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# HEWAN BANK

*J.E. Gordon*

*OS Grid Reference: NT285647*

## Highlights

The deposits in the section at Hewan Bank include two superimposed tills. These provide sedimentary evidence for the sequence and pattern of ice flow in the Lothian area during the Late Devensian and show successive ice movements from sources in the Highlands and Southern Uplands.

## Introduction

The Hewan Bank (NT 285647) site comprises a section on the west bank of the River North Esk near Polton, 10 km south of the centre of Edinburgh. The deposits consist of a sequence of till and glaciofluvial sediments. Hewan Bank is the best natural exposure currently available showing facies of the type which have been used in the past to erect a regional glacial stratigraphy for the Edinburgh and Lothians area. Details of the sediments and stratigraphy are given by Martin (1981).

## Description

Several exposures in the bank above an extensive area of landslips show the following sequence of deposits:

4. Gravel
3. Sand
2. Reddish-brown till
1. Blue-grey till

Details of these sediments are given by Martin (1981); the site corresponds with his Polton site. Martin described bed 1 as a massive, fissile diamicton. The upper diamicton (bed 2) is weathered with larger, more widely dispersed clasts; primary fissility cannot be distinguished. The contact with bed 3 is sharp and irregular, although lenses of till and clasts occur in the overlying sand. Deposits of sand, gravel, silt and clay are exposed above, and Martin (1981) recorded several facies variations including sands with load casts, stratified diamictons and stratified, reworked diamictons. Various sedimentary structures, notably sand pillars, are also present, as are small faults.

## Interpretation

In terms of the conventional stratigraphies, the tills (beds 1 and 2) at Hewan Bank correspond with the Lower Boulder Clay of Mitchell and Mykura (1962) and the Basal and Intermediate Tills, respectively, of Kirby (1968); the overlying sands and gravels (beds 3 and 4), with the "Middle" Sands and Gravels of Mitchell and Mykura (1962) and the outwash deposits associated with Kirby's Intermediate Till. The so-called Roslin Till or Southern Uplands Boulder Clay is not represented at Hewan Bank but can be seen in a number of working sandpits nearby (for example at NT 259626 and NT 297667).

According to Martin (1980), however, the sequence of deposits at Hewan Bank can be interpreted in terms of a single glacial episode during the Late Devensian. Bed 1 is a lodgement till; bed 2 is possibly transitional between a lodgement till and a melt-out till. The overlying sands and gravels are ice-marginal deposits, and the stratified diamictons are debris flow deposits.

Deposits similar to those at Hewan Bank have been widely recognised around Edinburgh and in

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the Lothians for over 170 years (see above) and have provided the basis for interpreting the sequence of glacial episodes in one of the historically core areas for Quaternary studies in Scotland. There is no long history of investigations at Hewan Bank, but the site provides one of the best natural exposures demonstrating examples of the main sedimentary units recognised in the various glacial successions identified for the area. Historically, a sequence of the type at Hewan Bank was first described in Midlothian by Maclaren (1828) and is known to occur at a number of other localities (Kirby, 1968). However, apart from Hewan Bank, few sections are currently exposed.

In addition to its stratigraphic interest, Hewan Bank is also of glaciological and sedimentological note for the multiple-unit depositional sequence that appears to reflect the convergence and interaction of ice flowlines from separate source areas during the Late Devensian glaciation. In this respect close analogies exist between Hewan Bank and several other sites, for example at Den Wick, Baile an t-Sratha, Nigg Bay, Boyne Quarry and Nith Bridge. Together these sites have important research potential for interpreting processes and patterns of debris entrainment and sedimentation beneath former ice sheets where the interaction of ice masses from different sources has produced distinctive sedimentary units. Such sites will also provide the field evidence to underpin mathematical modelling and reconstruction of ice sheet dynamics and the controls that determine changes in ice sheet flow patterns.

## Conclusions

The deposits at Hewan Bank are important for interpreting the glacial history of the Lothians area. They show that during the Late Devensian glaciation (around 18,000 years ago) the area was first covered by Highland ice issuing from the west, then by ice from sources in the Southern Uplands. There has been much discussion about whether these ice movements represent separate glacial episodes, but current interpretations favour a single ice sheet in which the direction of flow shifted. Hewan Bank is a valuable reference site not only for establishing the glacial sequence in this area, but also for studying the interaction between ice masses from different sources.

## Reference list

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