REPORT

Fossil aeolian features re-appear at Buddon Wood

In his classic 1912 volume on the Triassic 'Keuper Marls' around Charnwood Forest, T. O. Bosworth took advantage of the rapid expansion in hard-rock quarrying to study the nature of the unconformity between Triassic, Mercia Mudstone strata and underlying Precambrian to Ordovician 'basement' rocks. This remarkably prescient work also incorporated detailed sedimentological information on the Mercia Mudstone, which included palaeoenvironmental interpretations and analysis of heavy mineral separates.

One of the most interesting illustrations, Fig. 21 in Bosworth's book (Bosworth, T.O. 1912. *The Keuper Marls around Charnwood.* Leicester Literary and Philosophical Society, 129pp.) depicted a 'tor' of Ordovician granodiorite, emerging from beneath the Mercia Mudstone overburden that was being quarried away in what subsequently became known as Castle Hill Quarry, just to the west of Mountsorrel village. In this photograph, the top of the tor forms smooth-surfaced, rounded masses, and its vertical sides are sculpted into horizontal flutes or grooves, which were called 'terraces'. The flutes had previously been seen by W. W. Watts in 1899, again in association with the Mountsorrel granodiorite. They were attributed to wind abrasion, and gave fresh impetus to the theory of a desert origin for the overlying Triassic strata.

Recent removals of Triassic overburden from Mountsorrel granodiorite in the easterly extension to the Buddon Wood 'Superquarry' have once again revealed wind-fluting. It is seen as horizontal, parallel grooves on the smooth, fresh granodiorite surface. On close examination, Mercia Mudstone still adhering to this surface is studded with angular, sand-sized grains of fresh feldspar and quartz; perfectly fresh biotite grains are also seen. This detrital component would have been derived from the arid-climate process of 'sanding', acting upon the granodiorite to make available the grains that would then have effectively sand-blasted the bare rock surface to form the flutes. Breccias with highly angular fragments of fresh granodiorite are also found in the adhering Mercia Mudstone. Some fragments are thin, with curved margins, suggesting that they are debris caused by exfoliation of the granodiorite surface, due to the extreme diurnal temperature variations typical of desert climatic regimes.

According to Bosworth, the occurrence of wind-fluted ridges is unique to surfaces on the Mountsorrel granodiorite, and this has been confirmed by observations made since. Thus in the similarly large quarry farther south at Croft, the diorite surface, though locally smooth and highly polished, is not significantly wind-fluted. It is possible that deeply penetrating erosion and weathering along major joint surfaces on the Mountsorrel granodiorite was a prerequisite to the formation of a dissected, gullied topography that would have funnelled the strong desert winds. The siltstone 'skerries' intercalated in the Mercia Mudstone were interpreted by Bosworth as the shallow-water deposits of ephemeral lakes or ponds, on the basis of features such as desiccation cracks and halite pseudomorphs. They also show small-scale ripple marks, which Bosworth suggested were generated from currents driven by winds blowing from a south-westerly direction. Was his theory correct or is more palaeo-environmental interpretation needed? This is exactly the opposite direction to that predicted by modern global wind patterns for a location 15-20º north of the Equator, which is where the East Midlands would have been in mid-Triassic times.

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Fluting on granodiorite tors attributed to Triassic wind erosion and re-exposed in Buddon Wood Quarry (photo: British Geological Survey).