REPORT

Litton Mill lava exposure

During the 1860s, the Midland Railway built their line through the Derbyshire Peak District. A cutting above Litton Mill fortuitously exposed the eastern end of the Upper Miller's Dale Lava, so the site is now on the Monsal Trail cycle route and footpath that follows the abandoned railway. It is of geological value in that it offers a rare profile through a lava front that had entered the shallow waters of the Carboniferous shelf sea.

By 2022, many years of plant growth had almost obscured the geology. So in April, eleven members of the Society joined David Watts and Iain Thistlethwaite, trails rangers for the Peak District National Park, to clean up the rockface. The day's project proved to have been well worth the effort, as is seen in the *before* and *after* photographs on this page.

Less than five metres of olivine basalt lava is visible at the western (right) end of the exposure, though the base is below ground level and the top is still obscured. The key part of the exposure is the lava front that occupies the heart of the exposure. Most of this consists of a lithified mixture of lava rubble and hyaloclastite. The latter is the accumulation of glass fragments that were formed as the lava surface was chilled and fracture in contact with the seawater, it was essentially black sand. Conspicuous within this material are about a dozen rounded blocks of solid lava, each about half a metre in diameter. These are interpreted as pillows that formed on the front and then rolled down the underwater slope and settled within the mass of debris.

The eastern (left) end of the lava is a ramp above which lies the lowest beds of the Monsal Dale Limestone. Between lava and limestone, clearance of a thick wedge of soil has revealed a bed, up to a metre thick, of yellow granular material. This appears to be either hyaloclastite or tuff, but has not been examined under the microscope. Its alteration, to produce its colour, could have been contemporary subaerial or submarine weathering, subsequent hydrothermal alteration or later alteration by karstic groundwater in the limestone. Which of these is the case remains uncertain for the present.

The cutting before the clearance, in February, so without a new flush of summer greenery (see page 142).

In three months since its April clearance, fresh greenery has already started to appear on the face; It is unfortunate that the weathered basalt in joints and fissures is an almost perfect medium for plant growth. The face is going to require maintenance to retain its geological value, but at present it is a magnificent site.

Special credit is given to David Watts for making the site clear-up possible by establishing that its geological values were greater than any botanical value within overall plans for conservation.

Tony Waltham

The cut face after its clean-up. At the left end, continuations of the lava and yellow tuff are obscured by masonry that was built up to the base of the overhanging limestone. The base of the lava lies below the floor of the railway cutting, and its extreme toe is obscured by the masonry. As an indication of scale, the top of the signboard is about a metre above ground level.