

THE MID-D₁ UNCONFORMITY BETWEEN HARTINGTON AND ALSOP, DERBYSHIRE

by

Donald Parkinson

Summary

It is argued that the unconformity above the S₂ inlier near Hartington is a northwesterly extension of the middle D₁ break east of Wolfscote Dale.

The Wolfscote Dale area

In Wolfscote Dale on the north Staffordshire-west Derbyshire border there is a thick development of Carboniferous (Middle Viséan) Limestone of shelf (and in part reef) facies along the western boundary of the Derbyshire Massif. The lower part of this outcrop is a sparsely fossiliferous rock of fairly uniform character and a maximum thickness probably exceeding 800 feet, which was designated the Wolfscote Dale Limestone, and its age was attributed to the S Zone (Parkinson, 1950), but it was later shown (Parkinson and Ludford, 1964) to be of Lower D₁ age. It is succeeded by the Alsop Moor Limestone (Parkinson, 1950) of similar facies, which exceeds 500 feet in thickness on Wolfscote Hill. [I regret that in the 1964 paper the Alsop Moor Limestone was named in error the Alston Moor Limestone].

Westwards the Alsop Moor Limestone changes in character to become the massive Narrowdale Limestone of reef facies.

Southwest from Wolfscote Dale the Wolfscote Dale Limestone shows a gradual transition to the basin facies, with isolated developments of reef limestone. Eastwards it dwindles rapidly, and in a section between Biggin Dale and Coldeston the thickness has diminished to about 450 feet. Southeast of Coldeaton a fault running to Alsop en le Dale (Parkinson and Ludford, 1964, Plate 8) cuts out the remaining beds, and assuming a continuation of the thinning, the lower D₁ beds may be absent in the vicinity of Alsop.

In my 1950 paper (pp.283-4) I argued on various grounds that the attenuation of the Wolfscote Dale Limestone resulted primarily from overstep of the overlying Alsop Moor Limestone. The later work (Parkinson and Ludford, 1964) revealed a misinterpretation of an exposure high on the hillside east of the River Dove which caused some modification to but did not invalidate the earlier conclusion.

The Hartington area

Northeast of Hartington, Sadler and Wyatt (1966) discovered an inlier of S₂ limestone which they subdivided into the Vincent House Beds and the Hand Dale Beds, the latter being overlain by D₁ shelf limestones, named the Lean Low Beds, which are in turn followed by the Upper Limestones, also D₁. The authors convincingly demonstrate an unconformity below the Lean Low Beds, which are 75 feet thick and contain a characteristic D₁ fauna, including *Davidsonina septosa* (Phillips). It is unlikely that these beds constitute the lower part of the D₁ Zone, since *D. septosa* does not appear until near the summit of the Chee Tor Rock.

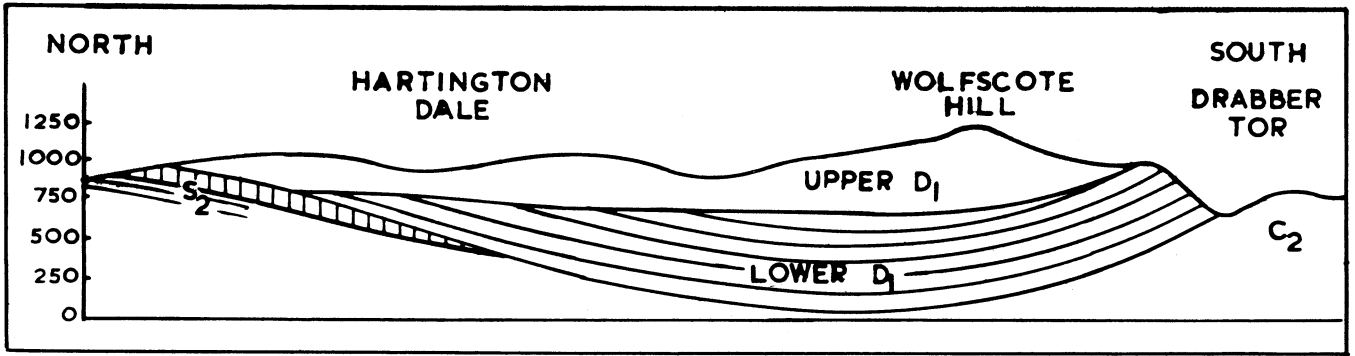


Figure 1. Generalised section to illustrate the relationships between the S_2 and the lower and upper D_1 beds. Vertical and horizontal scales the same.

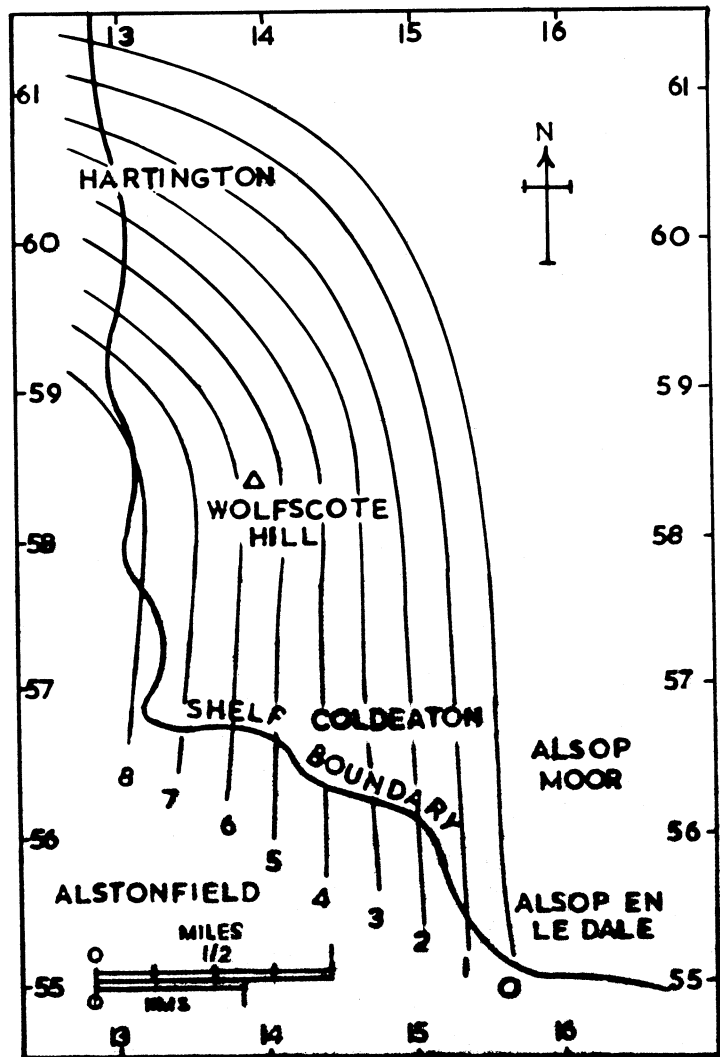


Figure 2. Isopachs at 100 ft intervals drawn on the Wolfscote Dale Limestone to illustrate the changing direction of the mid- D_1 axis of uplift.

Interpretation of the Unconformity

I suggest that the Lean Low Beds are an extension northwards of the lower part of the Alsop Moor Limestone which, from the foot of Beresford Dale, I presume to be transgressive northwards over the whole of the Wolfscote Dale Limestone. This interpretation is illustrated by a generalized section (Text-fig.1) which extends further southwards (though on a much smaller scale) than the more elaborate north-south section of Sadler and Wyatts' Fig.3.

The unconformity can be further illustrated by an isopachite map. In Text-fig.2 isopachs are drawn on the Wolfscote Dale Limestone, indicating a curved axis of uplift running from WNW-ESE north of Hartington to N-S south of Wolfscote Hill. (It is recognised, however, that the attenuation of the limestone may have been in part original). The map indicates that the axis of the earth movement is not related in direction to the shelf boundary.

South of Wolfscote Dale the S_2 beds are apparently absent and D_1 rests directly on (or C_2S_1 strata. This involves the existence of an earlier unconformity. The age of this is probably pre- S_2 (see 1950 and 1964 papers).

D. Parkinson, D.Sc., Ph.D., F.Inst.Pet., F.G.S.,
6 Clowes Avenue,
Bournemouth,
Hampshire,
BH6 4ES.

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References

- PARKINSON, D. 1950. The stratigraphy of the Dovedale area, Derbyshire and Staffordshire. Q. Jl. geol. Soc. Lond., vol. 105, pp. 265-294.
- PARKINSON, D and LUDFORD, A. 1964. The Carboniferous Limestone of the Blore-with-Swinscoe district, North-east Staffordshire, with revisions to the stratigraphy of neighbouring areas. Geol. J., vol. 4, pp. 167-176.
- SADLER, H.E. and WYATT, R.J. 1966. A Lower Carboniferous S_2 inlier near Hartington Derbyshire. Proc. Geol. Assoc., vol. 77, pp.55-64.