# Skipsea Withow

[TA 184 547]

*J. Innes*

## Introduction

Skipsea Withow (or Whitow) is a former freshwater mere to the east of Skipsea village in northern Holderness, East Riding of Yorkshire, which preserves a long sequence of Late Devensian to later Holocene sediments. The mere deposits have been examined in detail (Gilbertson, 1984a; Gilbertson *et al.,* 1987). Blackham and Flenley (1984) have presented a pollen analytical study of the Holocene sediments, which have been investigated for plant macrofossils by Hall (1984). The Late Devensian sediments have undergone molluscan (Thew and Woodall, 1984), palaeomagnetic (Gale, 1984), palaeobotanical (Hunt *et al.,* 1984) and animal bone (Jenkinson, 1984) study. Insect remains from the site have been studied by Kenward (1984). Archaeological material has been studied by Mellars (1984), and Gilbertson (1984b) and McAvoy (1995) have examined the preserved wood evidence. Earlier archaeological, litho-and biostratigraphical work was completed by Phillips (1829), Armstrong (1923), Godwin and Godwin (1933), Boylan (1966a) and Robinson (1972). The depositional and vegetation history of Skipsea Withow have been discussed by Beckett (1977a), Flenley (1984, 1987, 1990), Gilbertson (1990), Van de Noort and Davies (1993) and Dinnin (1995). The site has been surveyed archaeologically by Head *et al.* (1995a) and palaeoenvironmentally by Dinnin and Lillie (1995a). Van de Noort *et al.* (1995) have considered the preservation potential of the site. The history and drainage of the mere have been discussed by Sheppard (1912) and Sheppard (1956, 1957).

## Description

Skipsea Withow lies on the coast of north-eastern Holderness to the east of Skipsea and north of Atwick villages. The site is a former mere or cluster of meres that occupied a depression in the undulating till and hummocky outwash plain of this area (Catt and Penny, 1966), which has been classified as the 'Hornsea Member' of the Holderness Formation by Lewis (1999). It probably was one of the larger meres of Holderness (Sheppard, 1957; Flenley, 1987; Gilbertson, 1990) and in common with some other large mere sites its deeper valley and east–west orientation suggested to Valentin (1957) that it may occupy a pre-glacial valley in the underlying chalk bedrock. Although near to the complex of Skipsea Bail and Low meres, which lies to the west of Skipsea village, Skipsea Withow is separated from them by an elongated sand and gravel ridge composed of glacial material, which may have formed as an esker (Head *et al.,* 1995a). It was never joined to that neighbouring wetland system and has had an independent depositional history. Skipsea Withow ceased to be a freshwater body when it was breached and drained by at least the mid-17th century (Gilbertson, 1984a) by coastal erosion. The surviving mere sediments at Skipsea Withow occupy a hollow about 100 m across (Beckett, 1977a) at the Skipsea Withow Gap (Withow Hole) and have been exposed in section by erosion (Figure 8.25). They represent a highly complicated sequence of lake-margin deposits (Gilbertson *et al.,* 1987).

Early research at Skipsea Withow had established the site as of great potential for palaeoenvironmental research, although the published literature on this early work, reassessed by Gilbertson (1984a) and Dinnin (1995), led to considerable confusion. Phillips (1829) reported a stratigraphical succession in a large hollow up to 400 m wide exposed in a coastal section. It comprised a woody peat of up to 2 m thickness overlying clay with freshwater shells in the southern part of the hollow, with gravel resting upon till completing the lower succession. Although his text did not make this explicit, the drawings of the section by Phillips showed a clear unconformity between the shelly clay and the overlying peat. Also unclear was the stratigraphical position of a skull of giant deer *Cervus megaceros* (cf. *Megaloceros giganteus*)recovered from the deposits, which may have come from the shelly clays or the gravel. Equally uncertain was the context of early Mesolithic barbed 'harpoon' type points recovered in 1903 from within silt and below woody peat in the Skipsea Withow sediments (Armstrong, 1923), which apparently overlay the bones of *Megaloceros giganteus,* as well as of reindeer, red deer and aurochs. Further excavations by Armstrong recovered Mesolithic type flint implements from both the silty clays and the peats. The uncertainty in these early studies regarding the provenance of the sediments, animal bones and human artefacts led to the juxtaposition of Late- glacial and Holocene faunal, floral and cultural elements and the idea of the possible persistence of taxa perceived as diagnostic of the Late-glacial, such as the giant deer, into Holocene times. Such survival of *Megaloceros* into early Holocene times in parts of the British Isles is now supported by recent research (Gonzalez *et al.,* 2000; Kitchener and Bonsall, 1999). The controversy over the Skipsea Withow record, however, prompted Godwin and Godwin (1933) to apply pollen analysis to the Withow Gap sediments to clarify the age of the peat and the underlying silts, which contained the harpoon point. Armstrong's original harpoon site had been destroyed by continuing erosion and at the new site examined for pollen analysis the following stratigraphy was recorded (cf. Beckett, 1977a; Gilbertson, 1984a).

| | Depth (m) |
|---|---|
| Fine brown clay, now cracking into columnar form | 0.0–0.76 |
| Solid black or brown amorphous peat with large numbers of horizontal tree branches or trunks, including much oak (*Quercus*) especially in the upper 0.6m, which is almost solid with them. Hazel (*Corylus*) nuts found at 2.01, 2.46 and 2.68 m, and at its base | 0.76–2.89 |
| Brown sandy silt with fragments of *Pinus* bark, fins of pike (Esox Lucius) and flint artefacts. Stone fruit of ?*Prunus* | 2.89–3.04 |
| Buttery blue clay | >3.04 |

Gilbertson (1984a) redrew the pollen diagrams published by Godwin and Godwin (1933) and this redrawn figure is shown as (Figure 8.26). The high *Corylus, Quercus* and *Ulmus* values, with no *Alnus,* show the brown silt to be predate the *Alnus* rise of early Boreal Holocene age, pollen zone V It contained Mesolithic-type flint artefacts. The peat above it, with rising and then high *Alnus,* is of late Boreal Flandrian I and then mid-Holocene Flandrian II age, pollen zones VI and WIa. Study of molluscan assemblages in the brown silt showed it to be a freshwater lake deposit, but were climatically undiagnostic. Although the brown silt analysed by Godwin and Godwin (1933) was clearly of Holocene age, there is no evidence that it was the same silt unit from which skeletal and/or cultural material had previously been derived (Armstrong, 1923), although this correlation was assumed.

Clarification of the environmental history of 3. the site has been achieved by an interdisciplinary analysis of exposures at Skipsea Withow (Gilbertson, 1984a). Detailed sedimentological analyses of several sections allowed the adoption of the following 11 lithological units. Several minor sub-units were recognized within these and are listed elsewhere (Gilbertson, 2. 1984a; Gilbertson *et al.,* 1987).

11. Made ground.

10. Modern, grey clay soil.

9. Grey sandy silt, resting unconformably on unit 8.

8. Dense, well-humified, detrital and carr peat with abundant *Corylus* nuts and wood. Some sand and silt inwash partings. Carved wooden stakes and pegs found within this peat.

7. Brown, laminated, silty peat with abundant detrital brushwood.

6. Dark brown, silty peat with some wood. Unconformable contact with unit 5.

5. Orange-brown, weathered, sandy silt.

4. Poorly sorted coarse gravel with some clay and silt partings. Erosional upper surface with reworked peat and other sediment. A thin *Carex* peat in mid-unit is probably *in situ,* although much affected by reworking. Thinly laminated silts and clays. Blue-grey sticky clays. Locally common fragmented plant debris and shells. Textural varves in the lower unit, with reworked and in-situ thin detrital peats. Rich in molluscan remains, especially *Valvata piscinalis.* Flint blade found

above a silty detritus peat.

2. Well-sorted sands resting upon poorly sorted sandy clays.

1. Till.

The top of peat unit 8 was radiocarbon dated to 4500 ± 50 years BP (SRR-1942) and one of the carved wooden stakes in this unit was dated 4770 ± 70 years BP (HAR-3378). The base of the peat of unit 6 was dated to 9880 ± 60 years BP (SRR-1944). A *Betula* log within the *Carex* peat of unit 4 was dated 10440 ± 80 years BP (SRR-1943), and a *Betula* log within the blue clay of unit 3 was dated 10710 ± 70 years BP (Q-3035). These units and dates are shown in outline section in (Figure 8.27), as redrawn by Dinnin (1995) after Gilbertson *et al.* (1987).

Blackham and Flenley (1984) and Gilbertson *et al.* (1987) have presented a detailed pollen diagram through most of the above sedimentary sequence (Figure 8.28). The whole of organic units 6, 7 and 8 are included, with their bracketing radiocarbon dates of 9880 ± 60 years BP and 4500 ± 50 years BP A silt sample from unit 3 was added to the base of the diagram at 2.65 m, recovered from lower in the section. The following six local pollen assemblage zones, from the base of the diagram, are recognized.

| | Depth (m) |
|---|---|
| WM1 Dominated by *Betula* pollen with low values for *Pinus, Salix* and Gramineae | 2.65 |
| WM2 High values for *Betula,* Gramineae and Cyperaceae | 1.65 |
| WM3 Dominated by *Betula* and *Corylus* pollen. *Pinus* reaches a peak and *Quercus* and *Alnus* appear at the end of the zone | 1.62–1.22 |
| WM4 Dominated *by Alnus. Quercus,* and *Tilia* also present. *Fraxinus* appears and *Pinus* disappears during the zone | 1.22–0.67 |
| WM5 A reduction in total tree pollen occurs, followed by a recovery. *Alnus, Ulmus* and to a lesser extent *Tilia* are the trees most affected. Gramineae reaches a peak. Cereal and *Plantago* are present | 0.67–0.42 |
| WM6 Another reduction in tree pollen values with only a partial recovery. *Alnus* and *Ulmus* are most affected. Cereal and *Plantago* are continuously present | 0.42–0.02 |

Plant macrofossils were recorded by Hall (1984) from three points in the section analysed. At 1.4 m near the base, aquatic herbaceous taxa were common, and *Betula, Populus* and *Schoenoplectus* occurred. A single *Alnus* fruit was recorded. At 0.5 m in the woody peat *Alnus* was very common with other forest taxa present, including *Corylus, Quercus* and *Prunus.* Mosses likely to live on tree bark were present. At 0.2 m in the upper part of the peat *Alnus* was again common, and *Taxus* occurred. Gilbertson (1984a, b) examined the abundant wood remains in the peat of unit 8 and concluded that some showed evidence of woodworking. The main examples were a carved alder rod and peg, which gave the radiocarbon date of 4770 ± 70 years BP and a similar alder rod and peg still *in situ* inserted vertically into the peat, which exhibited a trimmed 'elbow' form typical of coppiced wood. A recent excavation at Skipsea Withow Gap (McAvoy, 1995) has reassessed these wood-rich horizons as a natural log-jam that contains beaver-gnawed wood. The origin and significance of the wood remains of unit 8 are therefore currently a subject of debate.

The Late Devensian succession at the Skipsea Withow Gap has been investigated in detail in several sections at three main exposures (Gilbertson *et al.,* 1984, 1987). It comprises site units 2 to 5 inclusive, between the weathered till of unit 1 and the Holocene sequence of unit 6 onwards. These have been categorized as sandy mudflows and sandy pebbly lag deposits of unit 2, a lacustrine fine-grained suite of silts, clays and rarer organic layers in unit 3, a coarse gravel-dominated suite in unit 4 and weathered sandy silts in unit 5. Erosional breaks in sedimentation were common in these units and faulting also occurred. A flint blade was found within the silts of unit 3. Hunt *et al.* (1984) studied the Late Devensian palaeobotanical evidence at several locations. The lacustrine silt–clay and gravel units all contained cold-stage-type pollen with high frequencies of Gramineae and Cyperaceae. The rich plant macrofossil assemblage also was dominated by Cyperaceae. *Betula* (cf. *B. nana*)pollen was common, as were *B. nana* leaf impressions and macrofossils. *Salix* pollen and macrofossils occurred, but *Juniperus* and *Populus* were represented only by macrofossils. Dwarf shrub pollen was common, with *Helianthemum, Hippophäe, Rhamnus* and various Ericaceae. A wide range of tundra-type open habitat herbs are present in both the pollen and the macrofossil assemblages. *Artemisia, Rumex, Thalictrum,* Chenopodiaceae, *Plantago* sp. and various Compositae are characteristic. The Late Devensian pollen diagrams through units 2, 3 and 4 (Hunt *et al.,* 1984) are shown as (Figure 8.29) and (Figure 8.30). Aquatic plant macrofossils are common, with *Chara, Potamogeton, Hippuris, Eleocharis* and *Sphagnum* notable. Pollen analysis was also completed on the silts of unit 3 in which the flint blade was found. An open Late-glacial type assemblage was recovered, notably Gramineae, Cyperaceae and *Artemisia,* with some *Betula* and *Pinus* and single records of more temperate-type taxa such as *Alnus* and *Quercus.*

Thew and Woodall (1984) performed highly detailed molluscan analyses of several sections at the site, and present full species lists of the forms identified. They were able to distinguish land snail and freshwater snail and bivalve elements in the faunas, with several species of *Valvata, Lymnaea* and *Pisidium* abundant among a very diverse assemblage. Correlation of the molluscan biostratigraphies and their ecological interpretation provided information on changes in water depth and trophic status, local vegetation, erosion, sedimentation and climate, particularly in relation to the Late-glacial lacustrine deposits. Other faunal remains from the site were undiagnostic and consisted of a restricted vertebrate assemblage of frogs, voles and shrews in the Late-glacial sediments (Jenkinson, 1984) and a poorly preserved insect fauna (Kenward, 1984). In the latter case a typical Late Devensian beetle *Arpedium brachypterum* occurred with other cold-adapted types in the Late Devensian levels, whereas swamp and fen woodland species characterized the Holocene peat units.

Mellars (1984) considered the Palaeolithic and Mesolithic archaeological finds from Skipsea Withow. He concluded that the flint blade found in the lacustrine silts of unit 3 had typological affinities with blade industries of Late Devensian age from elsewhere in northern England, and so was consistent with its inferred Late-glacial sedimentary context. Meliars agreed with Clark and Godwin (1956) that the 'harpoon' bone point recovered from sub-peat silt (Armstrong, 1923) typologically resembled other Holderness examples from Brandesburton and Hornsea, rather than the early Holocene examples from Star Carr and the Vale of Pickering to the north. He suggested that a late Late Devensian age for the implement was quite possible and that this would accord with the probable correlation of its original find context with the sandy silt of unit 5. Flint tools recovered by Armstrong (1923) from Skipsea Withow could be assigned to early Mesolithic and Late Upper Palaeolithic typologies (Mellars, 1984).

## Interpretation

The exposure by coastal erosion of laterally extensive sections through the sediment succession allows a three-dimensional spatial reconstruction of stratigraphical changes and the evolution of depositional environments at Skipsea Withow, in contrast to the single core records from most sites. Gilbertson (1984a), Gilbertson *et al.* (1987) and Dinnin (1995) have interpreted the environmental history at the site as follows. The radiocarbon date of 13 045 ± 270 years BP from The Bog, Roos (Beckett, 1981) provides a limiting age for deglaciation of this area. It and similar dates reflect organic inception within basins in the glaciogenic terrain, however, and the true deglaciation date must lie between that age and the localized ice surge (Eyles *et al.,* 1994) that occurred in east Yorkshire after the deposition of the Dimlington Silts about 18 000 years BP (Penny *et al.,* 1969; Catt, 1991b). The Late-glacial history at Skipsea Withow is likely to be comparable with that investigated in detail at nearby Gransmoor (Walker *et al.,* 1993). Prior to the establishment of lake environments in the Skipsea Withow Gap area, desiccation and weathering of the till surface was followed by hillwash mudflows under unstable slope condi tions, laying down unit 2. Lake formation in the Withow basin then took place and water levels reached over 8 m higher than present beach level at the Withow Gap, creating pebble lag deposits. Varved lake margin sediments of early unit 3 reflect repeated freezing of the lake. Climatic amelioration allowed the colonization of the lake and its environs by pioneer plant and animal taxa; freshwater bivalves, *Chara* and pondweeds in the water and tundra type herbs on unstable soils with poor vegetation cover in the catchment. Continued climatic warming in the early Late Devensian encouraged the spread of a rich thermophilous herb flora with increas ing *Betula, Populus* and *Salix* parkland. Fluctuating lake levels occurred that caused localized erosion and reworking of sediments. The enigmatic bone 'harpoon' find and the flint blade in unit 3 silts suggests human activity around this developing lake ecosystem, probably attracted by the hunting opportunities indicated by the bones of large mammals recovered in the early studies at the site. Benign climatic conditions of the Late-glacial interstadial are reflected in the presence of a rich and abundant molluscan fauna, including several taxa requiring summer warmth. Tree *Betula* and *Juniperus* became more common as a denser vegetation cover developed and erosion of catchment soils almost ceased. A climatic deterioration interrupted this warming trend, as erosive input to the lake increased again, *Betula nana* replaced tree birches and juniper and the molluscan fauna is much reduced in diversity and abundance. Biological activity in the mere declined in general. This environmental revertence is supporting evidence for the early climatic oscillation in the Late-glacial interstadial recorded at other key sites in the region, including The Bog, Roos (Beckett, 1981), Seamer Carrs (Jones, 1976a), Tadcaster (Bartley, 1962), Thorpe Bulmer (Bartley *et al.,* 1976) and Skipsea Bail Mere (Flenley, 1984), where twin *Betula* peaks and an intervening tundra herb flora indicate a temporary return to cold conditions. After this brief cold phase, warmer interstadial conditions and open woodland were restored, with a *Betula* phase that parallels that at nearby Gransmoor (Walker *et al.,* 1993). The Late-glacial succession at Skipsea Withow is also of interest because it includes marl deposits, a depositional facies not found in most of the other cored meres of Holderness but recorded elsewhere in the Skipsea area (Varley, 1968), although of later, Holocene, age.

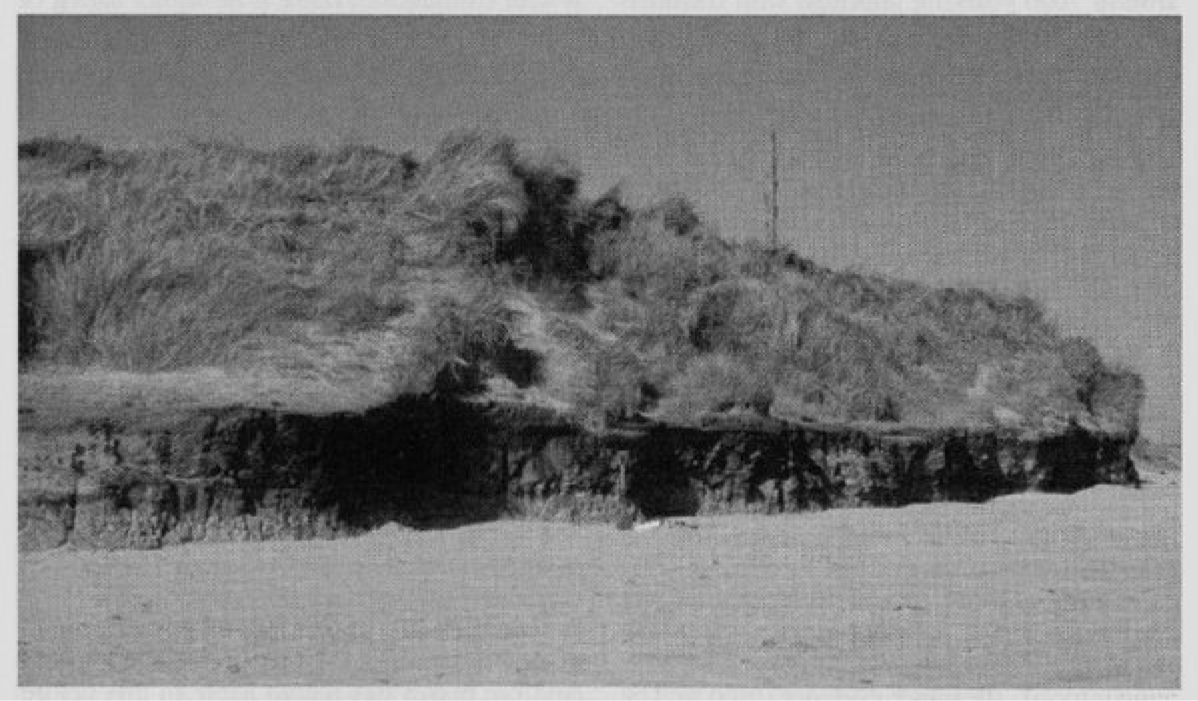
A sudden and distinct climatic decline, which corresponds with the Late-glacial Loch Lomond Stadial period is well marked at Skipsea Withow. It is manifest by a very severe fall in the diversity and numbers of molluscs in the lake, with warmth-indicating taxa disappearing. Biological productivity falls sharply and catchment erosion increases greatly. Thermophile plants are lost to the pollen and macrofossil record. Sedge–grass tundra replaced the birch parkland. The radiocarbon dates of 10 440 ± 80 years BP and 10 710 ± 70 years BP for wood in sediments of this phase are compatible with Loch Lomond Stadial times. Reworking of earlier sediments and deposition of coarse gravels in parts of the site occurred under these severe climatic conditions.

The Holocene climatic amelioration and spread of forest at Skipsea Withow (Blackham and Flenley, 1984) is similar to that at other sites in the region (Flenley, 1984, 1987; Dinnin, 1995), with progressive increase in *Betula, Pinus, Corylus, Ulmus, Alnus, Quercus* and *Tilia* in turn. The early Holocene mixed woodland and lake landscape must have been attractive to human exploitation, as shown by the recovery of several Early Mesolithic flint and bone tools, as well as the bone 'harpoon' of this age or earlier. The mid-Holocene saw the replacement of lacustrine sedimentation by detrital fen-carr peat formation across much of the marginal areas of the basin. The *Ulmus* Decline at Skipsea Withow is well marked and datable through the classic Elm Decline date of 5099 ± 50 years BP at nearby Gransmoor (Beckett, 1981). Skipsea Withow does differ, however, in the intensity of human activity after this horizon, with very high *Plantago lanceolata* and cereal frequencies indicating major forest clearance. The colluvial silt–clay of unit 9, which seals the peat at Skipsea Withow Gap, may well be the result of soil erosion caused by this Neolithic agricultural activity, although it is possible (Flenley, 1987; Dinnin, 1995) that the radiocarbon age of 4500 ± 50 years BP for the top of the peat below this colluvial unit may well be too old as a result of reworked material or hard-water error. The evidence from wood (McAvoy 1995) that beavers were active in the narrower sections of the mere provides an alternative to the Neolithic coppicing hypothesis of Gilbertson (1984b) as an explanation for mere-margin carr woodland disturbance. Damming of channels by beavers also may explain some of the Holocene water level changes noted in parts of the mere.

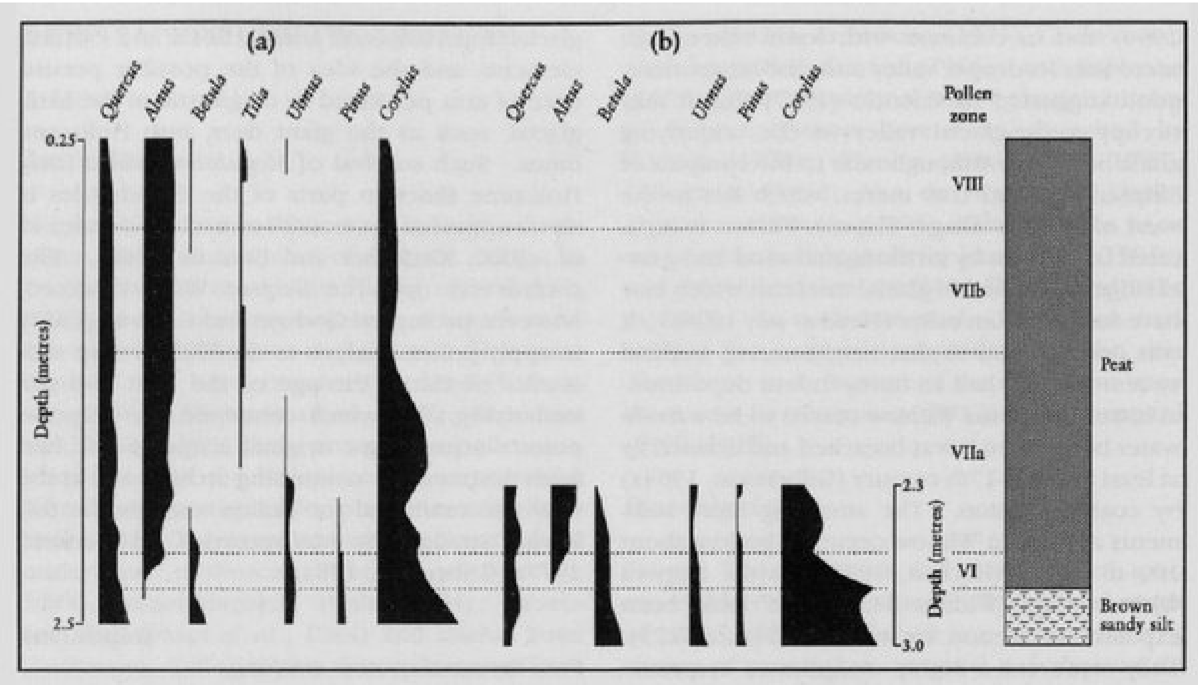
## Conclusions

The detailed, integrated, interdisciplinary research of the long sedimentary succession at Skipsea Withow makes the site one of the most important palaeoenvironmental records in the northern region, although the surviving deposits are probably only a small fraction of the original extent of the mere. The site also is important as one of the first in Britain where archaeological remains were relatively dated using pollen analysis (Godwin and Godwin, 1933). The threat to the survival of the geological resource at Skipsea Withow Gap is very great as deposits continue to be lost to coastal erosion, although mere sediments to the west still survive for analysis and may contain the late Holocene record truncated at the Withow Gap site. The proven spatial complexity of the geological record requires continuing scrutiny and research.

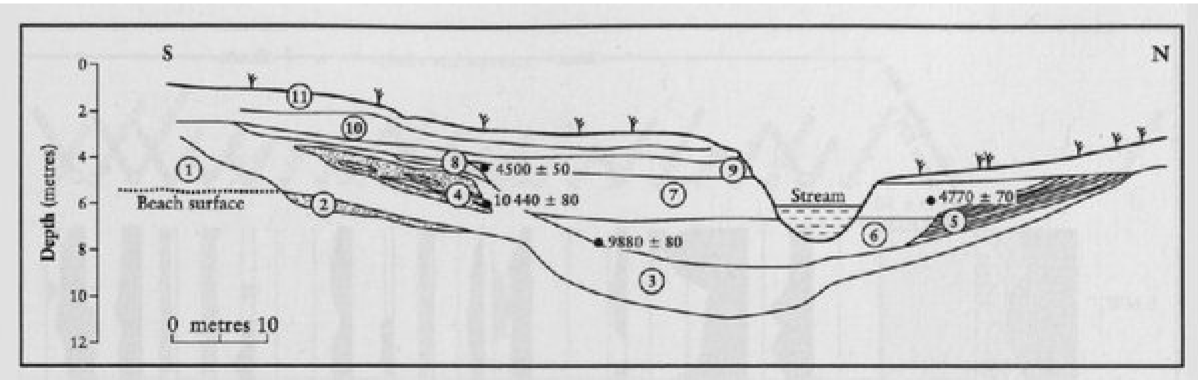
**References**



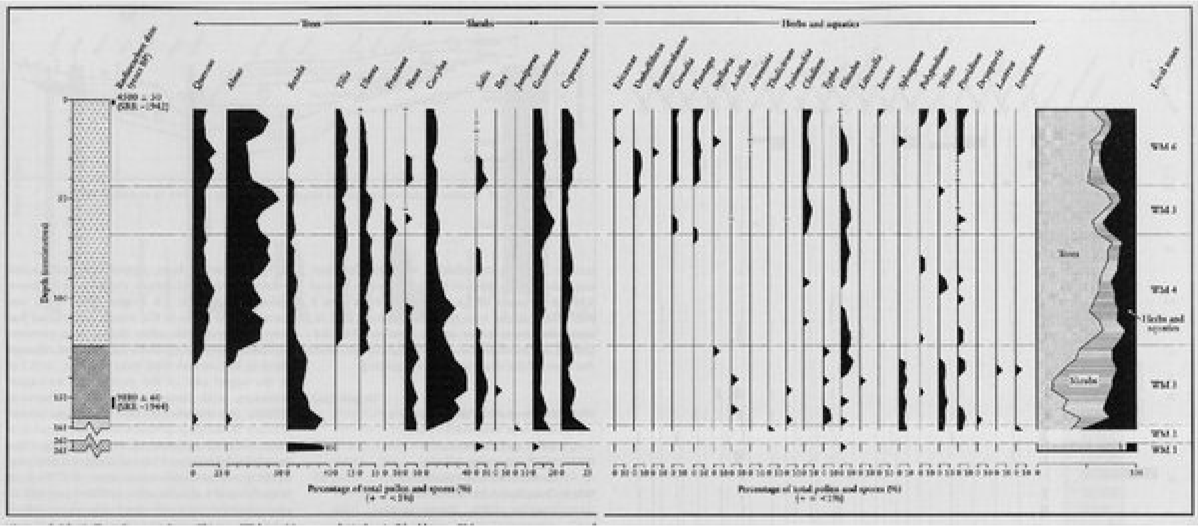
(Figure 8.25) Organic sediments exposed at Skipsea Withow. (Photo: J. Innes.)



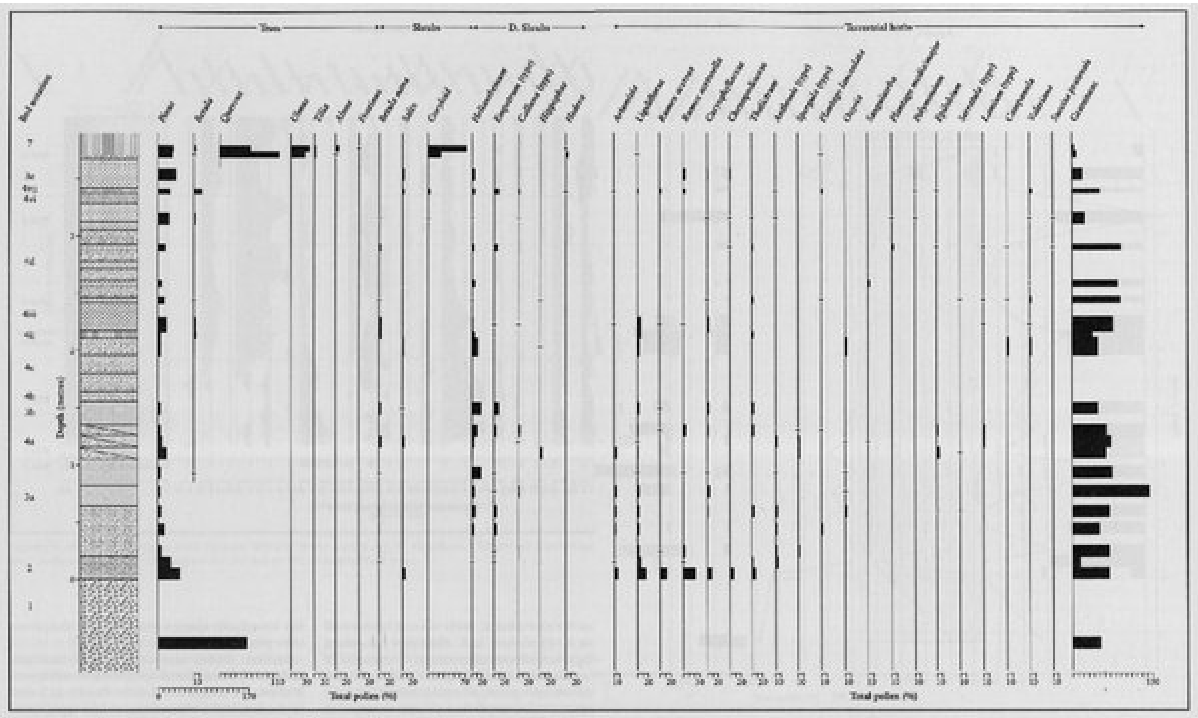

(Figure 8.26) Summary of the pollen diagram from Skipsea Withow published by Godwin and Godwin (1933).



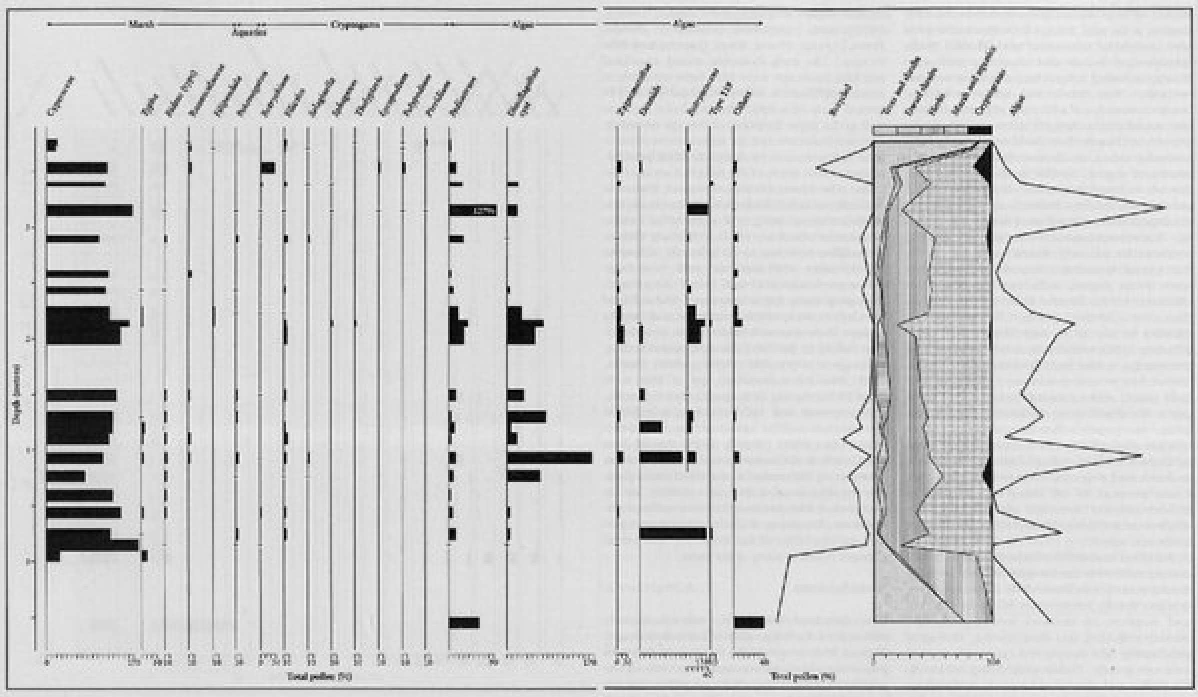

(Figure 8.27) Outline of the stratigraphy at Skipsea Withow Gap (for key to numbers, see text).



(Figure 8.28) Pollen diagram from Skipsea Withow Mere; analysis by A. Blackham. Values are percentages of total pollen and spores. See (Figure 8.1) for key to the stratigraphical log.



(Figure 8.29) Pollen diagram from the Late Devensian deposits at Skipsea Withow showing tree, shrub and terrestrial herb taxa. For stratigraphy, see text.




*(Figure 8.30) Pollen diagram from the Late Devensian deposits at Skipsea Withow showing marsh taxa, cryptograms and algae.*