EXCURSION TO THE NAMURIAN OUTCROP IN SOUTH WEST DERBYSHIRE AND NORTH EAST STAFFORDSHIRE

Leaders: B. K. Holdsworth and N. H. Trewin — Sunday, 10th September, 1967

The purpose of this excursion, which started from Longnor in mid-morning, was to demonstrate the leaders' main conclusions regarding the stratigraphy and sedimentology of lower Namurian rocks exposed in the upper reaches of the Rivers Dove, Manifold and Churnet.

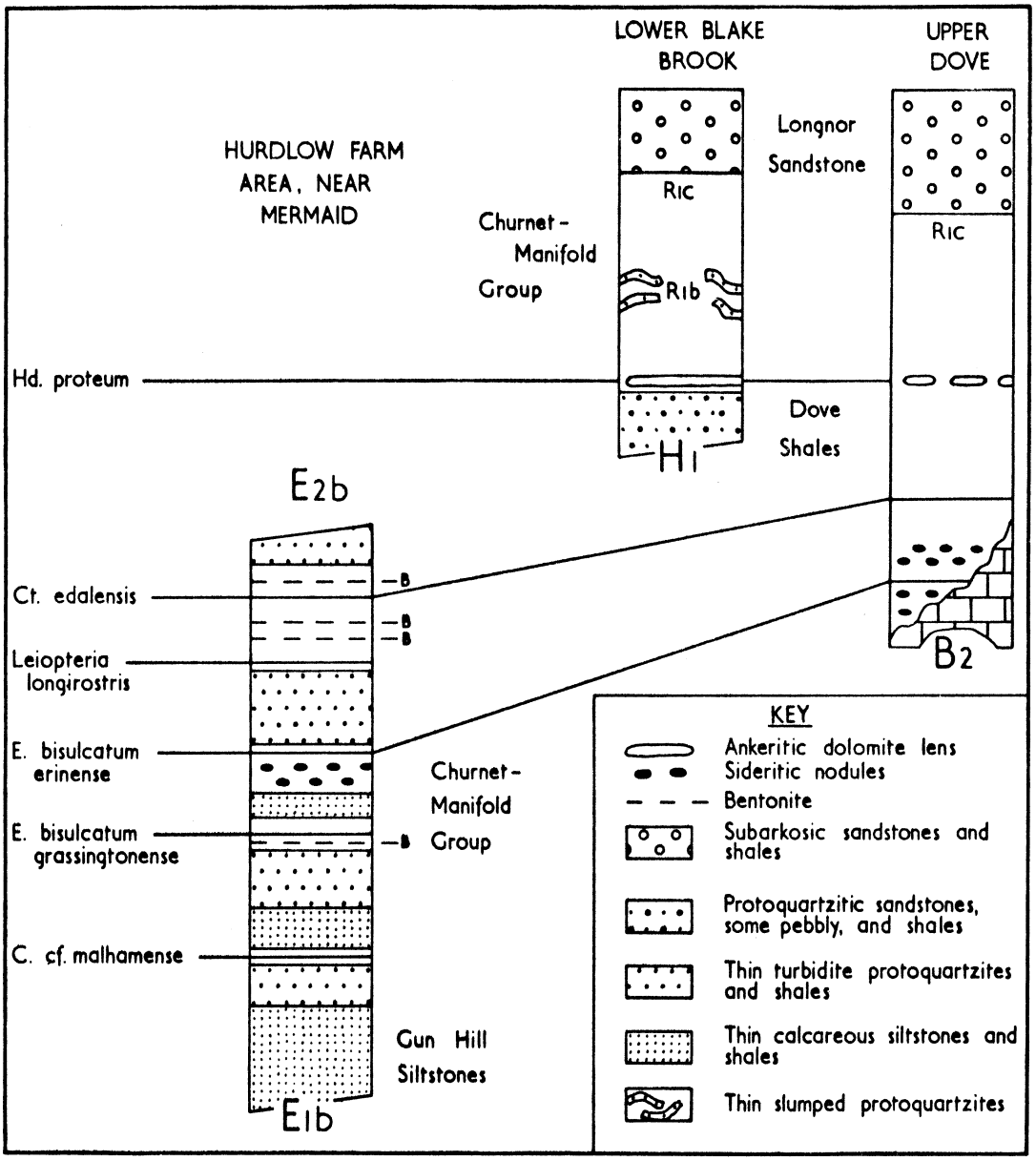
Longnor stands on a unit of thinly bedded sandstones with intercalated shales, the sandstone unit taking its name from the town. The base of the Longnor Sandstone is diachronous. In the Hollinsclough area the base is in the lower half of R1c: in the upper Manifold area it is in the uppermost part of R1c. The top of the Longnor Sandstone, formerly thought to be in lower R2b (Holdsworth, 1963a, fig. 1), underlies a marine band with Reticuloceras gracile Bisat, and is therefore at the top of R1c (Francis, 1967, p. 111). The Longnor Sandstone, only very locally exceeding a thickness of 200 feet, is thus, in its maximum development, equivalent to the much thicker arenaceous group of North Derbyshire, extending from the base of the Mam Tor Sandstones to the top of the Upper Kinderscout Grit. The thinner Longnor Sandstone of the upper Manifold area is probably equivalent only to the Upper Kinderscout Grit (Holdsworth, 1963b, p. 152).

As the party's coach left Longnor and descended the hill to Glutton Bridge, it crossed the scarp slope of the Longnor Sandstone and entered the underlying shale unit - the Dove Shales. These shales range from upper E2a to lower R1c. They have a narrow outcrop in the upper reaches of the River Dove and lie unconformably upon Visean (D1;B2) limestones of "reef facies", which form the steep but grassy north wall of the valley.

Leaving the coach at Glutton Bridge the party walked upstream to Stannery Farm. Here a brief sketch of local Namurian palaeogeography was attempted. It was stressed that the margin of the old Visean massif was resuscitated in late Visean or early Namurian time to constitute the north eastern margin of the Cheshire-Staffordshire-Derbyshire lower Namurian basin. The almost entirely silt and sand free Dove Shales must be considered as abnormal, marginal sediments of this basin, accumulating on slight southwardly tilted slopes which almost wholly denied ingress to sands and silts actively being swept into the basin from the south.

Exposures in the lowest goniatite band of the Dove Valley (SK 07516685), near Stannery Farm, yielded the typical upper E2a goniatite Eumorphoceras bisulcatum erinense Yates, together with Cravenoceras sp. and posidonid lamellibranchs. Further upstream the party visited the exposure (SK 07076698) at the foot of Chrome Hill, where the unconformity between Namurian shale and Visean limestone is exposed. On the surface of a loose block of Namurian limestone Mr. Strong made the remarkable discovery of a complete fossil fish some 8 cms. in length.

Crossing the stream at this point a less spectacular but stratigraphically more important fauna was encountered in the basal E2b.1 goniatite band of Cravenoceratoides edalensis (Bisat) (SK 07056694), and typical fragments of this goniatite were collected. Moving yet further upstream the party was shown the horizon of large, ankeritic lenses (SK 06656688) which constitutes the basal H2a goniatite horizon of Hudsonoceras proteum (Brown), and a few specimens with typical, spirally striate ornament were extracted. Attention was drawn to a few layers and streaks of quartz silt below this horizon, none more than 1 cm. thick. A forced march back to the coach and return to Longnor was followed by lunch in the Crewe and Harpur Arms.



Text-figure 1 Summary of strata examined on the excursion, columns not to scale
Details of faunal bands in the Dove Shales and Churnet-Manifold Group not examined by the excursion are omitted. Thicknesses: Dove Shales ca. 550 feet; Churnet-Manifold Group ca. 1200 feet; lowest part of Churnet-Manifold Group shown in section of Hurdlow Farm Area ca. 450 feet.

After lunch the coach was taken southwards to Lumpool Bridge. Members of the party were reminded that they were now moving away from the distal margin of the Namurian basin and towards the source of the early Namurian sands. Downstream of Lumpool Bridge, in the Blake Brook, the consequences of this move were immediately apparent. The Hd. proteum dolomite, a more continuous bed than in the Dove, was seen (SK 06216118) to be underlain by a considerable thickness of shales with protoquartzitic sandstones. Some of these sandstones are pebbly; the "traditional 'crowstone' type" of Staffordshire (Holdsworth, 1964). These sandstones are represented in the upper Dove area only by the thin quartz silts noted in the morning.

Walking downstream across slumped R1b protoquartzites (SK 06316118) the party encountered the local base of the Longnor Sandstone (SK 06486123). It was stressed that the Longnor Sandstone is subarkosic in marked contrast to all the practically feldspar-free protoquartzites lower in the succession. Partly, at least, this abrupt change in mineralogy is due to the onset of sand supply from the north. The party was able to see some evidence of the turbidite nature of the Longnor Sandstone beds and note the clear similarity in lithofacies to the Shale Grit of North Derbyshire.

Crossing to the high ground on the axis of the Morridge-Mixon Anticline the coach made its last stop beside the Mermaid Public House. Standing here on E2a sandstones and shales, the party had a view westwards which showed, in the near distance, the Goyt Syncline in upper Namurian grits and shales and further west the high ground of the Gun and Croker Anticlines, stratigraphically identical to the level at which the party stood. Descending into the complex of deeply incised upper Churnet tributary streams, a little south-west of the Mermaid, the E1c-E2b1 succession was demonstrated.

The party was reminded that in the morning they had seen an unconformity below the upper E2a band of Eumorphoceras bisulcatum erinense. Now, away from the distal margin of the basin, older goniatite horizons were present below this band and to the south, near Mixon, it was possible to show that the Visean-Namurian succession was unbroken. The E1c band of Cravenoceras cf. malhamense (Bisat) (SK 03056060), as usual, yielded only abundant specimens of the lamellibranch Caneyella membranaces (M'coy), the goniatite being very rare, but the typical goniatite faunas were collected from the higher bands of Eumorphoceras bisulcatum grassingtonense Dunham and Stubblefield, lower E2a (SK 02896042), E. bisulcatum erinense, upper E2a (SK 02876082) and Cravenoceratoides edalensis, E2b.1 (SK 02716073).

Attention was drawn to the thinly bedded protoquartzitic sandstones below Ct. edalensis - quite unrepresented in the upper Dove Valley - and to similar sandstone units below E. bisulcatum grassingtonense and below C. cf. malhamense. Bases of these sandstones showed a profusion of sedimentary structures, the most important being prod casts which indicate transport of these typically turbidite sands from the south. In the black shales adjacent to the E. bisulcatum grassingtonense and Ct. edalensis bands white clay seams, sometimes pyritic, less than 2 cm. in thickness were seen, and Mr. Trewin explained his recent conclusion that these thin beds are bentonites - layers of altered volcanic dust and ash which he has shown to be of remarkably wide extent in the Staffordshire-Derbyshire-Cheshire area.

In the late afternoon the party climbed back to the Mermaid and returned by coach and car to Nottingham.

B. K. H.

N. H. T.

REFERENCES

FRANCIS, E.A. 1967. The Namurian and lowermost Westphalian rocks in the southern part of the Goyt Syncline. In: Geological excursions in the Sheffield region. pp. 109-115, fig. 15.1. (see Neves and Downie, 1967).

HOLDSWORTH, B.K. 1963a. Pre-fluvial, autogeosynclinal sedimentation in the Namurian of the Southern Central Province. Nature, London, Vol. 199, pp. 133-135, 1 text-figure.

1963b. Unpublished Ph. D. Thesis, University of Manchester.

1964. The 'crowstones' of Staffordshire, Derbyshire and Cheshire. North Staffordshire Journal of Field Studies, Vol. 4, pp. 89-102, 2 text-figs.

NEVES, R. and DOWNIE, C. (Eds.) 1967. Geological excursions in the Sheffield region and the Peak District National Park. J.W. Northend Ltd., Sheffield. 163 pp.