



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

A Mesolithic Site at Kilmore, near Oban, Western Scotland

Citation for published version:

Bonsall, C, Payton, RW, Macklin, M & Ritchie, GA 2009, A Mesolithic Site at Kilmore, near Oban, Western Scotland. in N Finlay, S McCartan, N Milner & C Wickham-Jones (eds), *From Bann Flakes to Bushmills: papers in honour of Professor Peter Woodman*. Prehistoric Society Research Papers, no. 1, Oxbow Books, Oxford, pp. 70-77.

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Publisher's PDF, also known as Version of record

Published In:

From Bann Flakes to Bushmills

General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.



A Mesolithic Site at Kilmore, near Oban, Western Scotland

*Clive Bonsall, Robert Payton, Mark G. Macklin
and Graham A. Ritchie*

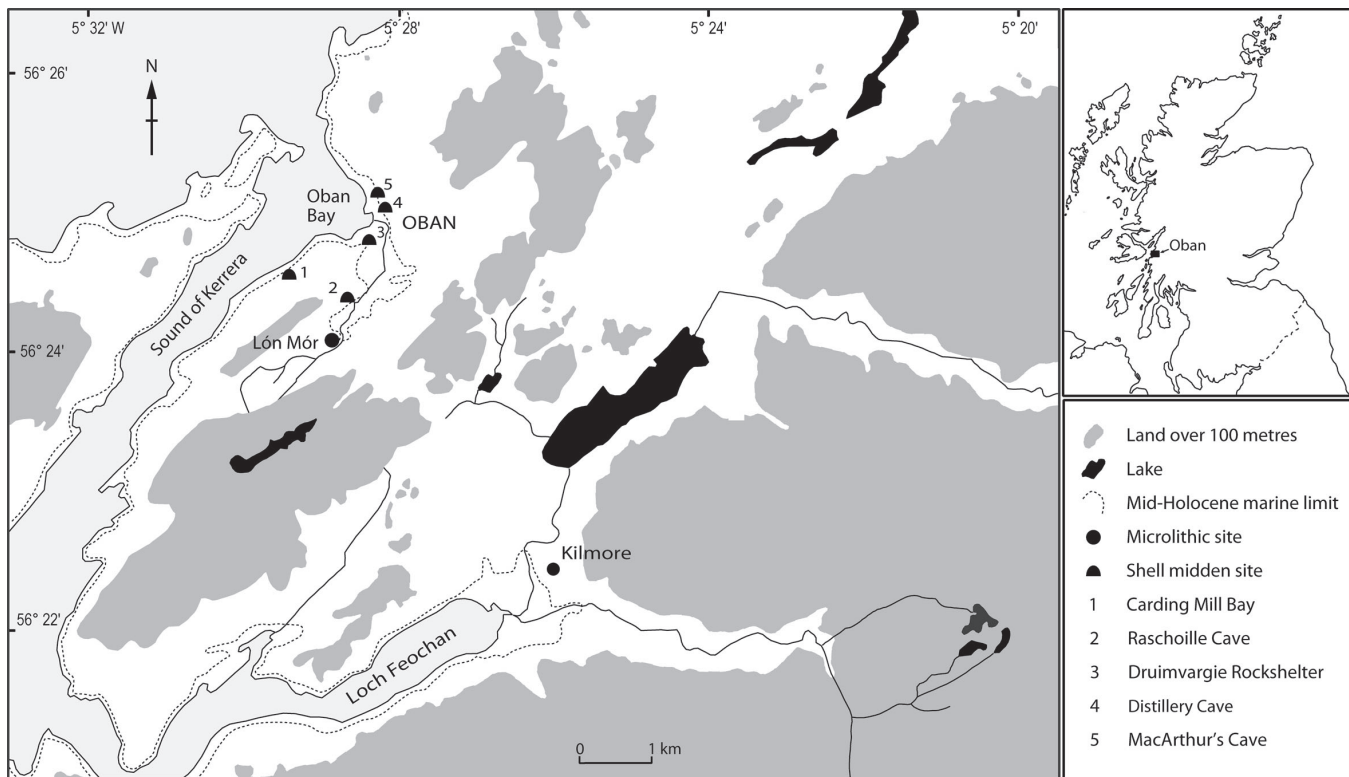
The Mesolithic shell midden sites found around Oban Bay and elsewhere along the coast of western Scotland were at one time thought to represent a distinct ‘Obanian’ culture. The proposition that these sites were in fact special-purpose camps, associated with unidentified base camps, was tested as part of the Oban Archaeological Project. The factors assumed to have influenced the location of the base camps were modelled and, subsequently, two open-air Mesolithic sites were identified – at Kilmore near the head of Loch Feochan, and Lón Mór at the head of the Oban embayment – both occupying sheltered, near-shoreline positions close to permanent sources of fresh water. Archaeological and pedological investigations of the Kilmore site have allowed a sequence of environmental and anthropogenic events to be reconstructed. The stratified remains of at least two phases of occupation associated with buried land surfaces were identified. A chipped stone assemblage comprising both flint and quartz artefacts was recovered, notable for the presence of Late Mesolithic ‘narrow blade’ microliths and an unusually high percentage of bipolar cores. An age younger than that of the highest Postglacial shoreline is suggested for the Mesolithic occupation.

Introduction

In the literature on the European Mesolithic, the Oban area in western Scotland is well known for a series of coastal shell midden sites, which occur within small sea-cut caves or rockshelters at the base of raised marine cliffs. Archaeologists who studied these and similar (open-air) shell middens on the islands of Oronsay and Risga in the late nineteenth and early twentieth centuries (Anderson 1895; 1898; Bishop 1914; Breuil 1922; Lacaille 1954; Clark 1956) concluded that they represented

a distinct Mesolithic culture, which came to be known as the ‘Obanian culture’ (Movius 1940). This view was based primarily on their apparent geographical isolation on the west coast of Scotland, and the contrast between the rather ‘impoverished’ lithic inventories of the Obanian sites and the more complex, often microlith-rich, assemblages from Mesolithic sites in other parts of Scotland.

With the discovery in the 1960s and 1970s of microlithic sites on the island of Jura between Oban and Oronsay (Mercer 1968; 1970; 1971;



1974; 1979) opinions started to change, and the possibility that the Obanian sites represent a particular aspect of Mesolithic culture in Scotland gained currency.

New investigations of the shell middens on Oronsay in the 1970s produced the first radiocarbon dates for Obanian sites (Shotton & Williams 1973; Shotton *et al.* 1975; Burleigh *et al.* 1976; Switsur & Mellars 1987). Bulk charcoal samples from five middens gave radiometric ¹⁴C ages between *c.* 6200 and 5400 BP (5150–4250 cal BC). From this evidence some authors concluded that the Obanian sites represented the final phase of the Mesolithic in western Scotland, characterised by changes in material culture and economy, perhaps influenced by the arrival of early Neolithic farmers (eg. Jacobi 1982, 21).

Dating evidence obtained in the 1980s and 1990s (eg. Bonsall & Smith 1989; 1990; 1992; Saville & Miket 1994; Bonsall *et al.* 1995; Hardy 2001) contradicted this interpretation, and showed that the Obanian phenomenon dates back to at least 7500 cal BC, overlapping substantially the time range of the microlithic assemblages.

Bonsall (1996a) proposed that the differences between Obanian and microlithic assem-

blages could be explained in terms of site function and preservation conditions. It was suggested that the shell middens found in the Oban caves and on Oronsay were not the remains of residential sites, but outlying short-stay camps set up primarily for the purpose of processing fish and shellfish taken along the adjacent shoreline. A corollary of this model is that base camps relating to the 'Obanian' processing camps should exist in the vicinity. Such settlements would likely be characterised by more complex artefact assemblages with a higher proportion of 'curated' tool forms, reflecting a more diverse set of activities.

Locating actual Mesolithic settlements was a key objective of the Oban Archaeological Project directed by two of the present authors (CB and MGM) in the 1990s, and sponsored by Historic Scotland. As a working hypothesis, it was assumed that among the factors likely to have influenced Mesolithic communities in their choice of locations for residential sites were: (i) ease of access to the coast and its resources; (ii) proximity to a permanent source of fresh water; (iii) shelter from prevailing winds; (iv) shelter from the effects of storm waves; and (v) level, well-drained ground for habitation. From this, it was predicted that

Figure 8.1: Mesolithic sites in the Oban area



Figure 8.2: View of the Kilmore site (from the east): 1 – shingle spit, 2 – trench A, 3 – trench B (Photo: Clive Bonsall)

settlements were most likely to be found in areas within protected embayments, especially near the heads of the fjord-like inlets (sea lochs) that characterise the coast of central-west Scotland.

Two such areas, close to the mid-Holocene marine limit (Main Postglacial Shoreline), were targeted in test-pit surveys – Kilmore near the head of Loch Feochan, and Lón Mór at the head of the (mid-Holocene) Oban embayment (Bonsall *et al.* 1993; Bonsall 1996b). Mesolithic open-air sites were discovered in both locations. Each site is situated in a sheltered, near-shoreline position close to a permanent source of fresh water (Fig. 8.1). In this paper we briefly describe the results of the investigations at Kilmore, which is located *c.* 5 km SSE of Oban.

The Kilmore site

Discovered in 1994, the site at Kilmore (56° 22' 21" N, 5° 25' 53" W) occupies a colluvial foot-slope position marginal to a peat-filled basin (Fig. 8.2). The basin originated as a depression in glacio-fluvial sands and gravels which was subsequently accentuated by the formation of a shingle ridge or spit at its western edge around the time of the maximum of the Main Postglacial Transgression (5500–5900 cal BC) when sea level was *c.* 10 m higher than today. At that time the basin may have formed a brackish water lagoon behind the shingle spit, fed by a small stream which enters from the northeast.

Test-pitting in September 1994 and March–

April 1995 located extensive lithic scatters on the slopes surrounding the basin. Two distinct concentrations of material were detected in areas near to the stream, one on the northern edge of the basin, the other on its eastern margin. The test pitting was confined to relatively well-drained areas of the site. In March–April 1996 two exploratory trenches (Trench A, 11 m × 1.5 m; Trench B, 13 m × 1.5 m) were dug in the poorly-drained soils at the foot of the slope (Fig. 8.2).

These excavations had three main objectives: (1) to investigate the nature of the soils and deposits infilling the basin; (2) to determine whether Mesolithic remains extend into these wetter, peat-covered areas; and (3) to assess the potential of the waterlogged deposits for the preservation of organic remains relating to Mesolithic and/or later occupations. The trenches were excavated on a 0.5 m grid and the soil from the trenches and test pits was wet sieved using a mesh size of 3mm.

Trench A

In Trench A, on the eastern margin of the basin, there was a clear buried land surface marked by a buried organic-rich soil horizon which could be traced along the whole length of the trench, extending from the moderately well-drained brown earths on the slope to very poorly-drained peaty humic gley soils on the margin of the peat bog (Fig. 8.3). This horizon is buried by almost stoneless clay loam colluvium on the slope, but at the bog margin is overlain by stoneless waterlaid silty clay. A similar buried A-horizon was found in test pits dug into the better-drained soils on the slopes surrounding the basin.

Remains of human occupation occurred in several contexts in Trench A. Human activity (in the form of refuse disposal) was probably a major source of the organic matter enriching the over-darkened buried A-horizon of the soils developed from the glacio-fluvial sands and gravels. The buried A-horizon is thickest and the organic material best preserved in waterlogged soils at the lower end of the trench where decay has been slowed down by anaerobic conditions. Flint and quartz artefacts and carbonised hazelnut shell fragments were recovered from this buried A-horizon. Lithic artefacts were also found on the buried land surface and in the overlying colluvial deposits.

On the lower slope a thin layer of densely-



Figure 8.3: (far left) The Kilmore site: the buried A-horizon in Area A. The thin layer of stones which overlies the buried A-horizon at the lower end of the trench is interpreted as an anthropogenic feature (Photo: Clive Bonsall)

Figure 8.4: (right) The Kilmore site: timber emplacement in Trench A. Below the timber structure is a thin stoneless, waterlaid silty clay which in turn overlies the stone emplacement from an earlier (Mesolithic?) occupation phase (Photo: Clive Bonsall)

packed stones occurred between the buried A-horizon, which here overlies waterlogged gleyed subsoil material developed from glacio-fluvial gravel, and the overlying waterlaid silty deposit (Fig. 8.3). This stony layer is lithologically distinct from the underlying gravel. The stones exhibit a more uniform size range, there is a much higher frequency of angular and tabular stones, and the tabular stones are often horizontally aligned. From this evidence, it seems likely that the stones were deliberately emplaced on the contemporaneous waterlogged land surface during an early phase in the occupation of the site.

At a slightly higher level in the same part of the trench were the partially decayed remains of numerous pieces of wood. These lay horizontally on the waterlaid silt, the larger pieces exhibiting two alignments more or less at right angles to one another. Among the timbers were fragments of bark and several very large stones (Fig. 8.4). The emplacement of the timber and stones is also likely to have been associated with human occupation. AMS 14C dating of two of the timbers places this event in the Early Historic period, *c.* AD 650. Pedological evidence indicates that emplacement was broadly contemporaneous

with the inception of peat formation. The timbers are preserved because the site has been continuously saturated by a high groundwater table. This also accounts for the peaty topsoil currently found at this location.

Site history

The sequence of events suggested by archaeological and pedological investigations in Trench A may be summarised as follows:

1. Deposition of glacio-fluvial sands and gravels in the Late Pleistocene.
2. Early Holocene soil development on the gravels, with possible colluvial and windblown additions, leading to a soil toposequence of moderately well-drained shallow rankers or brown earths on sloping ground passing downslope into groundwater gley soils at the edge of a marshy depression, possibly with areas of open water beyond.
3. Anthropogenic addition of organic material, with the evidence most pronounced on the waterlogged groundwater gley soils of the lower slope.
4. Anthropogenic addition of stones to the waterlogged landsurface on the lower slope.

5. Colluvial activity/hillwash on the upper slope and deposition of waterlaid silty clays on the lower slope. The latter could either be derived from sheet erosion and deposition on the lower slope, possibly accentuated by human activity maintaining bare ground, or be a result of deposition of silt and clay in shallow water at the edge of a water body.
6. The subsequent growth of peat on the lower slope during the later Holocene could be attributed to increased wetness of the lower slope location due to a rise in the groundwater table. This has resulted in the current humic gley soil which thickens into deeper peaty soils further out into the depression.
7. During the early phases of peat formation anthropogenic addition of timber and/or other organic debris contributed to peat development, as these organic materials would have been slow to decompose under the waterlogged and anaerobic conditions then pertaining at the landsurface.
8. At this time the deposition of hillslope colluvium (predominantly by creep) was taking place on the higher sloping ground. This continued into the later stages of peat growth and extended onto the developing humic gley soil in the foot slope position.

Trench B

Trench B at the northern margin of the peat bog shows a similar sequence. No buried A-horizon was found, but this exists in well-drained brown earths observed in test pits in higher slope positions.

The earliest occupation in Trench B is represented by stone emplacements directly upon gleyed mineral soil and below a thin stoneless silty waterlaid deposit overlain by a peaty surface horizon. This suggests either deposition of hillwash eroded from upslope locations after initial occupation, or a rise of the groundwater table to allow deposition of waterlaid sediments in shallow water.

Further stone emplacements, which include burnt and fractured stones, occur near the base of the surface peaty horizon and above the silty deposit, in an equivalent stratigraphic position to the timber emplacement in Trench A. The stones here are engulfed by the base of the peaty horizon which attains a thickness of up to 0.45 m. This suggests that this lower slope

situation became wetter after occupation and has remained waterlogged to the present. Soil structure and greater decomposition of plant remains in the surface 0.18 m of the peaty topsoil indicate current seasonal drying of the soil surface.

The lithic assemblage

The assemblage comprises 3769 pieces of 'flint' (this term is used here to refer to flint and similar cryptocrystalline siliceous rocks) weighing 1.75 kg, a much larger quantity of quartz débitage (total weight 16.83 kg), and 8 pieces of volcanic glass (probably pitchstone). So far, only the flint and pitchstone artefacts have been studied.

Most of retouched pieces are flint. Small, water-worn pebbles appear to have been the primary material. The source of this material is uncertain; flint pebbles may occur locally in glacio-fluvial gravels or in shingle ridges along the shoreline, but this has yet to be confirmed.

The flint assemblage comprises both débitage and tools. A provisional classification is presented in Table 8.1 according to the definitions proposed by Wickham-Jones (1990), and Wickham-Jones and McCartan (1990). However, the microlithic component of the Kilmore assemblage does not fit neatly within the system developed by Wickham-Jones and McCartan (1990). There is considerable morphological variability within type categories, and distinctions between types are sometimes blurred with one type grading into another. For example, there is a gradation in form between scalene triangles and crescents (cf. Finlayson *et al.* 1996, 259). Similarly, the distinction between backed bladelets and rods is unclear, and they are not differentiated in this study. A few of the microliths from Kilmore could not be assigned to any of Wickham-Jones and McCartan's types, and these are grouped together as 'atypical' or 'ad hoc' forms.

The microliths are all 'narrow blade' forms (Fig. 8.5). Narrow blade technology has a very broad time span in Scotland, from before c. 8200 cal BC until the end of the Mesolithic c. 4000 cal BC. However, given its location on the edge of a former lagoon protected by a shingle spit, which probably represents the Main Postglacial Shoreline in the locality, the

<i>TOTAL ASSEMBLAGE</i>		
Type	N	%
Pebbles	9	0.24%
Chunks	300	7.94%
Cores	217	5.75%
Irregular Flakes	2701	71.51%
Regular Flakes	299	7.92%
Blades	148	3.92%
Modified	103	2.73%
Total	3777	
<i>CORES</i>		
Type	N	%
Amorphous	35	16.13%
Bipolar	165	76.04%
Discoidal	2	0.92%
Platform	15	6.91%
Total	217	
<i>RETOUCHED PIECES</i>		
Type	N	%
Edge Retouched	42	40.78%
Invasive Points	1	0.97%
Microliths	48	46.60%
Piercers	2	1.94%
Scrapers	10	9.71%
Total	103	
<i>MICROLITHS</i>		
Type	N	%
Fine Points	14	29.17%
Backed Bladelets/Rods	9	18.75%
Crescents	6	12.50%
Scalene Triangles	8	16.67%
Trapeze	1	2.08%
Atypical/Ad hoc forms	5	10.42%
Fragments	5	10.42%
Total	48	

Kilmore site is unlikely to be older than *c.* 6000 cal BC (cf. Bonsall & Sutherland 1992).

A distinctive feature of the flint assemblage is the unusually high percentage of bipolar cores. In contrast, the proportions of blades and regular flakes are comparable to those in other Late Mesolithic sites in Scotland where similar recovery methods were employed, such as Kinloch on Rùm (Wickham-Jones 1990). One explanation for this pattern is that flint was in very short supply locally, and so when platform cores became 'exhausted' they continued to be worked using the bipolar technique. This would also account for the overwhelming predominance of quartz among the lithic débitage from the site.

It would be premature to suggest that the lithic artefacts recovered from the site relate exclusively to Mesolithic occupation. There was Early Bronze Age settlement of the glacio-fluvial terraces bordering the Kilmore basin (RCAHMS 1975, 52–3, fig. 22) which may have contributed to the archaeological assemblage, although the only supporting evidence is a single tanged-and-barbed arrowhead with a broken tip, which could be explained as a hunting loss. The presence of a few pieces of pitchstone may also be related to post-Mesolithic occupation.

Conclusions

The archaeological survey work at Kilmore was undertaken primarily in order to test the hypothesis that Mesolithic *settlements* (as distinct from 'Obanian' processing sites) exist in the Oban area, and the validity of the predictive model of settlement location outlined in the Introduction. To the extent that Late Mesolithic artefacts and associated stone emplacements were found on the slopes surrounding the Kilmore basin, the test was successful. However, whether the site served

Table 8.1: *The Kilmore site: composition of the flint assemblage*

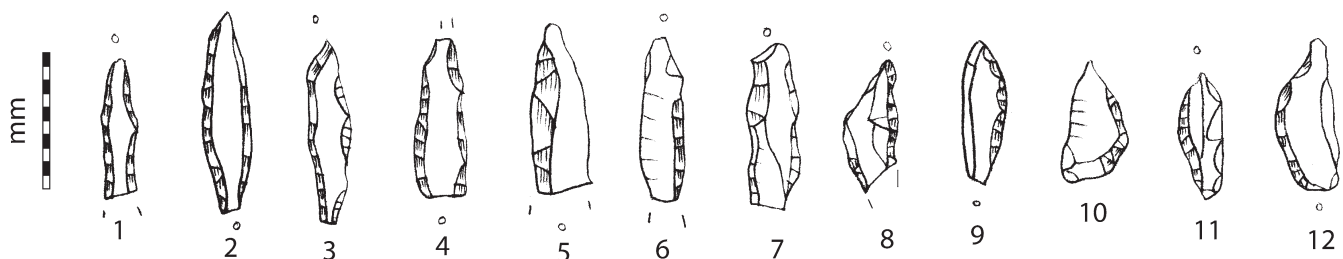


Figure 8.5: *Narrow blade microliths from the Kilmore site: 1–4 fine points, 5–7 backed bladelets/rods, 8–9 scalene triangles, 10–12 crescents*

as a residential base camp remains to be established.

The exploratory excavations at Kilmore have shown the site to possess a number of characteristics which make it suitable for further, long-term archaeological and palaeoenvironmental investigations. These include:

- extensive stratified remains of at least two phases of human occupation, both associated with a buried landsurface, separated by a period of apparent site abandonment;
- ‘structural’ remains associated with both occupation phases;
- preservation of organic archaeological materials in poorly-drained soils;
- materials suitable for the application of radiocarbon and other dating methods;
- potential for high-resolution on- and off-site environmental reconstruction and taphonomic studies, including potential for dating the initiation of peat formation in pre-existing soils in relation to sea-level movements, climate change and human occupation;
- the site also offers an unusual opportunity to study a soil toposequence related to a Mesolithic palaeo-landsurface, which will facilitate environmental reconstruction.

More work is needed to clarify the nature and chronology of Mesolithic activity at Kilmore. Among the questions still to be resolved are what was the specific function of the site (was it a residential location) and was it part of a complex of Mesolithic sites centred on the fjord-like Loch Feochan, like that found around the much smaller Oban embayment.

Postscript by Clive Bonsall

I first met Peter in 1978 at the Second International Mesolithic Symposium held in Potsdam. At that time I was a Research Assistant at the British Museum; he was an Assistant Keeper at the Ulster Museum in Belfast, and had not long completed his PhD on the Mesolithic in Ireland. It was in the course of numerous conversations in Potsdam that I came to appreciate his wisdom and his engaging sense of humour. Such was the impact of his research on the Irish Mesolithic and his growing reputation in the field of Mesolithic archaeology in the years following the Potsdam

meeting, that he was the natural choice to deliver the closing address at the Third Mesolithic Symposium, which I organised in Edinburgh in 1985. Since then, our paths have crossed on many occasions, during Peter’s numerous visits to Edinburgh and at conferences worldwide. I offer this paper in appreciation of years of friendship and Peter’s outstanding contribution to Mesolithic research.

Acknowledgements

The exploratory excavations at Kilmore were funded by Historic Scotland as part of the Oban Archaeological Project. Many people contributed to the work at Kilmore, including Patrick Ashmore, Simon Gilmour, John Gooder, Catriona Pickard, and several teams of undergraduate students from the University of Edinburgh.

Bibliography

- Anderson, J. 1895. Notice of a cave recently discovered at Oban, containing human remains and a refuse heap of shells and bones of animals, and stone and bone implements. *Proceedings of the Society of Antiquaries of Scotland* 29, 211–30
- Anderson, J. 1898. Notes on the contents of a small cave or rock shelter at Druimvargie, Oban; and of three shell mounds on Oronsay. *Proceedings of the Society of Antiquaries of Scotland* 32, 298–313
- Bishop, A.H. 1914. An Oronsay shell-mound – a Scottish pre-Neolithic site. *Proceedings of the Society of Antiquaries of Scotland* 48, 52–108
- Bonsall, C. 1996a. The ‘Obanian problem’: coastal adaptation in the Mesolithic of western Scotland. In T. Pollard & A. Morrison (eds), *The Early Prehistory of Scotland*, 183–197. Edinburgh: Edinburgh University Press
- Bonsall, C. 1996b. Lón Mór, Oban: radiocarbon dates. *Discovery and Excavation in Scotland* 1996, 136
- Bonsall, C., Robinson, M.R., Payton, R. & Macklin, M.G. 1993. Lón Mór. *Discovery and Excavation in Scotland* 1993, 76
- Bonsall, C. & Smith, C. 1989. Late Palaeolithic and Mesolithic bone and antler artifacts from Britain: first reactions to accelerator dates. *Mesolithic Miscellany* 10 (1), 33–38
- Bonsall, C. & Smith, C. 1990. Bone and antler technology in the British Late Upper Palaeolithic and Mesolithic: the impact of accelerator dating. In P.M. Vermeersch & P. Van Peer (eds), *Contributions to the Mesolithic in Europe*, 359–368. Leuven: University Press
- Bonsall, C. & Smith, C. 1992. New AMS 14C dates for antler and bone artefacts from Great Britain. *Mesolithic Miscellany* 13, 28–34
- Bonsall, C., Tolan-Smith, C. & Saville, A. 1995. Direct dating of Mesolithic antler and bone artifacts from Great Britain: new results for bevelled tools and

- red deer antler mattocks. *Mesolithic Miscellany* 16 (1), 2–10
- Bonsall, C. & Sutherland, D.G. 1992. The Oban caves. In M.J.C. Walker, J.M. Gray & J.J. Lowe (eds), *The South-West Scottish Highlands: Field Guide*, 115–121. Cambridge: Quaternary Research Association
- Burleigh, R., Hewson, A. & Meeks, N. 1976. British Museum natural radiocarbon measurements VIII. *Radiocarbon* 18, 16–42
- Breuil, H. 1922. Observations on the Pre-Neolithic industries of Scotland. *Proceedings of the Society of Antiquaries of Scotland* 56, 261–81
- Clark, J.G.D. 1956. Notes on the Obanian with special reference to antler- and bonework. *Proceedings of the Society of Antiquaries of Scotland* 89, 91–106
- Finlayson, B., Finlay, N. & Mithen, S. 1996 Mesolithic chipped stone assemblages: descriptive and analytical procedures used by the Southern Hebrides Mesolithic Project. In T. Pollard & A. Morrison (eds), *The Early Prehistory of Scotland*, 252–266. Edinburgh: Edinburgh University Press
- Hardy, K. 2001. Sand, Highland. *Discovery and Excavation in Scotland* (new series) 2, 125
- Jacobi, R.M. 1982. Later hunters in Kent: Tasmania and the earliest Neolithic. In P.E. Leach (ed.), *Archaeology in Kent to AD 1500*, 12–24. London: Council for British Archaeology Research Report 48
- Lacaille, A.D. 1954. *The Stone Age in Scotland*. London, Oxford University Press
- Mercer, J. 1968. Stone tools from a washing-limit deposit of the highest post-glacial transgression, Lealt Bay, Isle of Jura. *Proceedings of the Society of Antiquaries of Scotland* 100 (1967–8), 1–46
- Mercer, J. 1970. Flint tools from the present tidal zone, Lussa bay, Isle of Jura, Argyll. *Proceedings of the Society of Antiquaries of Scotland* 102 (1969–70), 1–30
- Mercer, J. 1971. A regression-time stone-workers' camp, 33ft OD, Lussa River, Isle of Jura. *Proceedings of the Society of Antiquaries of Scotland* 103, 1–32
- Mercer, J. 1974. Glenbarrick Waterhole, a microlithic site on the Isle of Jura. *Proceedings of the Society of Antiquaries of Scotland* 105 (1972–4), 9–32
- Mercer, J. 1979. The Palaeolithic and Mesolithic occupation of the Isle of Jura. *Almogaren* 9–10 (1978–9), 347–367
- Movius, H.L. 1940. An early post-glacial archaeological site at Cushendun, County Antrim. *Proceedings of the Royal Irish Academy* 46, 1–84
- RCAHMS (Royal Commission on the Ancient and Historical Monuments of Scotland) 1975. *Argyll: An Inventory of the Monuments, 2: Lorn*. Edinburgh: RCAHMS
- Saville, A. & Miket, R. 1994. An Corran, Staffin, Skye. *Discovery and Excavation in Scotland* 1994, 40–41
- Shotton, F.W. & Williams, R.E.G. 1973. Birmingham University radiocarbon dates VII. *Radiocarbon* 15, 451–468
- Shotton, F.W. Williams, R.E.G. & Johnson, A.S. 1975. Birmingham University radiocarbon dates IX. *Radiocarbon* 17, 255–275
- Switsur, V.R. & Mellars, P.A. 1987. Radiocarbon dating of the shell-midden sites. In P.A. Mellars (ed.), *Excavations on Oronsay: Prehistoric Human Ecology on a Small Island*, 139–149. Edinburgh: Edinburgh University Press
- Wickham-Jones, C.R. 1990. The lithic assemblage: definitions and composition. In C.R. Wickham-Jones (ed.), *Rhum. Mesolithic and Later Sites at Kinloch: Excavations 1984–86*, 57–63. Edinburgh: Society of Antiquaries of Scotland
- Wickham-Jones, C.R. & McCartan, S. 1990. The lithic assemblage: secondary technology. In C.R. Wickham-Jones (ed.), *Rhum. Mesolithic and Later Sites at Kinloch: Excavations 1984–86*, 87–102. Edinburgh: Society of Antiquaries of Scotland