

XVII.—*Extracts from a Paper entitled, Remarks on the Strata at Stinchcombe near Dursley, in Gloucestershire.*

By GEORGE CUMBERLAND, Esq.

[Read December 6th, 1822.]

ON Hampton common and at the top of the Stroudwater vale, towards Cirencester, we have a fine oolite, nearly approaching in texture to Bath stone. Beneath the level of the upper oolite, at Uley great quarry, is a mass of bastard-freestone, differing from Bath stone in the abundance and yellowness of the calcareous matter by which it is cemented, and in being more porous and subject to flake after frost. It contains but few shells. Below this freestone are rubbly beds, consisting of compact sparry masses, irregularly shaped like chalk-flints, very full of shells, and separated from one another by a soft calcareous powder, tinged by iron.

The tops of Stinchcombe hill and the other hills in its vicinity that flank the valley of the Severn, exhibit vast heaps of rubble, consisting of bastard-freestone mixed with some fragments of pure white oolite. The organic remains that we here find are three or four species of *Anomia*, *Trigonia* *dædalea* and *costata*, *Ostrea crista-galli*, and *Porpitæ*.

Beneath this debris, in a quarry on the northern side of Stinchcombe hill, under a high beech-wood, we see a few horizontal beds cropping out from beneath others of the above-described rubbly oolite. These beds are of a warm brown colour, and are rather compact in texture, consisting of a sandy loam (such as here prevails upon the surface) cemented by calcareous spar. These beds are divided into strata of moderate thickness. In the beds themselves but few shells can be distinguished; but their joints are full of the casts of *Myæ* and *Cardia* of large dimensions, mixed, occasionally, with a few small *Pecten*s.

The passage from the preceding beds on the sides of the hill to the brown beds at Stinchcombe in the valley below, is best exhibited in a hill called Long Down, above the little village of Upper Cam. At the top is a quarry of white stone: the road leading up to this quarry cuts through a deep stratum of soft brown sandy stone: beneath this lie the harder masses of the brown shelly rock, so well exposed at Newnham quarry and at two other quarries, all situated in the parish of Stinchcombe.

Newnham quarry is about one mile and a half distant from Dursley. Its strata correspond very nearly to those of Dundry hill on the south of Bristol,

though at Dundry we meet with few or no pentacrinital remains. The uppermost of the strata at Newnham consist of brown ochreous iron-shot sandy oolite, blended with calcareous spar. They contain an abundance of organic remains viz. Myæ, Pinnæ, three or four species of Anomia, casts of trigoniæ, ammonites, belemnites, pentacrinites, and fossil wood. The lower and more solid strata contain the stems of two species of pentacrinite, distinguished by their whiteness from the brown mass in which they are imbedded, and often well displayed on the weathered surfaces of the rock. In these strata we also find three or four species of belemnite, which are easily detached in consequence of their polished surfaces. We have also the *Anomia sulcata*, which sometimes parts with its exterior coat, and then appears with a fine silky lustre. The spined *Anomia* and spined *Ostreæ* can never be obtained perfectly clear of the rock.

Under these ochreous beds we almost every where meet with a whitish or drab-coloured clay, occasionally interstratified with beds of blue clay, and forming itself into somewhat indurated concretions. In these concretions we find Myæ, Anomiæ, and three or four species of ammonite, which may easily be detached by a slight blow of the hammer, and then frequently retain their originally naere. These argillaceous beds are found at the depth of ten feet at Newnham quarry. They lie nearer the surface at the mill of Messrs. Shepherd and Hawker at Uley, where in the year 1821, while enlarging the water-course, the workmen cut through the ochreous beds, full of shells, into those of clay, from which they turned up numbers of ammonites and other organic remains. The clay-beds are also seen in a water-course at Leonard Stanley under Frocester hill, at Cam, and at several other places below the Cotswold. In these retentive strata the springs appear, and wherever the clay occurs beneath the brown and ochreous beds, good water is found.

Beneath the foregoing beds we must place those of the blue lias, so well exhibited at Fretherne cliff on the Severn. The uppermost strata consist of slaty clay, in which gryphites are contained. Below them is a bed abounding in a peculiar pentacrinite, of which no head has yet been found, that I am aware of, except an injured specimen in the collection of Mr. George Hawker of Stroud. We can walk at low-water on the blue lias of Fretherne, to the extent of half a mile, as on an extensive level floor, and there see enormous ammonites under our feet, some exceeding four feet in diameter. In the lias is found jet, with calcareous spar traversing its cracks.

In the vale of the Severn we find red marl, which probably at some depth contains beds of salt; for at Ashton Somerville, at Child Wickham, and at Sandhurst, all lying on the same line near to Gloucester, brine springs have been discovered, though never worked.