at lower levels in their normal positions. Besides this dominant dislocation many minor faults and plications have taken place in the Carboniferous area, some of the coal-seams being folded zig-zag, so that at Mons a bed may be perforated six times in succession by the same vertical shaft, in a depth of 350 yards. At Charleroi a series of strata, which in their original horizontal position occupied a breadth of 8½ miles, have been compressed into rather less than half that space by being plicated into twenty-two zig-zag folds.

Southward the plateau of crystalline rocks in central France is dotted with more than 300 small Carboniferous basins which contain only portions of the Coal-measures. The most important of these basins are those of the Roannais and Beaujolais, St. Etienne, Autun, Commeny, Gard, and Brive. It would appear, however, that some of the surrounding slates are altered representatives of the lower parts of the Carboniferous system, for Carboniferous Limestone fossils have been found in them between Roanne and Lyons, and near Vichy.²²³ Even as far south as Montpellier, beds of limestone full of *Productus giganteus* and other charac-

²²² For the Boulonnais, see Godwin-Austen, *Q. J. Geol. Soc.* ix. p. 231; xii. p. 38; Barrois, *Proc. Geol. Assoc.* vi. No. 1; Report of meeting at Boulogne, *Bull. Soc. Geol. France*, ser. 3, viii. p. 483; Rigaux, *Mem. Soc. Sci. Boulogne*, vol. xiv. 1892; "Notice Geol. sur le Bas Boulonnais," Boulogne-sur-mer 1892.

²²³ Murchison, *Q. J. Geol. Soc.* vii. 1851, p. 13; Julien, *Comptes Rendus*, lxxviii. p. 74.