

Quaternary features of Scugdale, northwest Cleveland Hills - an excursion

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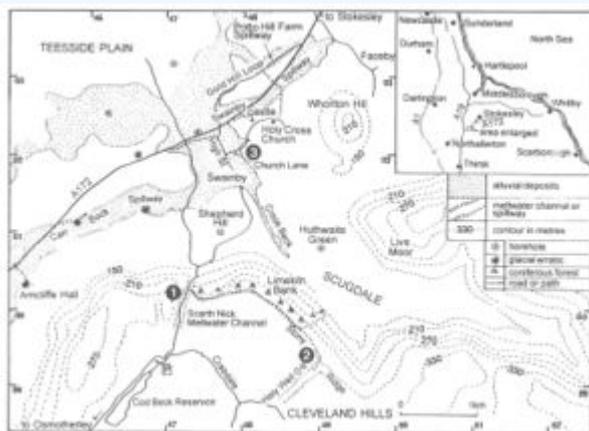


Figure 12.1 Quaternary features around Swainby and Scugdale.

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Purpose

To examine the Quaternary landforms and deposits of Scugdale and around Swainby on the northwest corner of the Cleveland Hills.

Logistics

This section was compiled in 2006 when the printed guidebook was published. Before visiting this site please ensure you have up-to-date contact and access information.

The excursion involves a total of about 7 km of easy walking.

Maps

O.S. 1:50 000 sheets 93 Middlesbrough & Darlington, 99 Northallerton & Ripon, and 100 Malton & Pickering; 1:25 000 Outdoor Leisure Map, North York Moors (NW & SW Sheets); 1:63 360 Tourist Map of the North York Moors; B.G.S. 1:50 000 Sheet 42 Northallerton.

Geological background

Most of the York and Teesside plains are covered by **drift** deposits of Devensian age (Dimlington **Stadial** — 26 000 to 13 000 BP). The glacial deposits are the product of an ice-sheet which spread southwards about 18 000 years ago and subsequently began to melt about 13 000 years ago. Older (pre-Devensian) deposits may be present in buried valleys and more recent Flandrian sediments locally overlie the Devensian deposits and modify the glacial topography.

The powerful early ice-sheets streamed out eastwards and southeastwards from the Lake District and southwest Scotland, being joined en route by less powerful ice from local Pennine glaciers occupying Wensleydale and Swaledale. Much of the ice came through the Stainmore Gap, with part continuing eastwards down the Tees, and another branch swinging south through the Vale of Mowbray into the York Plain. The total thickness of ice in the central Tees lowlands was probably about 800 m. As the ice-sheet melted and retreated from the Cleveland Hills, both downhill and northwards, it left behind a complex sequence of glacial deposits including **till** (boulder clay), sand and gravel, laminated clay, lacustrine clay, silt, sand and **loess**. Such lithologies also form distinctive morphologies indicative of their origin, **drumlins**, **eskers**, sites of glacial lakes and **meltwater channels**. There are no well-preserved **moraines** in this area comparable with the York and Eskrick features further south. However the margins of the hills around Scugdale abound with meltwater channels. This excursion highlights these features in the Osmotherley–Swainby area ([Figure 12.1](#)).

Excursion details

Locality 1, Scarth Nick Meltwater Channel.

The excursion begins from a car park [SE 471 993] on the minor road at the northern end of the Osmotherley (Cod Beck) Reservoir. Take this road to the north, which here occupies the bottom of the meltwater channel. Its sides are over 30 m high, and the base, at an altitude of about 220 m, is floored by peat. The gradient is largely to the south but a section drained north for a short period. At the northern end of Scarth Nick, sandstone crags are exposed and form the eastern side of the feature. Well-developed joints aligned parallel with the channel are indicative of a nearby **fault** which occupies the centre of the channel and was a contributory factor in the formation of this valley.

The meltwater channel follows the present line of the Cod Beck Valley southwards. Similar channels further south in the proximity of Nun House [SE 446 940] at an altitude of about 150 m may represent the continuation of this marginal flow around the western edge of the Cleveland Hills. Confirmation that a lake occupied the Cod Beck Valley for a short period during the Devensian is now provided by boreholes sunk along the dam line of the reservoir which proved it is filled by up to

8 m of laminated clays and silts and interlaminated sands. Below the dam, at the caravan site, a borehole [SE 4614 9808] proved silty clay and gravel to a depth of 27 m.

On the western flank of Scarth Nick, two small patches of gravel [NZ 470 000] occur at an altitude of some 260 m. They are rich in **chert** and sandstone pebbles and form the remnants of a **glaciofluvial** deposit associated with the meltwater channel.

Locality 2, Holy Well Gill Meltwater Channel

From the eastern side of Scarth Nick follow the southern edge of the forest eastwards around Limekiln Bank to a good vantage point about 3 km from the road [SE 488 996]. Here the forest ends, giving an uninterrupted view of Scugdale. The valley was once filled by ice. The subsequent meltwater was dammed up by the remaining plug of ice across the mouth of Scugdale which not only faced north but lay in the shadow of the northerly scarp of the Cleveland Hills. The first areas to melt would have been on the south-facing flanks of Live Moor [NZ 504 011]. Stony Ridge on the southwest side probably acted as a solid rock rim to 'Lake Scugdale'. Eventually a notch was eroded at one point [SE 490 992] along this ridge and an impressive glacial drainage channel was cut which now has the name Holy Well Gill. The Gill is dry and eroded into brown, fine-grained, ferruginous sandstone of the mid-Jurassic Ravenscar Group (Crinoid Grit Member). It is some 10 m deep and between 2 and 4 m wide. This channel is the highest recorded in the Cleveland area but its duration as a water-bearing channel was probably short-lived. The water drained into Crabdale and no doubt collected in the Cod Beck Valley, forming a lakelee which eventually drained through the lower channel of Scarth Nick. A small patch of sand and gravel [SE 488 996] on the northern side of Holy Well Gill at an altitude of about 305 m is possibly a remnant of a morainic ridge or reworked glaciofluvial beach deposit marginal to 'Lake Scugdale'.

The Holy Well Gill channel can be followed down into Crabdale to return to the Osmotherley Reservoir car park, or walk back along Stony Ridge and Limekiln Bank to the road.

Locality 3, Swainby Moraine and Glacial Spillways

Travel by car northwards through Scarth Nick and down the steep northern edge of the Cleveland Hills, taking the right fork for Swainby some 3 km distant. Ample parking is available near the village church on the corner of High Street and Church Lane.

The lower ground at the foot of the Cleveland Scarp shows typical hummocky topography attributed to the outwash and morainic debris resulting from the melting of the ice damming 'Lake Scugdale'. A borehole [NZ 47710100] near Shepherd Hill proved glacial deposits to a depth of at least 25 m. They comprised mostly yellow-brown clays with sand lenses in the upper 7 m, which overlie clayey sand and gravel in the lower section of the borehole. The sand becomes increasingly clayey towards the base. Another borehole at Huthwaite Green [NZ 4901 0081] on the opposite side of Scugdale proved yellow-brown stony till to a depth of at least 8 m.

Swainby is sited on a broad alluvial flat, in places up to 1 km wide, and out of all proportion to the size of the existing Crook Beck and Scugdale Beck which drain northwards through the village along the edge of High Street. The following glacial and post-glacial features were formed towards the end of the Devensian when the waning ice-sheet was largely confined to the lowland areas of the Teesside plain.

The area is rich in glacial spillways. They comprise flat-bottomed channels, 10 to 30 m wide, but with sharply defined edges of variable height. They may have been cut by sub-glacial streams or represent periods of still-stand in the ice as it retreated northwards. The water became restricted to

these channels, confined by the emerging scarp of the Cleveland Hills to the south and the ice-front to the north. Boreholes in the bottom of the spillways show the top 4 m or so to comprise recent alluvial deposits of soft grey mottled yellow clays and peat, overlying more than 14 m of brown clays with weak inter-laminations of silt and fine sand. A 0.10 m sample of peat [NZ 4525 0081] in the alluvium of Carr Beck, near Ingleby Arncliffe, was radiometrically **dated** at between 6450 ± 40 ¹⁴C yrs BP. The locality is described as a 'gutter' on the inner edge of the Scugdale Moraine, attributed to glaciofluvial erosion, and its final silting-up is therefore datable to the Atlantic Period.

Walk up Church Lane on the east side of Swainby High Street and climb Castle Bank to the remains of Whorlton Castle. The site utilized the steep bank of the Swainby glacial channel as its main defence to the north in medieval times. The bank is now subject to several small landslips in the drift and underlying shales of the basal beds of the early Jurassic Redcar Mudstone Formation. From this vantage point, the Swainby and Carr Beck spillway, which formed a major avenue for meltwater around the northwest corner of the Cleveland Hills, is clearly seen.

Walk to the Holy Cross Church where Roman pottery has been discovered and take the path north where the road turns at right angles. Follow the path down across the channel and the main A172 Stokesley road to Potto Hill Farm [NZ 4805 0309]. From here another spillway can be viewed parallel with the Swainby spillway in its easterly section. It unites with the Swainby spillway near Gorselands [NZ 486 034]. However at Potto Hill Farm it swings northwestwards, eventually joining the alluvium of Potto Beck. Turn left at Potto Hill Farm and walk westwards on the Gold Hill loop road which enables a 2 km circular return to Swainby.

The Swainby area contains many glacial **erratics**. The most striking are those derived from the Shap Granite in Cumbria. Large examples, up to 1 m in length, are present at locations [NZ 4675 0128], [NZ 4587 0114] and adjacent to the main road at [NZ 4663 0199]. A **basaltic** erratic occurs near Arncliffe All Saints Church [NZ 4523 0031], derived from either the Whin Sill or the Cleveland **Dyke**.

[Glossary](#)

[Bibliography](#)

At all times follow: [Countryside code](#) and [Code of conduct for geological field work](#)

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