EXCURSION TO THE ASHBOURNE AREA

Leader: T.J. Charsley — Sunday, July 2, 1978

The object of the excursion was to sample some of the lesser-known geology around Ashbourne, particularly those areas which have recently been the subject of primary mapping by the Institute of Geological Sciences.

Kniveton (SK 206 494)

The party walked across the fields from Brookhouse Farm to an exposure of a highly altered amygdaloidal porphyritic olivine-basalt. This was formerly regarded as a dyke (Green, *et al.*, 1869), but recent mapping has shown it to be concordant with the surrounding sedimentary rocks, though whether it is a lava flow or a sill has not yet been resolved.

The basalt, which has a thickness in the stream of 17.5 m, is exposed in a rather weathered section (SK 2060 4939) through Visean P_1 rocks of the Widmerpool Formation, which here consists of alternations of mudstones with graded beds of limestone of probable turbiditic origin. The section showed a number of beds of limestone with coarse bioclastic material at the base grading up into calcisiltite or calcilutite. The few current directions measured support the conclusions of Weaver & Stanley (1977) that palaeoflow and mineralogy are consistent with an origin to the southeast, possibly from the Charnwood Forest massif.

Punches Dumble (SK 191 482)

The first section (SK 1911 4813), in Namurian turbidites, showed some 6 m of alternating mudstones, siltstones and sandstones, with just over 50% mudstone. The sandstones are very fine- to medium-grained and quartzitic, and are in some cases graded. Their most characteristic feature is the presence of a variety of sole markings, mainly groove and load casts, with some prod marks and possibly unroofed sand-filled burrows. These features together with the cross-lamination observable in some units and the general poor degree of sorting are typical of turbidites. Measured current structures indicate flow towards the NNW.

The reddish colouring of the rocks is regarded as staining below a former Triassic cover, and the basal Triassic unconformity crops out 350 m SE from this locality. The rocks in the Dumble, which dip 14-22° ENE, lie on the western limit of a syncline having a N-S axis and a wavelength of about 350 m.

Two fossiliferous horizons, within the *Eumorphoceras bisulcatum* (E2a) Zone, are exposed along the stream course (at SK 1910 4815 and SK 1909 4807 respectively), and a number of intrepid fossil hunters, braving rubbish, mud and water, were rewarded with fair specimens of goniatites and bivalves.

Ashbourne (SK 1765 4657)

The party visited an exposure in the gardens of the old Ashbourne Grammar School, by kind permission of Mr. and Mrs. Bowden, to see a 3 m section in cemented gravels. The gravels consist of angular to well-rounded blocks, cobbles and pebbles of Carboniferous limestone with a few Carboniferous sandstone, quartz, quartzite and black chert pebbles. The matrix consists mainly of coarse quartz sand and the whole is strongly cemented by calcium carbonate. The gravels are poorly stratified and poorly sorted, and are regarded as being the product of a high energy fluvial environment, probably laid down as braid bars.

Six separate occurrences of the gravels have been located aligned in a general N-S direction across the west side of Ashbourne. These deposits lie about 15 m above the flood plain of the Henmore Brook at heights decreasing from about 360 ft AOD in the

north to 425 ft in the south over about $1\frac{1}{4}$ miles. Their height indicates that they pre-date the Mayfield Terrace of the River Dove which may be equated with the Beeston Terrace (Ipswichian) of the Middle Trent (Jones & Stanley, 1974).

The gravels are thus either the equivalent of the Hilton Terrace of the Middle Trent and of Wolstonian age, or, if they pre-date the till on the ridge above the school, they are pre-Wolstonian and the earliest Pleistocene deposits known from this part of the Midlands.

Limestone Hill area (SK 136 463)

Several sections were examined on and around Limestone Hill, a knoll-reef of Chadian (C_2S_1) age, which also formed a feature, later to be buried by sediment, in the sub-Triassic landscape. Sections along the stream course were seen showing local variations in the basal part of the Hawksmoor Formation, itself part of the Sherwood Sandstone Group. A thin bed containing silicified limestone clasts of probable local derivation was seen (SK 1382 4612) in a sequence of about 4 m of dark red-brown fine-grained micaceous silty sandstones with yellow mottles. Slightly upstream (SK 1383 4617), ten separate mudstone units, some showing silt laminae, in a sequence of interlayered mudstones and sandstones point to an origin for the sequences as fluvial channel sands with overbank deposits of silt and mud.

A basal Triassic conglomerate was seen at SK 1371 4637 where it consists of angular silicified limestone clasts up to 22 cm in diameter, set in a very fine sand matrix with secondary carbonate cement. The conglomerate rests on a part of the Widmerpool Formation in which limestone is dominant (c. 80%), formerly referred to as the Bull Gap Shales (Parkinson & Ludford, 1964) of Upper B_2 age.

After examining the site of a shaft, sunk in 1820 as part of a lead mining project (Porter & Robey, 1972), the party climbed Limestone Hill. Evidence of mineralisation was seen on the hillside including dolomitisation, blocks containing disseminated galena and a large boulder of finely crystalline baryte. The hill is surrounded by soft Triassic sandstones of the Hawksmoor Formation which give way at the top of the slope to well cemented coarse-grained, commonly pebbly, sandstones of the Hollington Formation.

Stanton Quarry (SK 123 466)

Little is now to be seen in the quarry, which was visited with the permission of the owners, Mr. and Mrs. Lucking, of the former extensive workings for building stone, but at a rock known as the "Tor" baryte veining and cementation of the sandstone was demonstrated. The control on the baryte mineralisation was regarded as partly structural and partly caused by the capping effect of the overlying Mercia Mudstone Group. A small pond in the quarry probably overlies an impermeable marl band, a feature of the Hollington Formation, but a previously-recorded exposure of mudstone could not be located on this occasion due to the thickness of the undergrowth. A member of the party reminded those present that the quarry was the location for the labyrinthodont holotype *Cyclotosaurus leptognathus*, formerly known as *C. stantonensis* (Paton, 1974), the skull of which now resides in the British Museum (Natural History).

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