Old Mere, Hornsea

[TA 208 474]

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Introduction

Old Mere, Hornsea, in the East Riding of Yorkshire, is an important site for the study of both local and regional vegetation history and environmental change in the Holderness area during the Holocene Epoch. The importance of the site is twofold. Firstly, palynological analyses of cores obtained from the site have been used in compilation of a regional pollen stratigraphy for Holderness (Beckett, 1981). Secondly, comparisons between Old Mere, Hornsea and the much smaller nearby kettlehole at The Bog, Roos have been used to demonstrate the importance of local factors in pollen deposition and preservation. The main published work on this site is that of Beckett (1975, 1981), who obtained radiocarbon-dated cores from Old Mere, Hornsea and from The Bog, Roos (Beckett, 1977b). The differences in the pollen records from the two sites reflect the much stronger local influences on pollen deposition at Old Mere, Hornsea. This is primarily the result of a greater input from local streams into the lake because of the larger size of the catchment at Old Mere. The site also features in many reviews of the regional palaeoenvironmental history of this area of Holderness (Gilbertson, 1984a; Flenley 1984, 1987, 1990; Catt, 1991b; Van de Noort and Davies, 1993; Dinnin, 1995; Dinnin and Lillie, 1995b; Taylor, 1995; Greig, 1996; Lillie and Geary, 1999).

Description

Old Mere, Hornsea lies on the Holderness coast, immediately south of the town of Hornsea. The entire Holderness Plain is composed of glaciogenic sediments, including a variable thickness of diamicton, sand and gravel. Organic deposits and place names provide evidence that numerous former shallow lakes (meres) existed in Late-glacial and post-glacial times, especially in eastern Holderness. Their disappearance was largely the result of natural silting aided by medieval and later drainage (Sheppard, 1957). The only surviving open-water mere is that of Hornsea Mere. The GCR site at Old Mere, Hornsea is a dry depression of landscaped ground at *c.* 1 m OD, protected from the North Sea by a sea wall. The site occupies the eastern end of a pre-glacial valley, which extends westwards to Brandes-burton and includes the surviving Hornsea Mere, which is immediately inland of Old Mere itself (Figure 8.43). Hornsea Mere is approximately 2.5 by 1 km and is drained by a dyke, which runs through the centre of the Old Mere basin. When Old Mere, Hornsea was open water, it had dimensions of at least 300 by 500 m (Beckett, 1981). A terrace approximately 3 m above present water level in the existing Hornsea Mere indicates a previously higher water level, and at some point in the past the two meres probably were joined into a single, much larger lake.

A transect of borings reported by Beckett (1981) revealed up to 14 m depth of lacustrine deposits in the Old Mere basin, comprising mainly clay and fine detritus mud (Table 8.9).

The upper 9.5 m of a core obtained by Beckett (1981) yielded sufficient pollen for palynological analysis and radiocarbon dating (Figure 8.44) and (Figure 8.45). The core has been divided into five pollen assemblage zones based upon pollen and spore content, each of which is given the local code HO.

HO-1 (9.45–8.95 m)

The pollen spectra are dominated by *Betula* (40–70%), *Pinus* (10%) and Gramineae (5–10%). *Quercus, Ulmus* and *Alnus* also occur in small amounts towards the top of this zone. *Salix* pollen is abundant at the base of this zone, but decreases upwards. The pollen of certain herbs, notably *Filipendula,* is present.

HO-2 (8.95–7.55 m)

The lower boundary of this zone is drawn where *Corylus/Myrica* pollen shows a sharp increase and *Betula* declines. *Ulmus* and *Quercus* also increase at the base of this zone. *Corylus/Myrica* pollen dominates, with values from 70% at the base to 40% at the top of this zone. *Betula, Pinus, Ulmus* and *Quercus* all contribute around 5–10%. *Tilia cordata* and *Alnus* pollen are present in small amounts. Very few herbs are present, apart from Gramineae and Cyperaceae pollen.

(Table 8.9) Generalized stratigraphy of Old Mere, Hornsea (source: Beckett, 1981)

Depth in core (cm)	Description
0.00–0.50	Made ground
0.50–1.40	Sandy clay
1.40–1.75	Clayey detritus mud with organic matter
1.75–9.30	Fine detritus mud with no recognizable plant material
9.30–12.30	Silty clay with occasional organic matter
12.30–12.60	Clayey fine detritus mus with some silt
12.60–13.80	Gravelly clay

HO-3 (7.55–4.40 m)

The base of this zone is marked by an increase in *Alnus* pollen to exceed 20%. *Alnus* contributes about 30% throughout the zone. Of the other trees, *Betula* and *Pinus* both decline from about 10% at the base to 2 or 3% at the top of the zone. *Ulmus* pollen values (5–10%) are also slightly higher at the base. *Quercus,* at 5–10% for much of this zone, increases to 15–20% near the top. *Tilia cordata* pollen values increase from minimal amounts to around 5% higher in this zone, and *Fraxinus* is sparsely present in the upper horizons. *Corylus/Myrica* pollen contributes 40%, decreasing to 20% at the top of the zone. *Hedera* pollen is consistently present in small amounts, whereas herb pollen is scarce.

HO-4 (4.40–2.55 m)

The lower boundary of this zone is drawn where *Ulmus* pollen values fall below 5%. *Alnus* (40%) and *Quercus* (10–20%) dominate the arboreal pollen, with *Pinus* and *Ulmus* present in small amounts. *Betula* pollen values lie around 5%. *Tilia cordata* pollen drops to around 2% near the base of the zone, but exceeds 5% at higher levels. *Fraxinus* is present in small amounts only in the lower half of this zone. *Corylus/Myrica* pollen values are consistently at 25–35%. At the base of the zone there is a slight increase in herb pollen values, notably of Gramineae; *Plantago lanceolata, Rumex acetosa* and *Artemisia* also occur. The increase in herb pollen is not maintained in the higher levels of the zone.

HO-5 (2.55–1.55 m)

The base of this zone is marked by a rise in the values of herbs, especially Gramineae and *Plantago lanceolata,* and a decline in *Tilia cordata. Alnus* (20–40%) and *Quercus* (5–20%) dominate the arboreal pollen, with small amounts of *Betula, Pinus, Ulmus, Tilia cordata* and *Fraxinus. Corylus/Myrica* pollen values decline from 30% to 5% through this zone. Herb pollen increases throughout the zone to reach 50% of the total dry-land pollen at the top of the profile. There also are significant amounts of pollen of Cerealia type (Cyperaceae, *Artemisia,* Liguliflorae and Chenopodiaceae) and a range of other herb pollen taxa in small quantities.

Interpretation

The stratigraphical evidence suggests that changes within the Old Mere throughout much of the Late Devensian and Holocene were only minor (Beckett, 1981). The Late-Glacial clay deposits and fine detritus mud that fills much of the basin are indicative of deposition in open water conditions. The absence of pollen of submerged and floating-leaved macrophytes from much of pollen zones HO-2 and HO-3 suggests that the throughflow of water was too rapid to allow the establishment of much aquatic vegetation and/or that the water depth was considerable. On the assumption that the raised shore lines of Hornsea Mere represent the water depth in zone HO-3, this suggests a water depth of around 7.5 m (Beckett, 1981). The increase in aquatic pollen during pollen zones HO-4 and HO-5 points to a shallowing of the water or reduction in stream flow. The uppermost deposits suggest that the mere may have dried out rapidly, with no time for a

regular hydroseral sequence, as in the kettlehole at The Bog, Roos. The upper horizons of detritus mud contain successively more inwashed clay, perhaps representing human activity. These are overlain by deposits of sand, interpreted as blown sand from the coastal dune systems. Beckett (1981) suggests that the mere dried up sometime around 2000 years BP. The presence of freshwater ostracods in the clayey upper horizons of the Old Mere demonstrates that the site was not inundated by the sea for any length of time (Robinson, 1972).

Beckett (1981) proposed five regional pollen assemblage zones for the Plain of Holderness based on the palynological analyses from Old Mere, Hornsea and The Bog, Roos. These follow the local pollen zones described above.

HO-1 *Betula–Pinus* assemblage zone

This zone is dominated by arboreal pollen, notably *Betula* with some *Pinus.* A range of herb types, notably *Filipendula,* also is present. Radiocarbon dating places this assemblage zone in the early Holocene, immediately above the Late Devensian–Holocene boundary.

HO-2 *Corylus/Myrica–Ulmus* assemblage zone

This zone is dominated by *Corylus/Myrica* pollen, with plentiful pollen of *Betula, Pinus, Ulmus* and *Quercus* and little herb pollen. A radiocarbon date of 8507 ± 55 years BP was obtained for this pollen zone (Beckett, 1975).

HO-3 *Alnus–Ulmus* assemblage zone

This zone is dominated by arboreal pollen, chiefly *Alnus,* but also with abundant *Ulmus* and *Quercus* and some *Corylus/Myrica* pollen. Herb pollen is scarce. This zone is bracketed by radiocarbon dates of 8507 ± 55 years BP from the top of HO-2 and a date of 5099 ± 50 years BP

HO-4 *Alnus–Quercus* assemblage zone

This zone is dominated by arboreal pollen including *Alnus* and *Quercus. Ulmus* pollen is scarce. Small amounts of herb pollen occur, notably Gramineae, *Plantago lanceolata* and Chenopodiaceae. The base of this zone is dated to 5099 ± 50 years BP (Beckett, 1975).

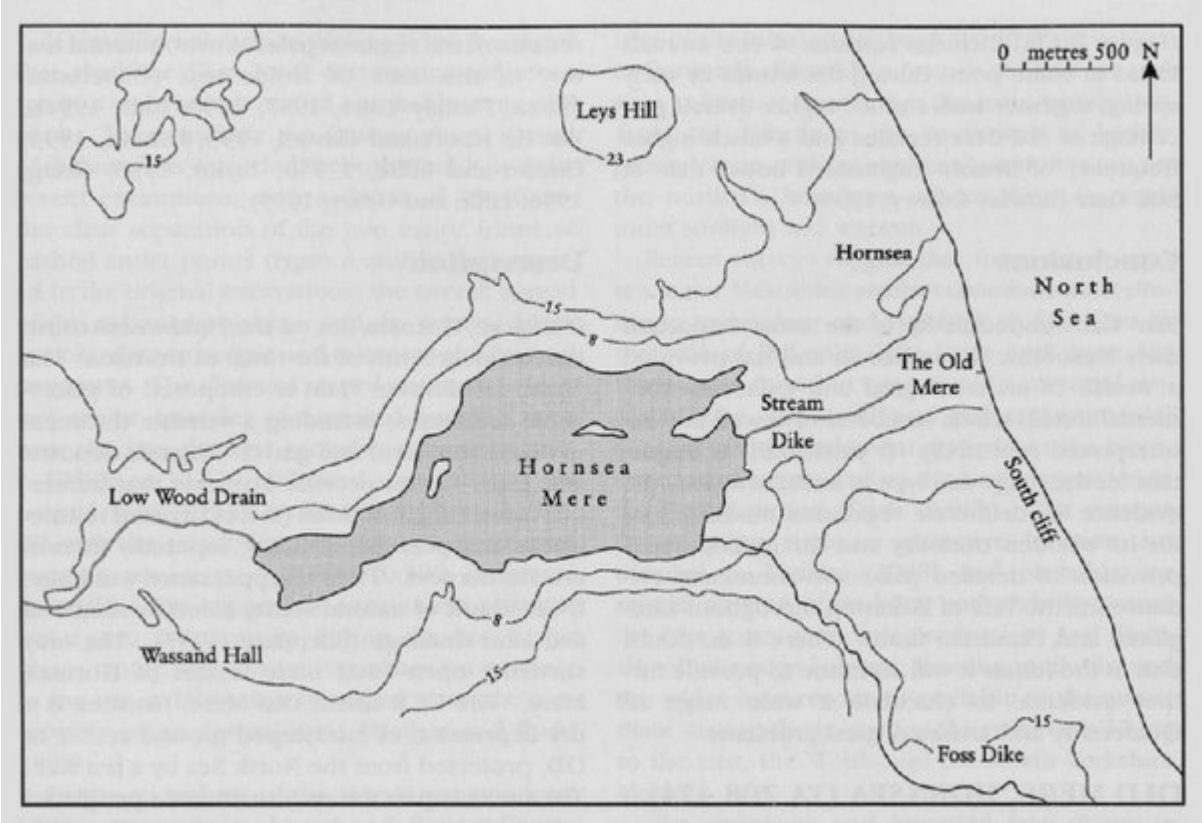
HO-5 Alnus–Gramineae assemblage zone

This zone contains abundant herb pollen. *Alnus* dominates the arboreal pollen, with smaller amounts of *Betula* and *Quercus.* Many herb pollen types are present, notably Gramineae, *Plantago lanceolata,* and Cerealia type. Dates for the start and end of this zone are unclear, but radiocarbon dates indicate that this pollen zone includes the time spanning 3120 ± 105 years BP to 3433 ± 110 years BP.

Conclusions

Old Mere, Hornsea has yielded a radiocarbon-dated pollen sequence from the Late Devensian–early Holocene boundary to *c.* 2000 years BP The pollen record from Old Mere, Hornsea is important in defining the regional pollen assemblages for Holderness, of which five regional pollen zones have been recognized. The pollen record from Old Mere is very different to that obtained from nearby at The Bog at Roos, where the pollen spectra are swamped by local pollen produced from the rapidly changing bog surface.

References



(Figure 8.43) Map of the area surrounding Old Mere, Hornsea (modified from Beckett, 1981). (Contours in metres.)

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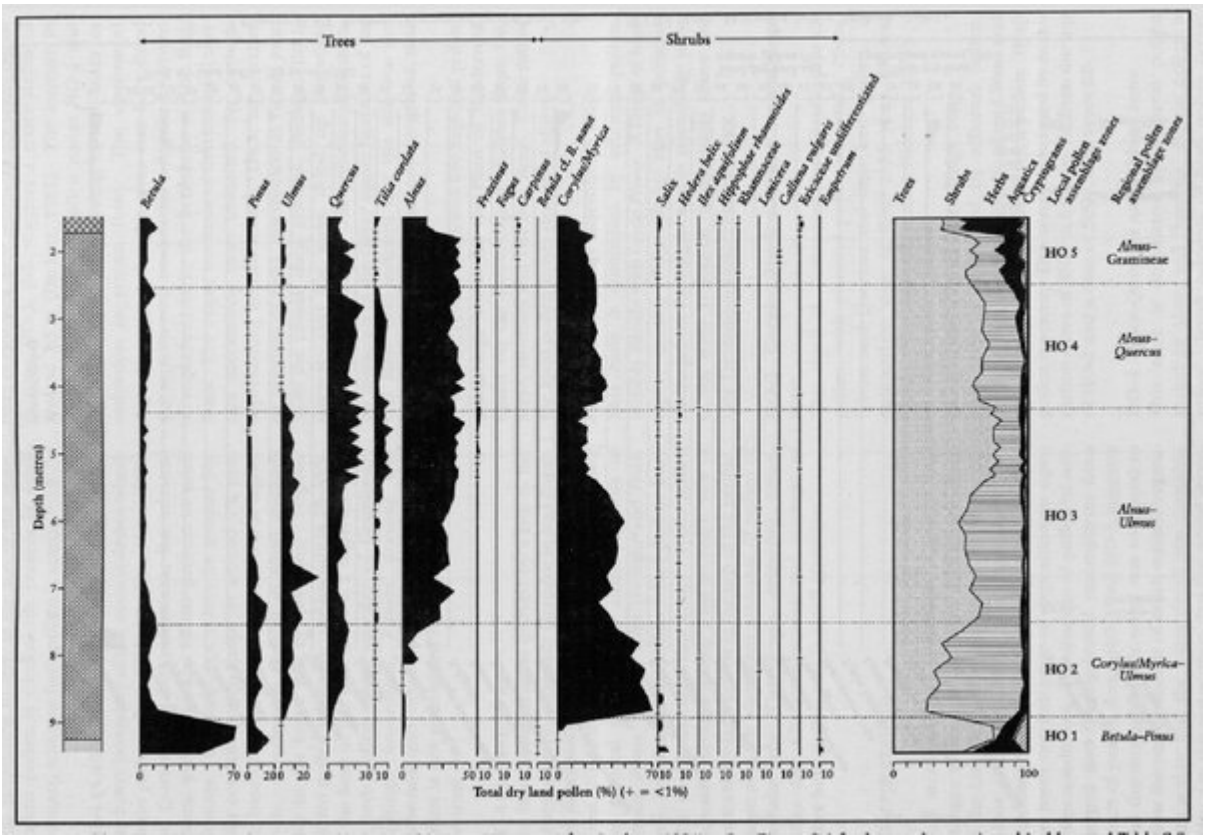
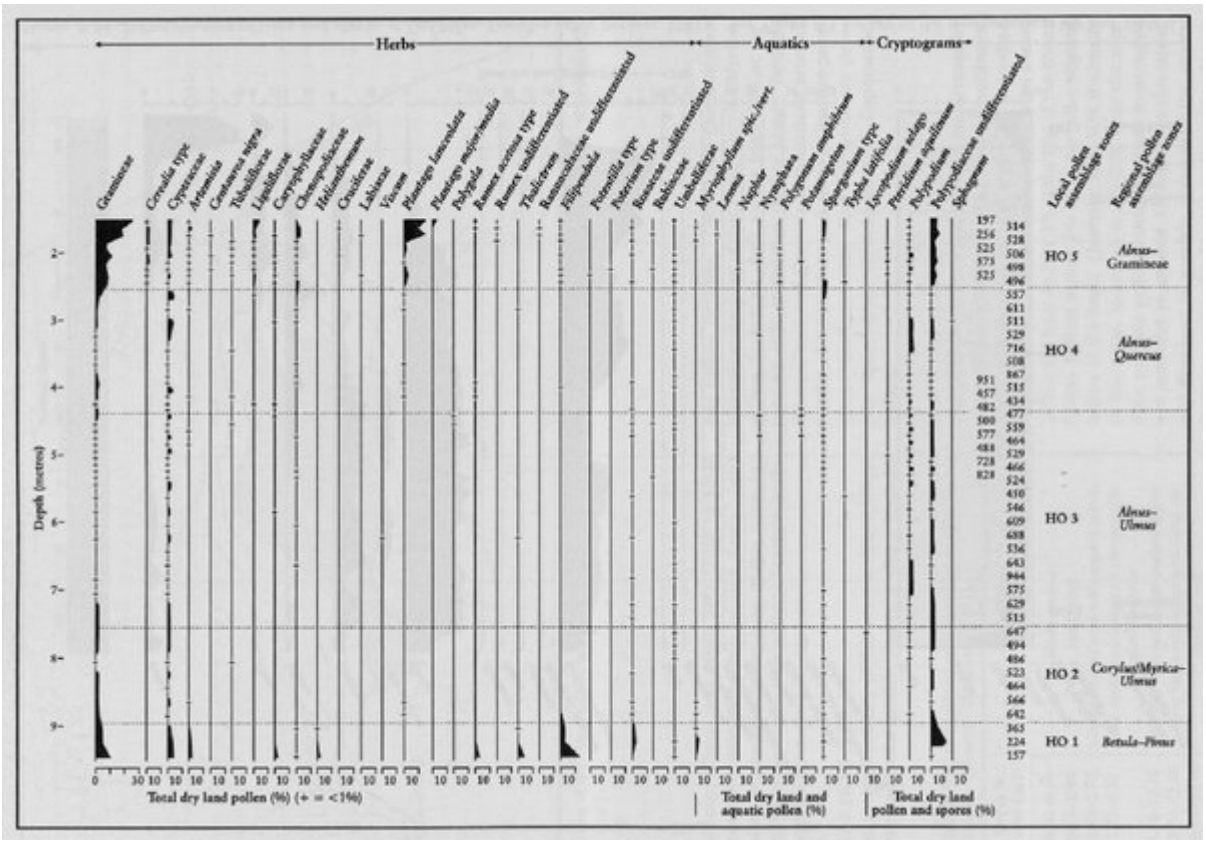


(Figure 8.44) Pollen diagram of trees and shrubs at Old Mere, Hornsea (after Beckett, 1981). See (Figure 8.1) for key to the stratigraphical log and (Table 8.9) for a more detailed description.



(Figure 8.45) Pollen diagram of herbs and aquatics at Old Mere, Hornsea (after Beckett, 1981).