

SHELL MIDDEN AT BRAEHEAD, ALLOA

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Introduction

After the last glaciation sea levels rose, and, relieved of the huge weight of ice, so did Scotland. Both of them rose at different rates at different times. Years of detailed work by Dr J.B. Sissons and others (e.g. Sissons, 1976a, 1976b; Browne, 1980) and consideration of the overall pattern of rise and fall of the British Isles and North Sea (Lambeck, 1995) has produced a detailed model of changing shore lines in the Firth of Forth. One of the particularly intriguing features of those shorelines is the presence of shell middens left by prehistoric people exploiting the shell fish of the estuary.

None of the shell middens so far dated in the Forth Valley is particularly early when compared to other hunter-gatherer sites in Scotland, for which there is now a wide range of radiocarbon dates from both the east and west proving settlement from at latest 7500 BC (Wickham Jones, 1994, p46; Ashmore, Cook and Harkness forthcoming). By that time birch and hazel had long colonised Scotland, and stands of elm and oak had started to appear (Dargie and Briggs, 1991). It seems likely that hunter-gatherers had been hunting seal and other marine mammals along the shores of Scotland, and reindeer inland, from much earlier, before birch and hazel replaced much of the tundra-like vegetation of earlier periods (Morrison and Bonsall, 1990, p!34).

There are records from the Forth Valley, between Cardross in the west and Grangemouth in the east, of 15 finds of whale skeletons in the estuarine clays. They presumably represent stranded whales, and some had harpoons and other tools by them. Those west of Stirling probably belong in the period of the post-glacial maximum sea level in the Forth Valley, at some time between 5500 (K) and 5250 BC (Sloan, 1993, fig. 3.1; Stuiver and Reimer, 1986).

The two earliest dates (so far) from an archaeological site in the Forth Valley come from a shell midden at Inveravon, West Lothian (Mackie, 1972). They are GX-2334, from charcoal in a lens of occupation material in the midden and GX-2331 for shell. GX-2334 measures 5955 +/-180 BP, which implies a calendar age of between 5280 and 4460 cal BC and GX-2331 measures 6010 +/- 180 BP which, after subtracting 405 years to allow for the differences between shell and charcoal, implies a date somewhere between 4895 and 4010 cal BC (Darkness, 1983; Stuiver and Reimer, 1986). More generally, middens accumulated from before 4500 cal BC until about 4000 cal BC. Thereafter several of the known middens were used particularly from before 3250 cal BC to after 2250 BC (to the nearest 250 years, see Ashmore, Cook and Harkness forthcoming). It may be that middens of still earlier periods remain above or below the present shoreline, for the post-glacial minimum sea level relative to the land occurred between 8000 cal

BC and 7600 cal BC (Sloan 1993, 140; Sruiver and Reimer, 1986).

The Braehead midden

The site lies at NS 86939370 on the edge of Braehead Golf Course, four to five metres above the road from Cambus to Alloa, which here forms the northern boundary of frequently flooded flat fields to the north of the Forth. A stream ran southward by here at some past period and the site lies near the end of a shall dry valley where it debouches onto the flood plain of the Forth, with a low bluff to its east. The bluff tops out at perhaps nine to 10 m above the level of the road. It is covered with recent vegetation including saplings perhaps up to two or three decades old. Above it again to the east is the golf course, here built on rig and furrow with a five-metre wavelength, which ran westward down hill to the bluff. The golf club held part of the nearly land from the 1880s until the 1930s; the area was owned from Arnsbrae House. It had been grazed at least from the 30s to 1969/70, when it was given by its then owner to the golf club. There had been borrow-pitting to extract sand for sandbags in this area during the war. The appearance of the land above the site and its history seem to match each other well and may explain some of the features visible at the site.

During small-scale borrow-pitting of soil for use on the golf course, at a piece of rough ground owned by the golf club a layer of shells and thick layers of soil were exposed some 40 m north of the road. The work also exposed clay and course sand, underlying a thick layer of soil, halfway in height and distance between the road and the exposure of shells.

The local authority archaeologist, Mrs L. Main, being unavailable, and at the invitation of Mr J. Pollock, Greens Convenor, and Mr A. Finlayson, Course Manager of Braehead Golf Club, we visited on 10th September 1996 and recorded the site.

The shell exposure had previously been masked by what looked like slumped soil, a know of which remained in place with an exposure of shells to either side in a layer 0.3 to 0.4 m thick on top of fine sand. It seems possible that the soil covering the shell exposure originated in run-off from a rig system above the bluff, for it gave the impression that it had slumped in one mass from higher up, from an earlier resting point. It may be that the shells too had slumped en masse from a higher position. Certainly, that is what careful and detailed recording showed had happened in somewhat similar circumstances at the centre point of a shell midden at Nether Kinneil (Sloan, 1993).

The shell layer seemed to have been truncated on the north side of the northerly exposure and the southerly exposure seemed to have been cut through at an earlier date. There was some shell in a soil layer half way up the knob of material separating the two exposures. A bulk sample Braehead Sample 1 was collected from the upper half of the northerly exposure. It consisted largely of oyster shells (see Appendix 1). The shells did not, by and

large, look well preserved. To provide a more testable reserve sample for a broad ranging date, should the shells from the exposure prove unsuitable, stray whelk and scallop shells were collected from recently disturbed loose material nearby, and bagged separately to form Braehead Sample 2. The date for Braehead Sample 1 turned out to be between 4470 cal BC and 4160 cal BC (GU- 4835; see Appendix 2).

Discussion

The midden is the most northerly and westerly known in the Forth Valley (Sloan, 1993; the recent discovered Mumrills midden lies near NS 902799), and unlike most known sites Braehead lies to the north of the river. At the maximum penetration of the sea, the immediate area would have been on the south side of a large low promontory between the Forth and the Devon. If it be accepted that the post-glacial maximum sea level in the Forth Valley occurred some time between 5600 and 5250 BC (Sloan, 1993, 140; Stuiver and Reimer, 1⁹K6), the date for the midden is slightly more recent and thus it seems to have been built up during the period that the sea level was falling from its maximum extent.

D. Sloan's doctoral thesis (available for inspection in the National Monuments Record of Scotland) provides a detailed synthesis of what was known before 1993. An improved understanding of the shell middens of the Forth Valley will require a considerable amount of detailed work. However, the best current interpretation of them is that they represent just one facet of the complex life style of people exploiting a wide range of resources in the Forth Valley and its surrounding uplands (Sloan 1993, pp392-5; Wickham-Jones 1994, pp11, 69, 112).

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Dr D. Sloan for access to his unpublished doctoral thesis.

References

1. Ashmore, P.J. (1996). Neolithic and Bronze Age Scotland. London: Batsford.
2. Ashmore, P.J., Cook, G. and Harkness, D.D. (forthcoming). *Radiocarbon Dates for archaeological sites in Scotland*. Edinburgh: Historic Scotland.
3. Bonsall, C. (ed.) (1990). *The Mesolithic in Europe: papers presented at the Third International Symposium*. Edinburgh: John Donald.
4. Browne, M.A.E. (1987). The physical geography and geology of the estuary and Firth of Forth, Scotland *Proceedings of the Royal Society Edinburgh* 93B, 235-244.
5. Dargie, T.C.D. and Briggs, D.J. (1991). State of the Scottish Environment 1991. *A report to Scottish Wildlife and Countryside Link*. Scottish Wildlife and Countryside Link.

6. Harkness, D.D. (1983). The extent of natural ¹⁴C deficiency in the coastal environment of the United Kingdom. In *¹⁴C and Archaeology* pp351-64. Groningen August 1981.
7. Lambeck, K. (1995). Late Devensian and Holocene shorelines of the British Isles and North Sea from models of glacio-hydro-isostatic rebound. *Journal of the Geological Society, London* vol. 152, 437-448.
8. Mackie, E.W. (1972). Radiocarbon dates for two Mesolithic shell heaps and a Neolithic axe factory in Scotland. *Proceedings of the Prehistoric Society* 38, 412-416.
9. Morrison, A. and Bonsall, C. (1990). The Early Post-Glacial Settlement of Scotland: a Review. In Bonsall (1990) pp!34-142 (see above).
10. Sissons, J.B. (1976a). The geomorphology of the upper Forth Valley. *Forth Naturalist and Historian I*, 5-20.
11. Sissons, J. B. (1976b). The geomorphology of the British Isles: Scotland. London: Methuen.
12. Sloan, D. (1993). Sample Site and System: Shell Midden Economies in Scotland 6000 to 4000 BP. Dissertation submitted for the degree of Doctor of Philosophy. Cambridge University.
13. Stuiver, M. and Reimer, P.J. (1986). A computer program for radiocarbon age calibration. In *Radiocarbon* (ed. M. Stuiver and R. S. Kra), vol. 28 (2B), pp1022-1030.
14. Wickham-Jones, C.R. (1994). Scotland's First Settlers. London: Batsford.

Appendix 1: The bulk sample

Sample 1 contained the following:

Quantity	Material	Dry Weight *(g)	%of sample	Average weight (g)
113	oyster shells	1900	52	16-8
15	scallop shells	450	12	30
4	winkle shells	5	1	0-8
2	mussel shells	1	<1	0-5
	'soil' residue (retained) with minor proportion of shattered shell	1300	35	
		3656		

*naturally dry, not kiln dried

That part of Sample 1 not used for radiocarbon dating, and Sample 2, has been deposited with Mrs L. Main of Stirling Council on behalf of Clackmannan Council.

Appendix 2: The Radiocarbon Date

A sample of scallop shells was submitted with a request to date the aragonite from the shells, rather than any calcite, because any calcite in the

shell might well have crystallised from aragonite at a date well after the shellfish died, incorporating carbon contemporary with the time of crystallisation rather than with the life of the shellfish.

GU-4835 Braehead Midden, Sample 1 5880 +/-60 BP $\delta^{13}C = 0-9$ ppm

Calibrated age ranges (Harkness, 1983; Stuiver and Reimer, 1986)

1 sigma cal BC 4365-4246

2 sigma cal BC 4470-4158

There are thus 19 out of 20 chances that the calendar date for the scallop shells falls between 4470 cal BC and 4160 cal BC. Please note the convention for reporting calibrated radiocarbon dates is to use the phrase 'cal BC' to distinguish the dates (which usually have large errors attached to them) from dates obtained from historical sources or other absolute dating methods.



Shell Midden at Braehead

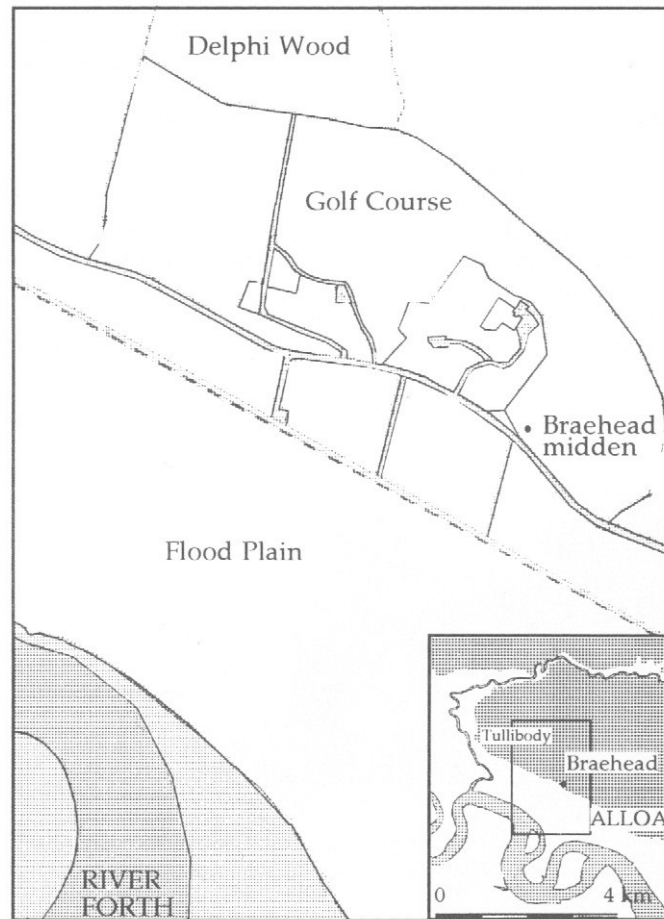


Figure 1. The location of Braehead midden.

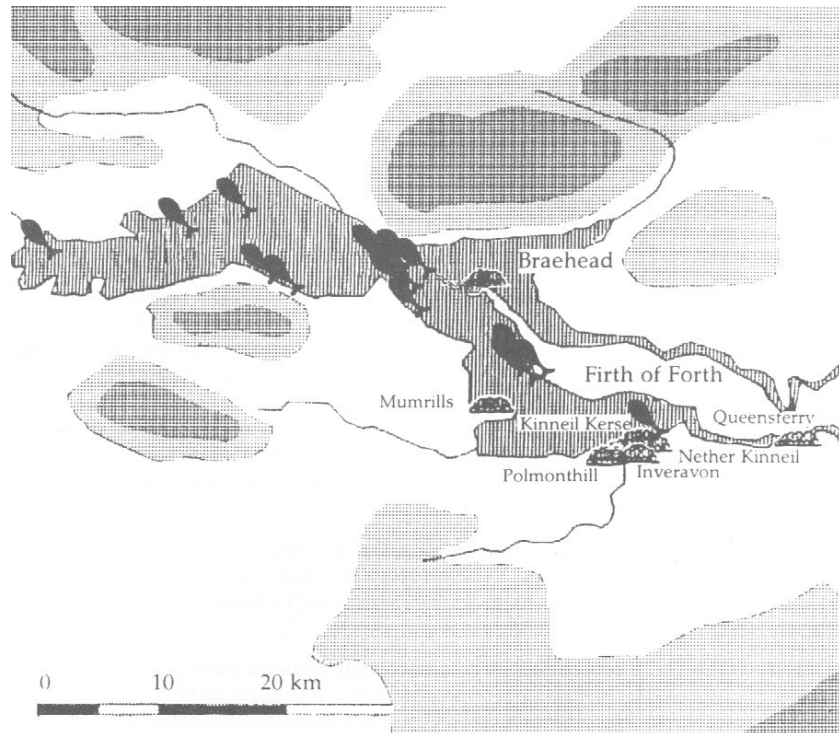


Figure 2. Finds of whale skeletons and shell middens in the upper Forth Valley, after Sloan 1993.

THE FORTH NATURALIST AND HISTORIAN

The Forth Naturalist and Historian (FNH) is an informal enterprise of Stirling University. It was set up in 1975 by several University and Central Regional Council staff to provide a focus for interests, activities and publications of environmental, heritage and historical studies for the Forth area comprising the local authority areas of Stirling, Falkirk and Clackmannshire.

The promotion of an annual environment symposium called *Man and the Landscape* has been a main feature, and 1997 is its 23rd year, with the theme Transportation - People and Environment.

The annual *The Forth Naturalist and Historian* has since 1975 published numerous papers, many being authoritative and significant in their field. They include annual reports of the weather, and of birds in the locality also some book reviews and notes. These volumes (20 as of 1997) provide a valuable successor to that basic resource *The Transactions of the Stirling Field and Archaeological Society, 1878-1939*. Five year contents/indexes are available, and selected papers are published in pamphlet form, while others eg. Ashfield Factory Village, The Weather and Bird Reports and Flora papers are available as reprints.

A major publication is the 230 page *Central Scotland - Land, Wildlife, People* 1994. A natural history and heritage survey, and exploited for schools throughout the area, also available in the form of a CD-Rom, *Heart of Scotland's Environment* (HSE).

Other FNH and associated publications still in print include - *Mines and Minerals of the Ochils, Airthrey and Bridge of Allan* - a guided walk. *The Making of Modern Stirling, Woollen Mills of the Hillfoots, The Ochil Hills* - landscape, wildlife, heritage - an introduction with walks, *Doune - historical notes. Doune in picture postcards, Alloa Tower and the Erskines of Marr, and the Lure of Loch Lomond*. Several of these are in association with Clackmannanshire Field Studies Society. Godfrey Maps have collaborated in producing old Ordnance Survey large scale maps of the 1890's for some 20 places in the area.

Offers of papers/notes for publication, and of presentations for symposia are ever welcome.

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