Glais

Highlights

The largest and most impressive of the South Wales valley moraines formed by a short-lived readvance of Late Devensian ice as it wasted and retreated up the Swansea Valley.

Introduction

The most spectacular of the South Wales valley moraines occurs at Glais [SN 697 004] in the Tawe (Swansea) Valley. It is thought to mark a still-stand of the Late Devensian ice. The site was first described by Strahan (1907a) and has featured in studies by Trueman (1924), Charlesworth (1929), Jones (1931a, 1931b), Griffiths (1939), Bowen (1970a) and Anderson (1977). The most detailed account of the feature was given by Jones (1942).

Description

The moraine extends westwards for a mile across the Swansea Valley from the hillside at Glais to the former Garth Farm. It reaches a height of 59m OD and rises up to c. 150 ft (45m) above the general level of the alluvial flat to the south. The northern slope of the moraine is gentle, but at its southern margin forms a steep slope, seen to advantage from the west side of the valley (at S 070 4000). Hummocky terrain is well developed over much of the moraine, especially towards Cefn-y-Garth [SN 697 004]. Stream exposures through the moraine are visible at the northern and western margins especially at [SN 689 006], where glaciotectonic structures are well displayed. Recent road excavations through the western part of the moraine have revealed the internal composition and structure of the moraine.

Interpretation

The moraine at Glais was first described by Strahan (1907a) who referred to the remarkable development of 'gravels' and the 'dam' across the Tawe Valley at Glais. He remarked that the surface of the moraine was diversified by a number of small ridges running parallel to the main mass, and concluded that the moraine had been produced by the advance and retreat of a valley glacier over sediments 'extruded' from the ice-front. A gravel flat to the south of the moraine, ending abruptly some 15 ft (4.5m) above the general level of the valley floor was also thought by Strahan to be associated with the moraine which had subsequently caused a major diversion of the River Tawe.

Charlesworth (1929) referred to the moraine and noted that moraines at intervals across the Tawe and Nedd (Neath) Valleys were recessional deposits associated with the 'Newer Drift' ice-sheet; the features in these valleys having formed as the ice-sheet thinned into two distinct valley glaciers. The interpretation of the Glais moraine and similar features in neighbouring valleys as halt-stage moraines of 'Newer Drift' age was also supported by R O Jones (1931a, 1931b) and Griffiths (1939).

The most detailed account of the Glais moraine was given by O T Jones (1942). He mapped the extent of the feature and the distribution of other Late Pleistocene and Holocene deposits in its vicinity. Using borehole and sedimentary evidence, he showed that a large buried channel, as deep as 146 ft (44.5m) below OD, occurred to the south-west of the moraine. He considered this channel had been excavated in either 'Glacial' or 'pre-Glacial' times and had then been filled with proglacial outwash sands and gravels associated with the glacier which formed the Glais moraine in 'Late-Glacial' times. Subsequently, the channel was further filled with lacustrine and alluvial deposits, the upper part of the sequence being cuffed by the Tawe in 'Post-Glacial' times. Jones estimated that during formation of the buried channel, sea-level must have been about 200 ft (60m) lower than at present.

Details of the Quaternary evolution of the Tawe drainage system have not yet been established, but studies by Al-Saadi and Brooks (1973), Anderson and Owen (1979) and Culver and Bull (1979) have confirmed the presence of deep buried

rock basins in the area. A geophysical study by Al-Saadi and Brooks (1973) showed that a series of Pleistocene buried valleys was present in the lower Swansea and Neath Valleys. These, they suggested, had been over-deepened by preferential ice erosion along major fault zones and pre-glacial river courses. Lacustrine deposits were described from these basins and their offshore extensions in Swansea Bay (Culver and Bull 1979). These sediments were considered to be Devensian late-glacial and early Holocene in age although the precise relationship of these buried valleys and associated sediments to the Glais moraine was not established.

The Glais moraine is a classic glacial landform. Its exact age and significance within the Quaternary evolution of the Swansea Valley area is still indeterminate, but it is generally considered to represent an advance of ice during general wastage of the Late Devensian ice-sheet (Bowen 1970a; Groom 1971; Anderson 1977). As such, the feature contrasts with the moraine at Llaniahangel–Crucorney in south-east Wales which probably marks the maximum extent of the Late Devensian ice-sheet.

Conclusions

The Glais moraine is a classic text-book example and is the best valley moraine in Wales. Its significance is not yet fully understood, but it may provide evidence for a minor and temporary readvance of a last ice age glacier as it wasted northwards.

References