

ally, surrounded by stone harder than the other part of the stratum, and project above the surface. At Sandsend, near Whitby, the alum shale has been perforated near the sea, to the depth of one hundred and thirty yards, without penetrating into the subjacent rock; to which if we add the height of the cliffs above, it will make a total thickness of lias exceeding two hundred and twenty yards: the upper parts are more productive of alum than the lower.* In Dorsetshire, the whole thickness of the lias formation may be seen in succession: a few miles west of Bridport, the uppermost bed rises above the level of the sea; and three miles west of Lyme it terminates, and the white lias (the lowest part of this formation) may be observed at low water resting on red marl.

The lias formation is extensively developed on the eastern side of France. In passing by Rouvray to Dijon, in the year 1820, I was exceedingly struck with the complete resemblance of the geology of the country, with that of Leicestershire and Worcestershire. Before arriving at Rouvray, we pass over red marl; after leaving that town, the road traverses a very low range of decomposing sienite and granite rocks, exactly similar to those of Malvern; after which it passes for several miles over well characterized lias, filled with gryphites and belemnites: masses of the harder parts, filled with these fossils, are collected for keeping the road in repair.

In England, lias limestone occurs, almost always, in nearly horizontal strata, and never attains any great elevation. On the west of Gloucester, at Highnam Park, lias limestone forms a nearly flat pavement, resting on red marl, on the summit of a hill about two hundred and fifty feet above the level of the Vale of Severn. From this point to the north-west, there is no bed of lias known in England or Wales; but it is found in the north-west part of Ireland, and in some of the Hebrides. At Barrow-on-Soar, in Leicestershire, lias rises considerably above the level of the river; it is in the flattened balls that occur in the Barrow limestone, that the finest specimens of fossil fish are found. The most interesting junction of lias and red marl, that I have observed, occurs in the south side of the Severn at Aust passage, where the red marl may be seen for a considerable distance, supporting the lias, but separated from it by a micaceous bed, filled with broken bones of saurian animals, and other organic remains. Another junction is mentioned Chap. II. p. 20. The lias clay, from its comparative softness, has been more affected by the action of torrents and inundations than the strata above or beneath it: hence it is frequently excavated into valleys. Some of the mountain valleys, in the Alps, are cut in lias clay. The lias limestone of the Alps and the Jura, loses its flat and parallel stratification, and is bent and con-

* Mr John Phillips, in his recent survey of the Yorkshire coast, estimates the average thickness of the lias, comprising the lower, middle, and upper beds, at 850 feet, or 283 yards.