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# Nith Bridge

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## Highlights

The river-bank section at Nith Bridge demonstrates a multiple till sequence. This shows that during the main Late Devensian glaciation, the area was successively crossed by ice from sources in the Highlands and Southern Uplands.

## Introduction

This site [NS 594 141] comprises a section on the south-west bank of the River Nith at Nith Bridge, 6 km south of Cumnock. It shows a sequence of tills and glaciofluvial deposits that is important in illustrating ice-movement patterns in south-central Scotland and, in particular, the interaction of two ice masses with their respective sources in the western Highlands and the Southern Uplands. The intercalation of tills deposited by these two ice masses has long been noted (Geikie, 1863a). It is now generally thought that the tills were deposited by the Late Devensian ice-sheet and that the relative strengths of the two ice masses reflects variations in the climate during the progress of the last glaciation (Bowen *et al.*, 1986). The Nith Bridge section has been investigated by Holden (1977a, 1977c; see also Holden and Jardine, 1980).

## Description

The sediments exposed on the south-west bank of the River Nith at Nith Bridge have been described by Holden (1977a, 1977c; Holden and Jardine, 1980). He described the following sequence (Figure 16.2):

5. Till, grey, coarse-grained and gravelly	up to 3.5 m
4. Gravel	<0.5 m
3. Till, brown, less compact and more clayey than bed 1 and containing shell fragments	2m
2. Gravels and minor sand horizons	c. 2 m
1. Till, purple, stiff and sandy	at least 1.5 m

Bed 1 occurs immediately above river level. Beds 2 and 3 are truncated and unconformably overlain by bed 4. However, when examined in the field, bed 4 appears to be a line of stones in the till.

## Interpretation

Holden investigated the particle size, lithology and clast fabric of the tills. He concluded that the two lower tills had a similar provenance, both being deposited by ice originating in the Highlands and probably flowing across central Ayrshire from the Firth of Clyde area (Holden, 1977c). This view of ice movement is in accord with that of Bell (1871), Craig (1873), Smith (1891), Richey *et al.* (1930), Eyles *et al.* (1949) and McLellan (1967a, 1969) based on those authors' investigations of other sites in Ayrshire and Lanarkshire.

The uppermost till, in contrast, has a southern provenance, as indicated by its erratic content and clast fabrics (Holden, 1977a). This difference demonstrated the former existence of two separate ice masses in central Ayrshire, long established by Geikie (1863a, 1901), Geikie *et al.* (1871) and Geikie (1894). From the stratigraphic relations of the tills at Nith Bridge and other sites, Holden (1977a, 1977c) concluded that there had been at least two distinctive phases of ice movement in central Ayrshire, with an initial advance of Highland ice into the area being succeeded by Southern Uplands ice. Other than locally, there was no evidence for breaks in the deposition of the deposits relating to the separate ice movements. It was therefore concluded that the ice movements related to differences in pressure exerted by the

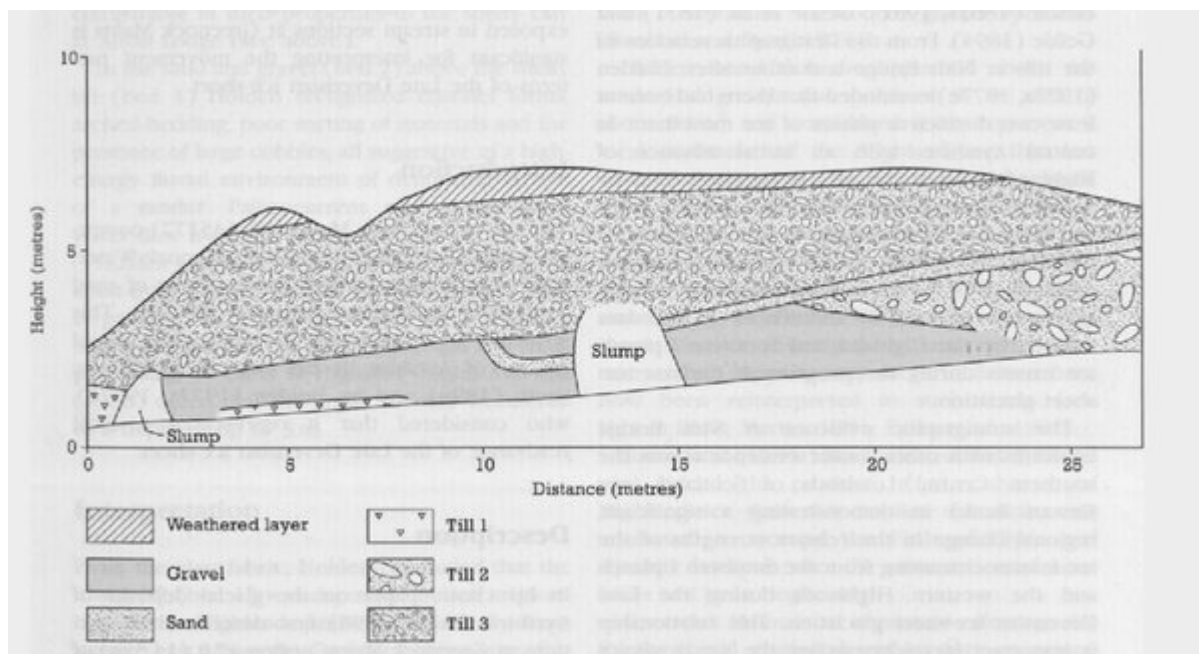
Highland and Southern Uplands ice masses during the progress of the last ice-sheet glaciation.

The stratigraphic evidence at Nith Bridge conforms with other similar evidence across the southern Central Lowlands of Scotland (see Hewan Bank) in demonstrating a significant, regional change in the relative strengths of the ice masses emanating from the Southern Uplands and the western Highlands during the Late Devensian ice-sheet glaciation. This relationship is important in understanding the ice dynamics and the palaeoclimate of Scotland during that glaciation, since it clearly demonstrates a significant shift in the relative importance of the different ice accumulation areas. Such a shift was presumably climatically driven (Bowen *et al.*, 1986) and merits further investigation through modelling of palaeoclimate and the dynamic behaviour of the last ice-sheet.

## Conclusion

The deposits at Nith Bridge are important for interpreting the glacial history of the western Central Lowlands. They demonstrate that during the Late Devensian glaciation (about 18,000 years ago), ice from the Highlands first crossed the area and was then replaced by ice coming from the Southern Uplands. Nith Bridge is a valuable reference site for the glacial sequence in this area and for studying the interactions between ice masses from different sources.

## References



(Figure 16.2) Nith Bridge: sequence of sediments (from Holden and Jardine, 1980).