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# Hartfell Score

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O.S.1:50 000 sheets 78, Nithsdale & Lowther Hills

B.G.S. Scotland 1:50 000 sheet 16 (Moffat)

Route: (Figure 43)

## Introduction

A visit to Hartfell Score involves 5 to 6 km of easy walking on the public footpath. Warm and waterproof clothing is desirable in view of the exposed nature of the terrain.

Hartfell Score is one of the largest exposures in the Moffat Shale of southern Scotland, and is the type area for Lapworth's Hartfell Shales division of the Moffat Shales. The exposure was described in some detail by Lapworth (1878, pp. 292–296) and Peach & Horne (1899, pp. 134–137). Although the range of strata that can be studied at Hartfell is not as great as at Dob's Linn (q.v.) or Craigmichan Scaurs, the visitor is compensated by the splendid exposures of Lower Hartfell Shales, and the ease with which fossils may be collected.

From the centre of Moffat head north on the road to Edinburgh (A701), but after about 400 m, near the church, where the main road swings left out of the town, take the minor road (a dead end) that continues northwards to Ericstane (Figure 43). After 5 km the road crosses Auchencat Burn; here there is limited parking space by a large red corrugated iron building south of the bridge. Just north of the bridge a public footpath is signposted eastwards to Hartfell Spa; the way is marked by the occasional confidence-post. The path follows Auchencat Burn upstream, but lies well above the north bank. Bluffs by the burn show the brick-red colour of the Permian rocks that floor the valley of the River Annan. After nearly a km there is a hill-fort, from which one can see, to the north-east, the gash in the hill that is Hartfell Score [NT 097 117]. North-west of the hill-fort the burn occupies a gorge with a waterfall at the head (Frizles Linn); at this place in the gorge, upfaulted Lower Birkhill Shales are overlaid by Cala greywackes. The path stays high above the burn to the head of Frizles Linn, but just beyond it descends to the bank by a series of well-made steps. The path remains on the north bank and follows roughly the line of the fault that brings up the Hartfell Inlier. Half a km upstream, on the south bank, is the site of a trial for copper minerals, associated with an outcrop of green-stained Birkhill Shales. After a further half km Auchencat Burn swings away to the right, but the path continues north-eastwards, parallel now with a tributary, the Spa Well Burn; and the Hartfell Spa itself is reached about 1.5 km from the steps. The chalybeate waters of Hartfell Spa were declared beneficial by John Williamson in 1748. The well is now enclosed and sheltered by a small stone building. Just upstream of the spa are large masses of what looks like a conglomerate; this is a fossil scree known as 'head' consisting of small fragments and consolidated by a ferruginous cement during the post-glacial period.

An excellent view of the main sector of Hartfell Score (Figure 44) is obtained from a point 100 m or so upstream from the spa. As is frequently the case in the upfaulted inliers of Moffat Shales, the south-east (right-hand) side of the inlier is strongly deformed; at Hartfell this side is composed, at least partly, of Lower and Upper Birkhill Shales, but it is very difficult to interpret the stratigraphy in detail. The north-west side of the exposure, however, is much more coherent. Though complicated by thrusting, the general succession is as follows:

- Upper Hartfell Shales — grey 'barren' mudstones — Ashgill
- Lower Hartfell Shales — black graptolitic mudstones — Caradoc
- Glenkiln Shales — grey mudstones and cherts — Llandeilo

The north-west Main Cliff (Figure 45) can be well viewed by ascending the cliff on the opposite side of the burn. It approaches 500 m in length and 70 m in height. The lower slopes are covered by scree, but higher up the beds are well

exposed, dipping into the cliff at about 40° and striking straight along the cliff. For the fossils-collector the screes at the foot of the cliff are most accessible and can afford very rewarding hunting. For stratigraphically controlled specimens it is necessary to ascend the Main Cliff. It is not very steep and can be studied at many points.

The succession is clearly repeated more than once. Early workers considered these repetitions to be brought about by folding, but more recently thrusting has been preferred to account for the structure. Lapworth, who originated the hypothesis of isoclinal folding in the Southern Uplands, did recognise that one limb of each isocline here was faulted out.

Upstream of the spa well the pale hard beds of the Glen kiln Shales are overlain by dark platy mudstones with occasional fossiliferous seams. These represent the *Climacograptus wilsoni* Zone, are about 3 m thick, and may yield well preserved examples of the following:

*Climacograptus wilsoni*, *C. antiquus*, *C. bicornis*, *Pseudoclimacograptus* spp. *Orthograptus amplexicaulis* [= *truncatus*] *O. calcaratus vulgatus*, species of *Glossograptus* and *Lasiograptus*, *Dicranograptus nicholsoni* and swarms of *Corynoides calicularis*.

The overlying beds are the hard black flaggy mudstones of the *Dicranograptus clingani* Zone. These strata extend along the cliff from the Spa to the gullies near the north-east end of the Score, where they are well exposed. They are estimated to be 7 or 8 m thick. Some layers are highly pyritous and spark when hammered. Graptolites occur on numerous bedding-planes, often in monospecific swarms. Their preservation is good to poor. The total fauna is large, and includes the following:

*Dicranograptus clingani* (towards the base), *D. ramosus*, *Dicellograptus caduceus*, *D. flexuosus*, *D. morrisi*, *D. pumilus* (upper beds), *Climacograptus caudatus* (lower beds), *C. miserabilis*.

*C. spiniferus*, *C. dorotheus* (upper beds), *Orthograptus amplexicaulis*, *O. calcaratus* (group), *O. pageanus* (lower beds), *O. quadrimucronatus* (upper beds), *Glyptograptus daviesi*, *Lasiograptus harknessi*, *Neurograptus margaritatus*, *Corynoides calicularis* and other forms.

The overlying *Pleurograptus linearis* Zone is developed in black mudstones, less hard and more fissile than those below. The boundary with the *clingani* Zone is not yet precisely defined, but may provisionally be taken at the level where *P. linearis* appears. There are thin pale beds of metabentonite in this zone, which is about 4–5 m thick.

The fauna includes:

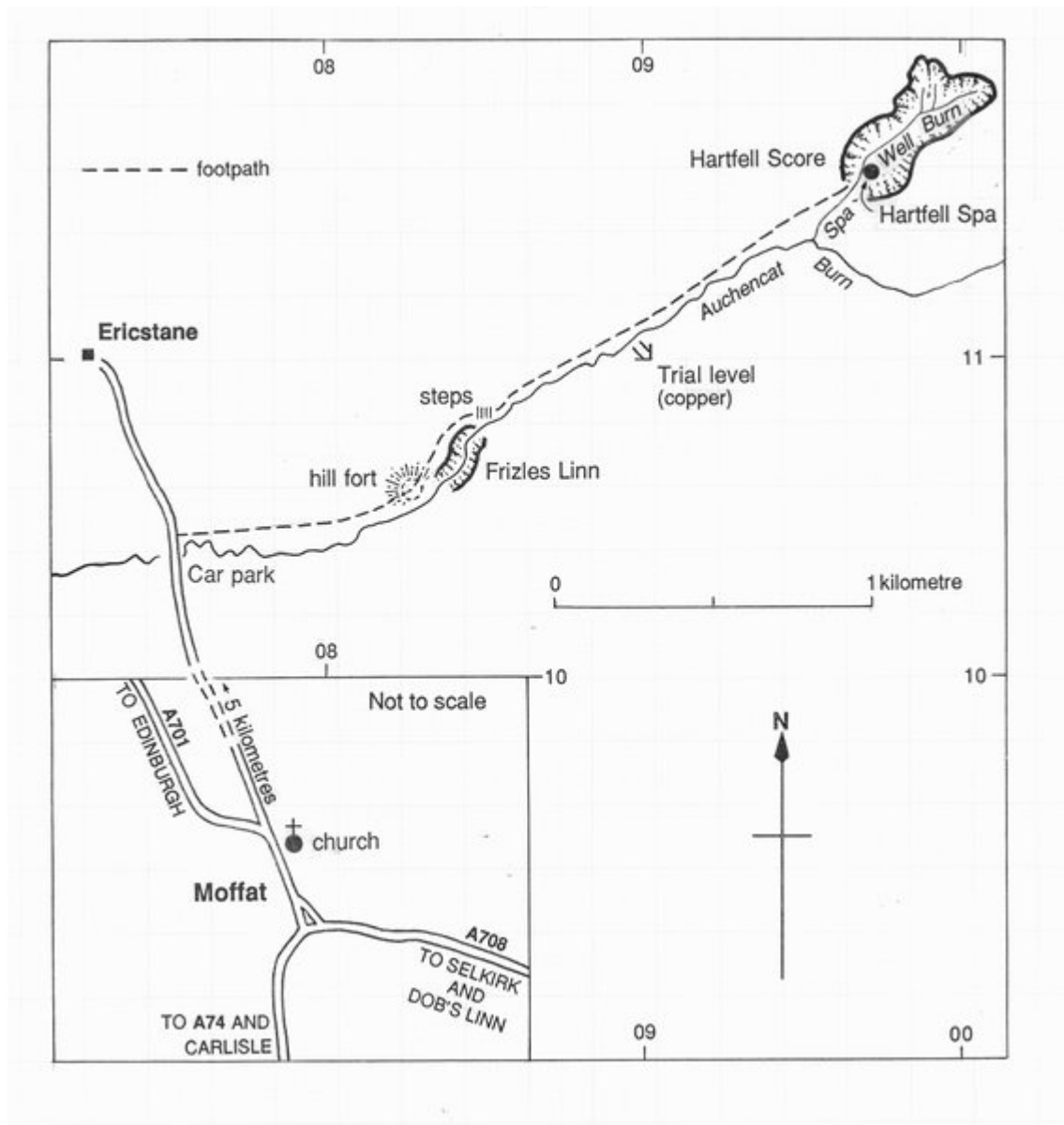
*Pleurograptus linearis*, *Leptograptus capillaris*, *L. flaccidus macer*. *Dicellograptus morrisi*, *D. elegans*, *Climacograptus miserabilis*, *C. styloideus*, *C. tubuliferus*, *Orthograptus amplexicaulis*, *O. calcaratus basilicus*, *O. quadrimucronatus*, *Plegmatograptus nebula*, and other forms.

Above the black mudstones of the *P. linearis* Zone are pale 'barren' mudstones; it is not known if these are part of the Upper Hartfell Shales. Just south-west of the gullies that gash the Main Cliff at its north-east end they form a small cliff, above which the slope slackens and the exposure is less complete. If these are the Upper Hartfell Shales their full thickness is not seen here, the upper part (including the black aniceps beds) being faulted out; it is possible, however, that black seams with *Dicellograptus compianatus*, present at Dob's Linn, might be found.

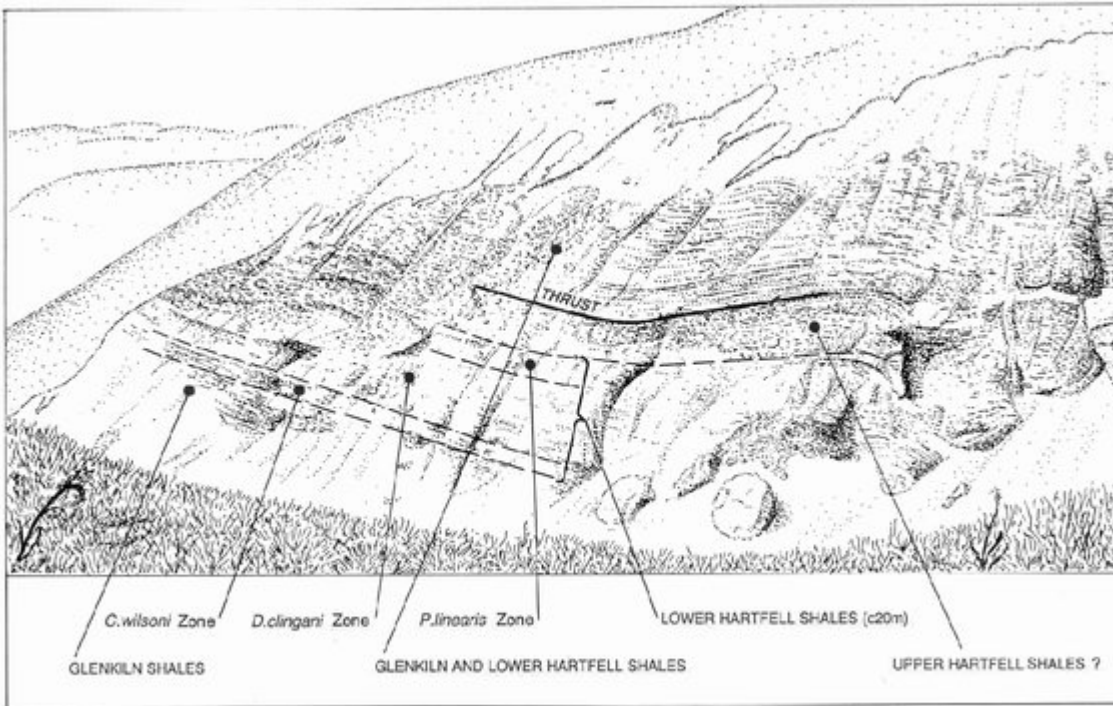
Higher on the slope the upper part of the Glenkiln Shales reappear, apparently on an upthrust. Here they include black shales that have yielded fragmentary graptolites. Above them lie the lower part of the Lower Hartfell Shales (yielding *D. clingani* and *C. caudatus*) and perhaps also the *P. linearis* Zone; and near the top of the exposure the Glenkiln Shales reappear once more, indicating a further thrust slice, the details of which have not been studied.

Despite its importance and the excellent exposure, Hartfell Score remains inadequately studied. The most detailed account of the Main Cliff remains that of Lapworth (1878). No systematic account of the distribution of fossils there has been published, though preliminary results obtained by the Palaeontological Association in 1990 are included in (Figure 44) and (Figure 45).

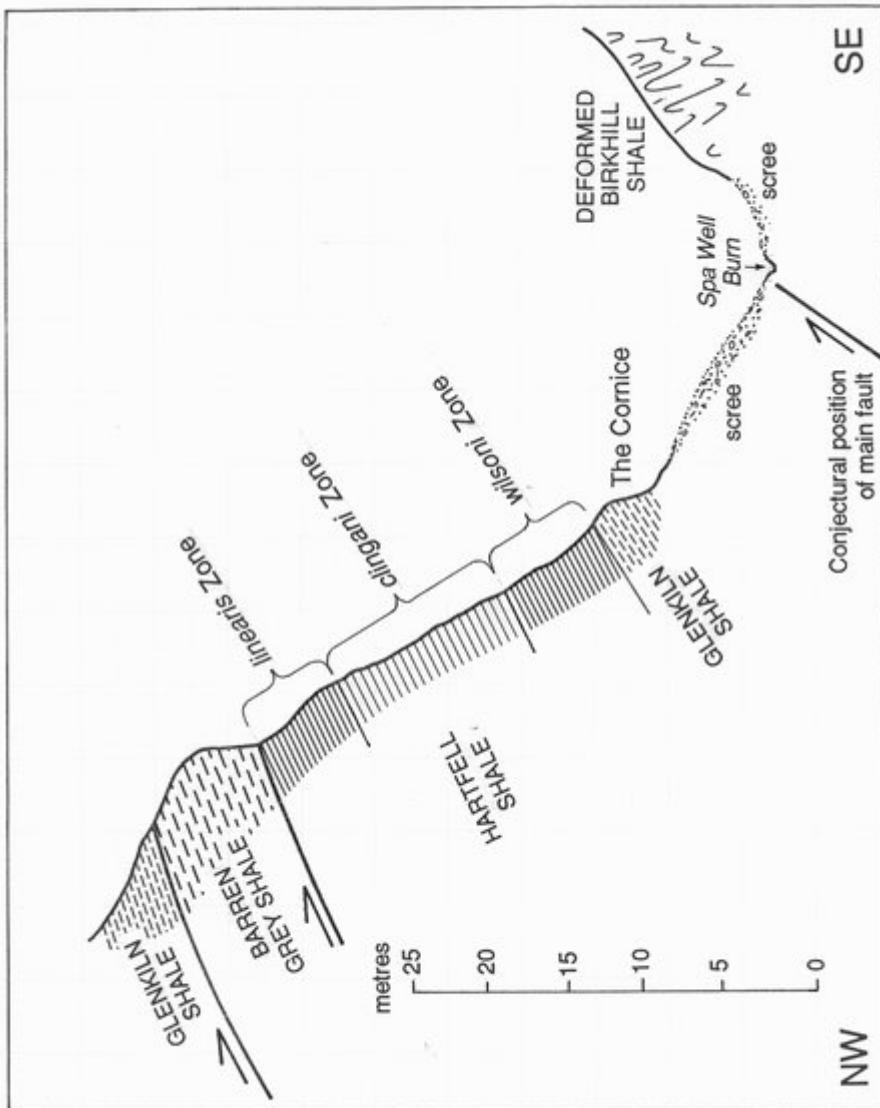
[References](#)



(Figure 43) Hartfell Score excursion.



(Figure 44) View of Hartfell Score.



*(Figure 45) Main cliff, Hartfell Score.*