

EXCURSION

Ballidon Limestone Quarry

Leaders: Darren Middleton and Philip Loxley

Wednesday, 2nd June 1999

Sixteen Society members braved torrential rain and thunderstorms to visit Ballidon Quarry on the southern edge of the Peak District. The visit was led by the quarry managers who kindly provided excellent notes describing the quarrying operations. Transport around the site was in minibuses provided by the quarry operators, Tilcon, part of the Anglo American Group.

Ballidon Quarry (at SK203556) lies just inside the southern boundary of the Peak District National Park, almost midway between Dove Dale and Matlock, and is visible from the High Peak trail. Quarrying started in the 1940s, rather later than most other quarries started in the area. The quarried product is mainly a limestone of very high purity, with about 99% CaCO₃. Around 60% of the output is used as a white filler powder in a variety of industries. Some of the coarser stone is used to make white concrete blocks in a plant on site, and some is used as roadstone chippings in a bitumen coating plant, also on site. Impure material is used for fill, including restoration work in the quarry.

The first excursion stop was a viewpoint overlooking the main quarry in the Bee Low Limestone, which was producing up to 6000 tonnes of stone per week. Site restoration could be seen on the northwest side of the quarry. Contoured screening bunds blanket the old quarry sides with a mix of loose fill and boulders to create an appearance similar to the natural slopes and gorges in the area. Subsequently some 20,000 trees of species appropriate to the area are planted, together with a seed mix to mimic the local flora. The key to the visual success of the operation lay in the placement and the size range of the stone blocks left protruding from the face of fill.

A zone of stone below the viewpoint had not been quarried and was described as a fault; its extension could be seen as a darker area in the opposite wall of the quarry. No bedding displacement could be seen across the fault, but the limestone is heavily brecciated, and the voids in it are filled with clays that make it uneconomic to quarry for high purity limestone. Discussion on the nature of the fault was cut short by the increasing intensity of rainfall and two very close lightning strikes.

The party retreated to the control room of the primary crushing plant. Broken stone from the blasted quarry faces is brought by dumper truck in 45 tonne loads to the primary crusher. It is then screened to remove material less than 40 mm in diameter, as this fraction contains almost all of the clay, iron oxides and other impurities. Product quality is also aided by the face loaders selecting only the larger and better material to fill the dumper

trucks. Crushed material exceeding 40 mm is stockpiled for further processing.

Amelioration of the storm enabled the party to visit a face in the newer, northern part of the quarry, on a bench just below the original ground surface where the Monsal Dale Limestone was being removed, where it overlies the Bee Low Limestone. The Monsal Dale beds were deposited in a marine lagoonal basin in water about 30 m deep. The rock is darker in colour, with conspicuous fossils of corals, crinoids and productid brachiopods. It is very hard and commonly breaks with a conchoidal fracture, and is of lower commercial value than the Bee Low Limestone due to its higher content of impurities. Locally the limestone is heavily shattered, and slickensides were seen on fault planes. Exposed across the quarry face, two layers of pyroclastic material, separated by a thin limestone, were thought to be related to the Lower Matlock Lava. The volcanic sediment is finely laminated, suggesting its deposition in water; it is also very reddened, which is taken to indicate subaerial weathering after phases of uplift. It was thought that these volcanic horizons in the Monsal Dale Limestone had no other local exposures. The red clastic material made the rock only of use for low quality fill. Some of the limestone exposed on the same bench has been dolomitised; this is also unsuitable for the main quarry products.

The increasing downpour caused the party to retreat to shelter again, in the control room of the secondary crusher. In this plant, the clean limestone is further crushed, screened into particles of sizes down to 3 mm, and stored in hoppers ready for despatch.

The Ballidon Quarry had revealed to members some interesting contrasts between the Bee Low and Monsal Dale Limestones, and some insights to the geological problems of stone quarrying. In near cloudburst conditions, the quarry company leaders were briefly and informally thanked and the party departed wet but enlightened. The Society is grateful to the company, its managers and its staff, who provided our members with an excellent visit.

Alan Filmer