
Aucheneck

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Highlights

The landforms at Aucheneck demonstrate important aspects of the geomorphology of the Loch Lomond Readvance; they include one of the best examples of an end-moraine ridge in the type area for the readvance.

Introduction

The site [NS 478 830] is located west of Aucheneck athwart the Finnich Glen and covers an area of c. 1 km². It is important for an assemblage of landforms associated with the Loch Lomond Readvance glacier in the Loch Lomond basin, the area in which the readvance was first recognized (Simpson, 1933). In particular, it contains one of the finest segments of a till moraine ridge associated with the former Loch Lomond glacier. It is also notable for good sections in the moraine and clear contrasts in landform patterns and soil development 'inside' and 'outside' the ice limit. The only detailed account of the site is by Rose (1981), although the moraine as a whole is discussed in a number of publications (Renwick and Gregory, 1907; Gregory, 1928; Simpson, 1933; Dickson *et al*, 1978; Rose, 1980d).

Description

The geomorphology of the Aucheneck area is shown in (Figure 13.2). The terminal moraine is best developed on the west side of the glen, where it forms a prominent landform, 5–7 m high and about 40 m wide, on the otherwise subdued relief of Cameron Muir. Immediately inside the terminal ridge three further ridge fragments occur, then an area of hummocky drift and meltwater channels. On the east side of Finnich Glen [NS 482 828] there are good stream sections in the moraine. These show dark, reddish-brown, sandy till, locally with flow banding (Rose, 1981). Clast fabrics are orientated parallel to the ridge (Rose, 1981). Several subglacial meltwater channels occur on the north side of the ridge, trending towards the north and east. The channels appear to form two groups (Rose, 1981): those aligned west–east were formed by meltwater draining directly from the ice, whereas those aligned north–south may have received part of their discharge from the Carnock catchment.

At [NS 483 834] one of the channels leads into an esker. Of further interest is the contrast in landform type and development 'outside' and 'inside' the moraine limit (Figure 13.2). On the south side, there are low drumlins with ridge crests orientated west–east; on the north side, the drift has a sharper, more irregular, hummocky form, and drumlins (outside the site) have long axes aligned NW–SE. There is also a contrast in the form of the Carnock valley on either side of the ice limit; on the south side, the valley is relatively wide, and bedrock is exposed along the sides; to the north, an earlier valley has been infilled with till, and the present burn occupies a narrow course cut in this material and locally a bedrock gorge. Shells of marine molluscs and Foraminifera have been recorded in the till 'inside' the moraine, for example along the Carnock Burn west of Aucheneck House [NS 487 835] (Simpson, 1928, 1933; J. Rose, unpublished data), but have not been found 'outside' the moraine. There is also a contrast in soil development 'inside' and 'outside' the ice limit with higher levels of podsolization and indurated layer development on the 'outer' side (J. Rose, unpublished data).

Interpretation

The Aucheneck moraine is part of a near continuous end-moraine system extending around the south end of Loch Lomond from Conic Hill to Glen Fruin (Renwick and Gregory, 1907; Gregory, 1928; Simpson, 1928, 1929, 1933; Dickson *et al.*, 1978; Rose 1980d). Gregory (1928) considered that the best remnant on the east side was at Aucheneck. Renwick (1895) first recognized that the fragment in Glen Fruin was associated with Loch Lomond basin ice rather than ice coming from the west, as postulated by Bell (1891b, 1893c, 1894, 1896b). Subsequently, from the evidence of the

moraine itself and the distinctive shelly till (see Croftamie (below), and Jack, 1875) that occurred inside the line of the moraine, but not outside it, Simpson (1933) inferred a readvance of ice during the wastage of the last ice-sheet, which he called the Loch Lomond Readvance. Charlesworth (1956) identified the moraine as part of his Lateglacial 'Stage M' or 'Moraine glaciation'. From pollen studies Donner (1957) placed the readvance during the climatic deterioration represented in Lateglacial Pollen Zone III of the Jessen–Godwin scheme. Subsequently radiocarbon dating has confirmed that the readvance occurred between c. 11,000–10,000 BP (see Gartness and Croftamie), and the period of climatic deterioration has been called the Loch Lomond Stadial (Gray and Lowe, 1977a) after the area where the readvance was first named by Simpson (1933). A summary of the stratigraphic evidence justifying the designation as a type area is given in Rose (1989).

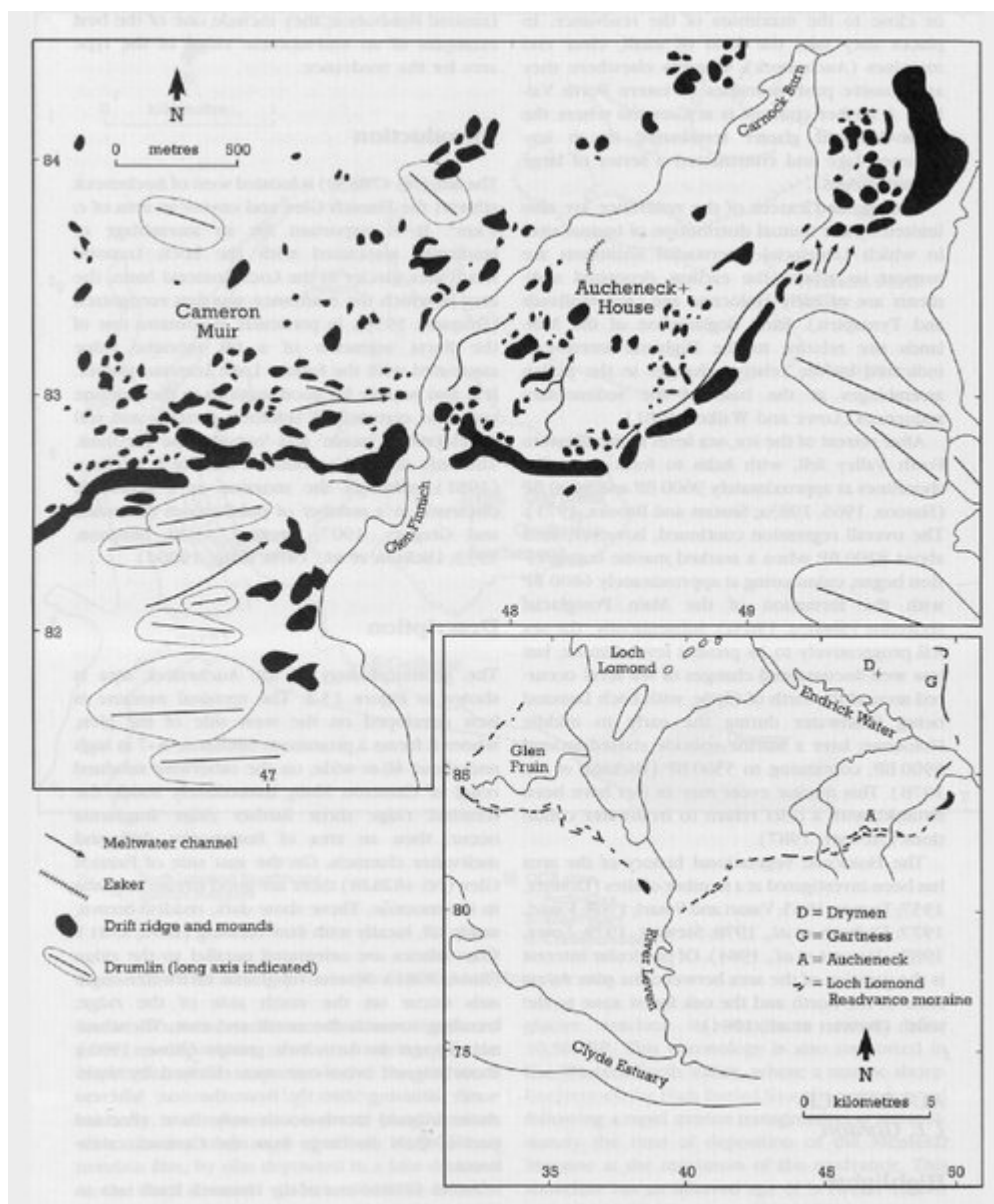
Rose (1981) considered that the moraine at Aucheneck formed by a combination of debris pushed up at the ice margin and also material that slumped off the glacier surface. The ice limit is clearly defined, not only by the moraine, but also by the contrast in landforms 'inside' and 'outside' it. 'Outside', the drumlins have a west–east orientation associated with the last movement of the Late Devensian ice-sheet across the area (Rose, 1981, 1987) and their relatively subdued appearance reflects the effects of gelifluction during the Loch Lomond Stadial. The landforms inside the limit are associated with a north-west to southeast ice movement of the piedmont lobe of the Loch Lomond glacier and have not been modified to the same extent by periglacial mass movement.

Single and multiple end moraines were widely formed during the Loch Lomond Readvance in the Highlands and Southern Uplands of Scotland, the Lake District and North Wales (see Cnoc a'Mhoraire, Tauchers, Gribun, Lochnagar, the Cairngorms, and An Teallach) (Sissons, 1974c, 1979e, 1980a; Gray, 1982a). The particular significance of Aucheneck centres on it being one of the best examples of a till ridge in the type area for the readvance (Simpson, 1933; Jardine, 1981; Rose, 1989) and the clear assemblage of evidence it provides for ice readvance: the end moraine itself and the contrasts in till lithology (shell and Foraminifera content), landforms and soils inside and outside the ice limit. The exposures, additional landform assemblage, including meltwater channels, hummocky drift and an esker, and proximity to dated biostratigraphy make Aucheneck a better representative site than, for example, the equally fine moraine in Glen Fruin. Moreover, the multiple end-moraine sequence at Aucheneck may be significant in illustrating local fluctuations of the ice margin during the stadial. Aucheneck complements the sites at Gartness where Loch Lomond Readvance end moraines were formed subaqueously and Croftamie where the local shelly till of the readvance is well represented.

Conclusion

Aucheneck provides an excellent representative assemblage of landforms formed by a Loch Lomond Readvance glacier (approximately 11,000–10,000 years ago) in the type area where this readvance was first recognized. In particular, it includes one of the best examples of an end-moraine ridge in the area and is important in demonstrating other characteristic landforms produced by the ice readvance.

References



(Figure 13.2) Landforms and deposits associated with the Loch Lomond Readvance ice limit at Aucheneck (from Rose, 1981). Inset shows the wider extent of the moraine that marks the ice limit at the southern end of Loch Lomond (from Dickson et al., 1978).