

SECTION OF THE LIAS CLAY IN A RAILWAY-CUTTING
NEAR STOW-ON-THE WOLD.

BY THE REV. S. LUCAS, F.G.S.

As Mr. E. Hull of the Geological Survey, in his 'Geology of the Country around Cheltenham' (1857), p. 24, complains of the scarcity of sections of the Upper Lias in that district, and as a section in the Railway, near Oddington and Stow-on-the-Wold, exhibits a section of Liassic clays, which appear to me to belong to the upper series, I beg to offer you the following rough but accurate account of the bed there exposed.

The list of fossils has been made with the assistance of a geological friend in London.

I believe the section here described is not at the very top of the Lias, for on the hill-side on either side of the valley the Lias ascends considerably higher than at the railway-cutting. The cutting, which is in the parish of Mangersbury, is about twenty-five to thirty feet deep, and the section is as follows:—

1. Clay 6 feet . There are no fossils in this bed. It has been probably mostly washed down from higher ground.
2. Ferruginous Bed. 1 ft. 6 in. This is almost one compact mass of shells :
Belemnites elongatus, Mill.; *Ammonites hybrida*, D'Orb.; *A. Humphreysianus* (young), Sow.; *A. Henleyi* (young), Sow.; *A. annulatus* (young), Sow.; *Nautilus*; *Trochus imbricatus*, Sow.; *T. cyclostoma* (?), Quenst.; *Pleurotomaria anglica*, Sow. (including *P. Amalthei*, Quenst.); *P. Pallium*, Sow.; *Helicina (Rotella) expansa*, Sow.; *Turbo euomphalus*, Quenst.; *Astarte*; *Unicardium cardioides*, Phil.; *Pholadomya Murchisonia*, Sow.; *Cucullæa Muensteri* (?), Quenst.; *Arca Muensteri*, Quenst.; *A. elongata*, Quenst.; *Myacites Liassinus*, Quenst.; *M. elegans*, Phil.; *M. tumidus* (?), Mor. and Lyc.; *M. sp.*; *Myoconcha psilonoti* (?), Quenst.; *Cardium multicostratum* (?), Quenst.; *Modiola Scalprum*, Soc.; *Anomia*; *Gryphæa incurva*, Sow.; *G. obliquata*, Goldf.; *Ostrea*; *Plicatula spinosa* (and var.), Sow.; *Avicula inæquivalvis*, Sow.; *Perna (Crenatula) ventricosa*, Sow.; *Pecten sublævis*, Sow.; *Plagiostoma Hermannii*, Goldf.; *P. duplicatum*, Sow.; *Rhynchonella rimosa*, Sow.
3. Stiff Blue Clay . 3 feet . Containing an Ammonite (*A. Henleyi*), and only a few other fossils.
4. Hard, slightly . 1 foot . A small *Unicardium (U. verrucosum)*, is more ferruginous and impervious bed. very plentiful in this bed, generally occurring as single valves.

5. Stiff Blue Clay . 5 feet . With *Ammonites Henleyi*, *Perna ventricosa*, and *Myacites*.
6. Hard stiff Blue Clay 12-14ft. With *Ammonites fimbriatus*, *A. margaritatus*, *A. Henleyi*, *Perna ventricosa*, and small *Pentacrinite*.
7. An irregular band of limestone, generally formed of a mass of shells *Unicardium cardioides*, *Cardinea concinna*, *Myacites tumidus* (?), *Modiola scalprum*, *Gervillia laevis*, *Perna ventricosa*, *Lima* (small), *Ostrea* (small), *Pecten sublavis*, *Plagiostoma Hermannii*, *Terebratula numismalis*, *Rhynchonella furcillata*, *R. concinna*, *R. subconcinna*, *Pentacrinus*.

The upper shelly bed (No. 2) undulates; the distance between the crest and the trough of the wave being about a hundred yards, and the depth of the trough about six feet. This is very much stained with oxide of iron.

The clayey beds Nos. 3, 5, 6, have fossiliferous concretionary nodules, and are all very similar; they contain but few fossils, and those mostly of the same species. Bed No. 7 is also stained with iron, but not so much so as bed No. 2. It is very irregular as to its composition; the stony bed being often interrupted by coarse concretionary masses at some distance from each other. This bed I also found at Oddington, four miles from the railway-cutting; and there it is only just beneath the surface-soil, so that there must have been considerable denudation.

I should think that the Upper Lias Clay is much thicker in this locality and at Chipping-Norton than is generally supposed. Mr. Bliss, the owner of the factory there, told me that he bored 500 feet without getting through the clay. This is where it crops from beneath the Inferior Oolite.

Though the beds above described may possibly belong to the Middle Lias, yet I think there is much evidence to the contrary, such as the close contiguity of the Inferior Oolite, especially the "passage-sands," with the ferruginous ammonite-bed. At Oddington, about three miles from the cutting, these sands rest directly on bed No. 7 of the section.

TRAILS, TRACKS, AND SURFACE-MARKINGS.

BY T. RUPERT JONES, F.G.S.

Geologizing, with some friends, on the south coast of the Isle of Wight, a few summers since (1859), we noticed some puddles of rain-water in the clay talus of the Wealden Cliffs near Brook Point, and observed that, like other such surfaces, the partially dried clay beds of the diminished pools showed rain-prints, foot-tracks, trails, and the rings of broken bubbles. Amongst these various markings are *convex* trail-like lines (fig. 1), which at first appeared difficult to account