Shapfell Quarry, Hardendale: past, present and future

Leader Sylvia Woodhead 17 August 2019

A large party assembled at the minor road corner 'Castlehouse Scar' NY 590 146, for a visit to Shapfell Quarry, Hardendale. The visit was hosted by Tata Steel: the General Manager and Operations Manager gave up their Saturday morning to show us round the quarry. In 1962 the quarry was opened for good quality limestone for the Scottish steel industry. Active blasting ceased in 2009, and the quarry is now being restored. The restoration is planned to run for 18 years, in 3 phases, and includes a scheme for geological interpretation which formed the focus of the visit.



Figure 1 View to NE corner of Shapfell quarry

The quarry was opened for significant extraction in 1962 by Colvilles of Glasgow, to provide crushed limestone for the Scottish steel industry. The limestone has a high $CaCO_3$ content, with low sulphur and phosphorus, which also makes it suitable for calcination to high quality lime, and in 1972 the first three of Shapfell's four lime kilns were built, with the fourth added in 1990. The plant makes approximately one-fifth of the UK's lime. The stone was taken from the quarry by a private haul road over the M6 to the Shapfell works site where it was crushed prior to calcination, with the fines or 'slimes' from the crushing plant being returned to the quarry as backfill. Water was pumped into settling ponds.

The land on Hardendale Nab was formerly agricultural grazing land. In 1996 when the then extant restoration plan was approved it was assumed that the quarry would be infilled to return the land for agriculture, and that the rock faces would be obscured by landscaping. An area of Hardendale Nab has been restored.

In 1967 Colvilles were taken over by British Steel, who merged with the Dutch steelmaker Hoogovens to form Corus in 1999. In 2007 Corus and the quarry were purchased by Tata Steel of India. By 2009 the majority of the quarry's consented reserves had been exhausted, and the quarry was mothballed whilst an application to further deepen the quarry was determined. This application however was subsequently withdrawn by Tata Steel due to concerns that pumping below the water table for a significant period may be ecologically harmful, and instead an enhanced restoration application was submitted.

In 2009 active drilling and shot blasting at the quarry ceased, and it filled with water once the pumps were switched off. The works now uses limestone from Hanson's Shap Beck Quarry, north of Shap NY 554 182 and from Tarmac in Derbyshire, the latter brought by rail. The quarry void continues to be restored with slimes, which comprise mainly fine limestone particles with some clay that arise as washings from the washing plant.

In 2018 a new application was granted to extend the restoration and time scale to 18 years, in 3 phases. There was extensive public consultation. Cumbria GeoConservation (CGC) submitted a response requesting that the rock faces are not obscured by planting, that the geological heritage of the quarry is recognised, and that accompanied visits for geological groups can be made available by appointment.

In 2019 the application was approved, with a planning condition requiring a scheme for geological interpretation. The new restoration plan will return the land to the landowner in a 'suitably restored condition'. Around 37 hectares will be restored for agriculture and ecology, but the 30 ha of water will remain. CGC is now in discussion with Tata Steel & planning officers of Cumbria County Council over the details of geological interpretation. The scheme

includes at least 2 geological interpretation panels; and agreement of their design, mounting and siting.

One panel may be located at the meeting place, NY 590 146, 'Sandpot Hole' on the OS map, with this panel describing the background to the past, present & future of the quarry, with an explanation of the restoration plan and reference to a geological trail around the quarry exterior.



Figure 2 CGS members on the 'bedding plane' area

To access the quarry interior, following from previous visits by CGC, Tata Steel have installed a locked gate at NY 585 142 in the quarry boundary fence. At NY 589 146 a small area of limestone pavement with some erratic blocks of Shap granite was examined. As the gate was approached, the first views into the quarry were obtained (figure 1). A large limestone block near the gate is the proposed site for a further panel, this time to focus on the geology.

The view into the quarry is impressive, a large body of water and distant views of the strike face of the Lower Carboniferous Knipe Scar Limestone (KNL) Formation (described by the BGS as rhythmically bedded wackestones with thin interbeds of mudstone and siltstone, with a regional thickness of around 100m). In the quarry the KNL appears pale grey, blocky and well jointed. The strata dip to the east at approximately 5-10°.

Through the gate Tata Steel have begun an indicative path of crushed stone, into the quarry void. On the descent into the quarry members were distracted by fossils in loose blocks, which also included examples of sandstone, possibly the Wintertarn Sandstone Formation (WTRS) of the Yoredale/ Alston Group, which overlies the KNL.

In the northwest corner an inclined bedding plane exposed by quarrying shows good cross sections of fossil corals (figure 2). This area is intended to be on the internal quarry geology trail that will be created as part of the final restoration phase. Large blocks of limestone, to be called the Rock Park, also show good fossils (figure 3). In addition to a second geology interpretation board, further interpretation of the fossils is planned.

The party were then taken to the *piece de resistance,* amazing gour pools, deposits of tufa, (figure 4) (described in detail in a separate article in this publication). All agreed these features were of outstanding quality. On leaving the quarry the



Figure 3 View to 'rock park' area