XXI. *Account of a Variety of Argillaceous Limestone, found in connexion with the Iron-stone of Staffordshire.*

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THE variety of limestone here referred to is called by the miners *Curl*. The name evidently alludes to the convoluted form of its distinct concretions, each of which is either itself a complete and regular cone, or is wrapped round part of a cone, which serves as the basis of its structure. Each distinct concretion, on being parted from the conical surface to which it has been attached, presents on its concavity a series of wrinkles, regularly indented, and always parallel to the base of the cone. The *convex* surface is longitudinally striated. The circular bases of the cones project a little one beyond another, and thus give to the external surface of the mass the appearance of leaves folded over one another. Hence has arisen the conjecture, that the mineral in question is a petrified palm, or lotus. This opinion would have been immediately abandoned, if those who adopted it had descended into the bowels of the earth to see the substance in its natural situation, instead of merely inspecting the detached masses of it, which, in the neighbourhood of Cosely, are seen on every side, lying upon the ground, or used in building walls.

The fracture of this mineral is splintery ; its colour greyish black.

The masses, which are exposed to the weather, soon acquire externally a yellow rusty aspect, from the combination of oxygen with the iron which they contain.

The curl is here found in connexion with one stratum only. This is a bed of iron-stone, called the Bottom Stone of the New Mines. Beneath the measures, which, during a long period of time have been worked for coal and iron-stone in the great mining district of Staffordshire, lies a second series of strata called the *New Mines*, because they have only been worked for about sixteen years. The chief part of the iron-stone in this series of strata occurs in two beds of a few inches in thickness, which, unless so far as they are interrupted by faults, are supposed to extend continuously through the whole of this basin. The upper bed, *a*, (Fig. 6, Plate 38,) is called the *top-stone*, and the lower, *b*, the *bottom-stone*. They are separated by a bed, about two feet in thickness, of the greyish-blue slate-clay, which the miners call *clunch*. This substance also forms beds both above and below the beds of iron-stone, and contains disseminated balls and flattened nodules of iron-stone.

The bottom-stone is generally about four inches in thickness. But, at irregular intervals, it swells into great protuberances, *c, c*, which increase its thickness, in some cases, to half a yard. These protuberances are occupied by *curl*, the iron-stone remaining of the same thickness as in the parts where there is no curl. When the whole stratum has been blown up by means of gunpowder, the curl, as there is no natural parting, is separated from the iron-stone by strong blows of the hammer. The masses of curl thus attached to the iron-stone, and which appear to be of contemporaneous formation, extend in very various and irregular forms through spaces from five yards in length to twenty yards. At the edge of the protuberance, the cones are small, scarce half an inch in length;

but, as it swells to a greater thickness, the size of the cones increases proportionally, until they are a foot in length from the apex to the base.

In the mine which I inspected, (*the Coppice-mine*) the protuberances are attached to the under side of the stratum of iron-stone, never to the upper ; and the base of the cone is placed downwards, its apex being directed towards the iron-stone. This is seen to be the case, where the stratum has suffered no disturbance, and, according to the information I received from the miners, the curl is not found in this district attached to the upper surface of the iron-stone in any instance. I have however observed masses of curl, into which the iron-stone penetrated so as to surround and inclose a portion of the curl. In these specimens, the apices of the cones were always presented towards the iron-stone, so that the bases of cones proceeding from opposite surfaces of iron-stone, were presented to one another, and, but for a small interstice partly filled with clay, were brought into apposition.

The stratum contains small veins of calcareous spar, passing vertically, and without interruption, through both the iron-stone and the curl beneath it. These veins intersect one another as in the reticulations of septaria.

The Staffordshire curl has been recently employed in considerable quantities for making *Roman cement*, for which purpose it is burnt and ground to a fine powder.

Curl, (or, as it is there called, *curl-stone*,) is found in the Shropshire coal-field at Prior's Lee, Sned's Hill, and Ketley. At the Ketley iron-works it was once employed as a flux, instead of common limestone ; but its application to this use was abandoned. Its occurrence in that district is mentioned by Mr. Arthur Aikin, in the *Geological Transactions*, vol. I. p. 197.

Mr. Sowerby has given two representations of this mineral in his *British Mineralogy* (vol. II. plates 148, 149); and we are there informed that it occurs near Sunderland, at Bartonfel in Cumberland, at Boulby in Yorkshire, and in Derbyshire. The variety found in Derbyshire is described and figured in Martin's *Petrificata Derbiensia* (Wigan, 1809) plate 27, fig. 4. It is found immediately above and attached to a stratum of iron-stone which extends from Tupton Moor to Staveley.

In the collection of the Geological Society, are specimens from the clay-slate from the vale of the Dyfy, near Machynlleth, in Merionethshire. They differ very considerably from the Staffordshire and Shropshire specimens in fracture, in colour, and in the size of the distinct concretions.

From the information of Dr. G. Forchhammer, I am also enabled to state, that this substance (to which Werner, not long before his death, gave the name of *dutenmergel*, or *funnel marl*,) is found at G'ororp's Mill in Shoenen, and in the island of Bornholm, near the town of Rónne. It occurs at those places in a coal-formation, and is attached to a stratum of sandstone.

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