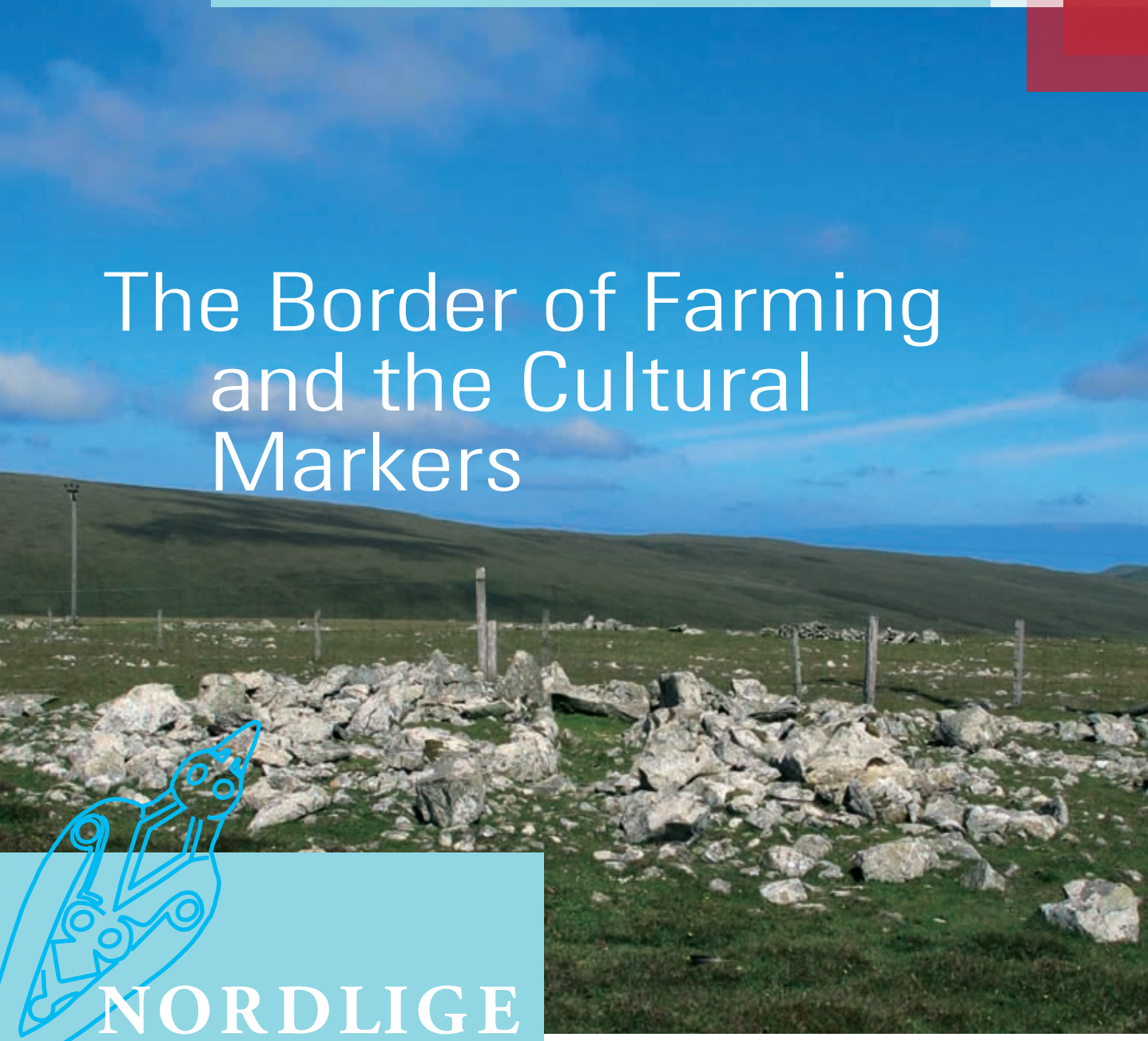
NATIONALMUSEET

The Border of Farming and the Cultural Markers



NORDLIGE VERDENER

Short papers from the network meeting in Lerwick, Shetland September 5th – 9th 2011

Edited by Ditlev L. Mahler
Northern Worlds
The National Museum of Denmark

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Front cover:
Europe's northern most still existing passage grave at Caldback, Unst, seen from the East.
Photo by Ditlev L. Mahler, summer 2011

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Northern Worlds
The National Museum of Denmark
Copenhagen 2012

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Ortholit at Pinhoulland. D. Mahler photo

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Northern Worlds
The interdisciplinary research initiative of the National Museum

Hans Christian Gulløv
Coordinator, senior researcher

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The National Museum of Denmark has initiated its most comprehensive interdisciplinary research venture so far: Northern Worlds. Between 2009 and 2013, the programme will produce and communicate new knowledge on the relationship between people and environment over the last 15.000 years in ways relevant to the present, with its notable climatic changes.

The research initiative Northern Worlds combines and coordinates the expertise of the National Museum within the disciplines of archaeology, history, ethnography, conservation and natural science (environmental history).

Northern Worlds has 20 different subprojects, which are led by researchers from the various research units at the National Museum. The projects are organized within three main research areas defined to create sufficiently broad, dynamic and interdisciplinary research environments for the topics. The project Shetland – the Border of Farming 4000-3000 BC is part of the research area:

Farming on the edge:
Cultural landscapes of the North

The expansion of agriculture into the temperate and sub-arctic zones of the planet represents a more than 6.000 year long narrative, characterized by repeated advances followed by stagnation. Farming on the edge focuses on periods and areas with large potential for the creation of new knowledge on agricultural advances and their associated social structures and ideologies. The ultimate boundaries of farming communities in

different parts of Scandinavia and the North Atlantic are explored. The project Shetland – the Border of Farming 4000-3000 BC is part of this initiative.

In economical terms, Northern Worlds is the National Museum's greatest research initiative ever. The Augustinus Foundation is the main funder of Northern Worlds. It is with pleasure that it is possible to present the second report from the network conference held in Lerwick, Shetland, September 5th-9th 2011 within the scientific project Shetland – the Border of Farming 4000-3000 BC.

Nordlige Verdener
Shetlandsprojekt

Neolithic Shetland: a view from the 'mainland'

Alison Sheridan

Introduction

In comparison with the rest of Scotland, where our understanding of the Neolithic period has advanced considerably as a result of excavation and targeted research, Neolithic Shetland has remained something of an enigma. This is largely because the focus for excavation and research in Shetland over the last quarter century has tended to be on later periods, principally the Iron Age and Viking and Norse period, and because commercial and rescue archaeology has not operated on the same scale as on the Scottish 'mainland', leading to fewer discoveries. Until recently, very little Neolithic-orientated excavation or research had been carried out since Alasdair Whittle's excavations at the Scord of Brouster settlement between 1977 and 1979 (Whittle et al. 1986) and Roy Ritchie's investigation of felsite sources and their products (R. Ritchie 1968; 1992). With the exception of Gordon Parry's West Burra survey (Hedges 1984), there had been nothing to compare with the flurry of surveying and excavation that took place during the late 1940s, 1950s and 1960s, with the intention of clarifying Neolithic settlement and funerary practices (e.g. Calder 1950; 1956; 1963; Henshall 1963).

However, there have been signs of a recent growth of interest in Shetland's Neolithic, not least because of discoveries at West Voe, Sumburgh in 2002, 2004 and 2005 when Mesolithic and Neolithic middens, exposed through coastal erosion, were investigated (Melton 2005; Melton & Nicholson 2004 and see below). That small-scale excavation sparked Bradford University's research project on the Mesolithic-Neolithic transition in Shetland, which has included palaeoenvironmental investigation near West Voe and an osteological and isotopic analysis of the human remains from the cist found at Sumburgh Airport in 1977 (Edwards et al. 2009; Gilmore & Melton

2011; Melton 2008; 2009; Melton & Montgomery 2009). Renewed interest in the exploitation of felsite for the manufacture of axeheads and knives (Ballin 2011a; 2011b) has led to the current research project as outlined by Ballin and Cooney elsewhere in this volume, while the excavation of sites of probable Neolithic (and later) date on the Hill of Crooksetter near Sullom Voe in 2010 and 2011, in advance of the construction of a gas processing plant by Total E&P UK, promises to produce important new evidence regarding Neolithic settlement in that part of Shetland (Ballin 2011c; Brend 2010; Brend & Barton 2011). Furthermore, in the last three years there have been three initiatives that focus specifically on Shetland's Neolithic: the first is part of the Scotland-wide ScARF (Scottish Archaeological Research Framework) Project, undertaken for Historic Scotland by the Society of Antiquaries of Scotland *(http://www.socantscot.org/scarf.asp)*, and involves a critical appraisal of our current state of knowledge and outstanding research questions. The second is the development of *The Neolithic Heart of Shetland Heritage Strategy*, undertaken by AOC Archaeology for Viking Energy in 2010 and relating to plans for a major wind farm development around Voe in Central Mainland *(http://www.shetland.gov.uk/planningcontrol/documents/AppendixA13.6TheNeolithicHeartofShetlandHeritageStrategy.pdf)*.

If this controversial development were to go ahead, this strategy would include the excavation of several cairns and settlements of presumed Neolithic date. The third initiative is, of course, the Nationalmuseet's *Farming on the Edge: Cultural Landscapes of the North* Project (Mahler & Andersen 2011), which has given rise to this volume and has acted as a catalyst for fresh research, including detailed field survey of several settlements and related land divisions by Ditlev Mahler. This work complements the survey work undertaken by Val Turner (Turner 2011) and the aerial photographic work undertaken by David Cowley of the Royal Commission on the Ancient and Historical Monuments of Scotland in 2010 at Sandwick Bay and the Walls area (RCAHMS 2010: 194); the results of all of this survey work need to be followed by excavation in order to determine how many of the sites are of Neolithic date. All these developments mean that the time is ripe to assess what we can say, and what we need to find out, about this fascinating but under-researched part of Shetland's past. This contribution constitutes an initial attempt to do just that.

Beginnings: the Earliest Neolithic and prior human activity

While it has been claimed, on palynological grounds, that there was human presence in Shetland as early as c. 6000

BC (Edwards et al. 2009: 117), the earliest unequivocal evidence comes from the aforementioned West Voe site (see above for references) and consists of a shell midden, comprising mainly oyster shells along with bones of seals and birds, that lay at the bottom of the sequence of deposits. Shell and charcoal from this lowest, Mesolithic, midden produced radiocarbon dates (with the shell dates calibrated with regard to the marine offset) of between 4200 and 3600 BC (see Melton 2009 for details). The fact that this site was discovered as a result of coastal erosion reminds us that the record for early human activity in Shetland is likely to have been truncated, not only through erosion but because of a 9 metre sea level rise since c. 5500 BP (as measured near Lerwick, and as attested by submerged logs of 6th millennium BC date found in Lerwick harbour: Melton 2009: 185; 2010).

Other evidence for Mesolithic activity is more equivocal, as Edwards et al.'s 2009 discussion of the palynological record makes clear; and, as for the oft-cited Mesolithic flint core axehead from Fair Isle (Cumming 1946), there remains uncertainty about its status (e.g. Saville 2000). Since so much has been written about this object, it would be prudent to cite Saville's comments: '...the Fair Isle implement is not as typologically explicit as one would wish, since in this case it lacks a clear cutting edge...Nevertheless, the consensus among those who have studied this implement is that it is a Mesolithic type, and the question of its provenance is critical. This was a surface find "embedded with other pebbles in a patch of bare ground from which the peat had been eroded" on "the summit of a knoll...about 800 yards west-north-west of the naval huts at North Haven" (Cumming 1946). One would have to speculate quite hard to produce circumstances in which this find could be a modern import, and yet there is absolutely no other evidence for human activity in Fair Isle before the Neolithic...For the moment the conclusion must continue to be that "it would seem rash to suggest this as an indigenous Mesolithic find" (Saville 1994)' (Saville 2000, 94–5).

The evidence relating to the earliest Neolithic presence in Shetland is similarly sparse and, in some cases, problematic. Indeed, defining what is meant by 'Neolithic' in any particular area can be fraught with difficulties since we know, from elsewhere in Europe (e.g. southern Scandinavia), that there can be selective adoption of traits associated with a farming way of life – such as the use of pottery – without switching subsistence strategies from hunting/gathering/fishing. Be that as it may, the earliest evidence in Shetland for any trait normally associated with a Neolithic way of life

consists of just a handful of small, featureless sherds (see below) which were found, along with bones from 'a large terrestrial ungulate' (species unspecified) and limpet and mussel shells, lying at the top of the aforementioned oyster midden at West Voe. A radiocarbon date from the mammal bone (OxA-14242) indicated that these were deposited c. 3700–3600 cal BC[1]. (See Melton 2009 regarding the dating of this site.)

The other evidence that has been cited to support the idea of a Neolithic presence in Shetland prior to c. 3600 BC is more problematic. Firstly, while Edwards et al. (2009) argued that a long phase of forest reduction from c. 3910 BC at Loch of Gards could relate to agricultural activities, no cereal-type pollen was found in the sampled material and this interpretation can only be provisional. Secondly, a single date of 5050±85 BP (4030–3660 cal BC, CAR-253), obtained from a mixed sample of charcoal (described as 'birch, etc.': Whittle et al. 1986: 37, table 1) from House 2 at Scord of Brouster, poses problems. The sample was believed to relate to the initial use of the stone house, and yet it is significantly earlier than the four dates relating to the pre-house occupation and to the construction of the house (ibid.). No explanation for this anomaly was offered and it may well be that this represents residual material from an earlier episode of burning, not necessarily anthropogenic in nature.

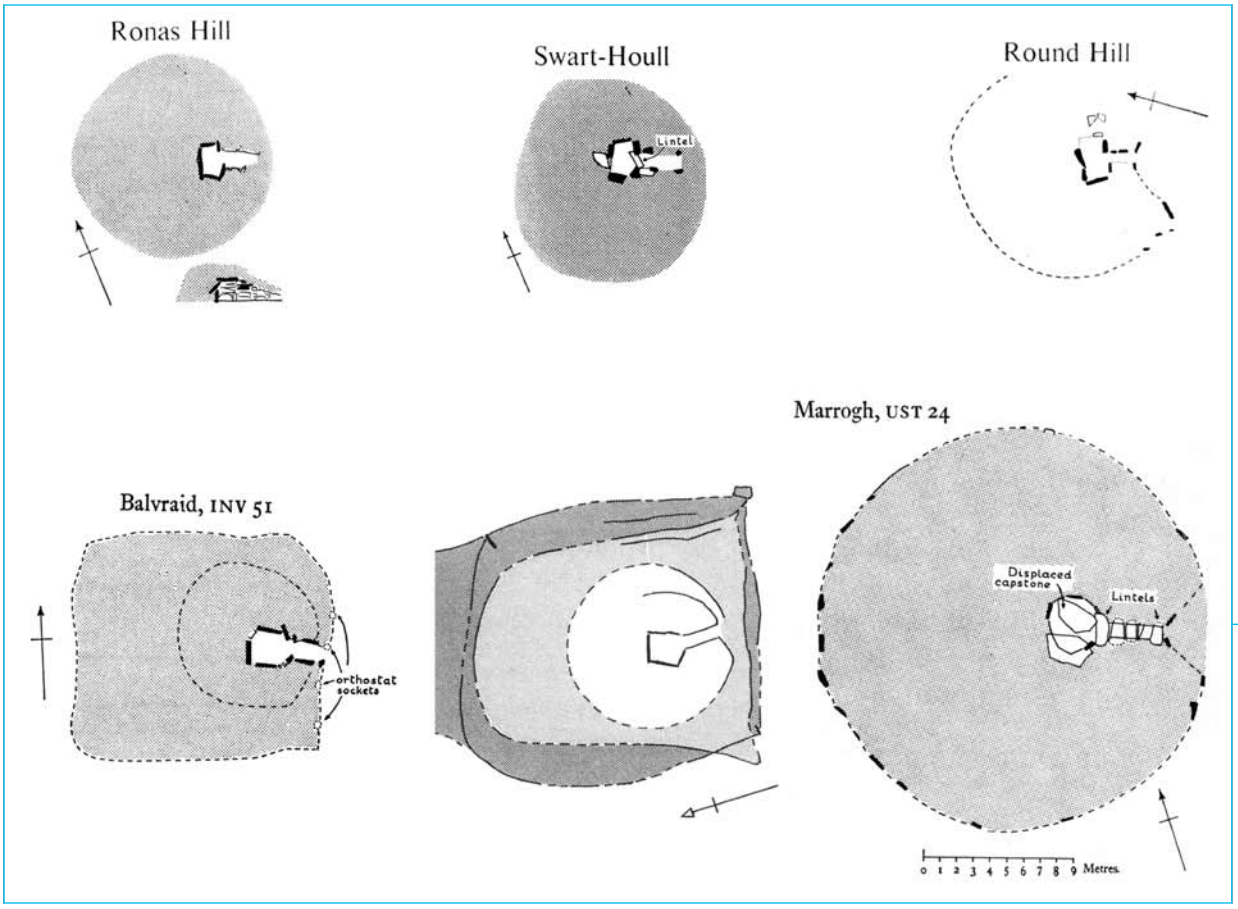
However, what can be said, from taking a broader perspective of late 5th and early 4th millennium developments, is that Shetland does not seem to have formed part of either of the two initial strands of Neolithisation that have been identified on the Scottish 'mainland'. As this author has argued elsewhere (e.g. Sheridan 2010), these appear to have involved small-scale migration of farming groups from northern France, followed by acculturation of the indigenous hunter-gatherer-fisher communities. The first strand featured movement up the Atlantic façade from the Morbihan area of Brittany at some time between c. 4300 and 4000 BC, and is most clearly attested at Achnacreebeag, Argyll & Bute, where Breton-style pottery was found in a Breton-style megalithic monument (featuring a closed chamber succeeded by a simple passage tomb, the pottery having been found in the latter: J.N.G. Ritchie 1970).

This 'strand' of Neolithisation gave rise to the tradition of building passage tombs in Scotland and Ireland. The second strand – the so-called 'Carinated Bowl [or 'CB'] Neolithic' – is most likely to have originated in or around the Nord-Pas de Calais region in the far north of France, and will have arrived as far north

[1] Note: with the exception of the West Voe dates (where Nigel Melton's original marine effect-corrected calibrations are cited), all radiocarbon dates cited here have been calibrated using OxCal 4.1 and are cited at their 95.4% probability value, rounded to the nearest decade.

as Caithness at some time between 4000 and 3800 BC. (See Sheridan 2007a and 2010 for a description of its key characteristics, and Sheridan 2012 for a review of the recent Bayesian modelling of the available dates for the initial CB Neolithic by Whittle et al. 2011: chapter 14 and fig. 14.177.) Despite their small size and lack of diagnostic characteristics, the handful of sherds from West Voe cannot comfortably be assigned to either the Breton ceramic tradition or to the earliest form of Carinated Bowl pottery, although the latter does encompass some vessels of comparable thickness and coarseness.

There is some evidence to suggest that the Neolithisation of Shetland could have occurred as part of a secondary expansion of the farming lifestyle and its associated traditions from western Scotland, perhaps during the late 38th or 37th century BC. This expansion is at-



tested by the spread of passage tomb building to the Western Isles, the northern mainland of Scotland and the Northern Isles, as reflected in the distribution of what Audrey Henshall has described as 'Orkney-Cromarty' (or 'Orkney-Cromarty-Hebrides') passage tombs (Henshall 1963: 304–57 and 495–534; cf. Davidson & Henshall 1991: fig. 2 and 80–85). As suggested above, its origins lie in the tradition of passage tomb building as established by the Breton, Atlantic façade strand of Neolithisation. The evidence that this expansion reached as far as Shetland consists principally of the passage tombs of relatively simple design on Shetland, and in particular the examples on Ronas Hill and Swart-Houll with their simple polygonal chambers, which show some points of similarity of design with, for example, Tulach an t'Sionnaich in Caithness (Fig. 1). It is unfortunate that no dating evidence is available from the Shetland tombs, and one priority for future fieldwork could be their investigation. The other piece of evidence that could be put forward in support of this hypothesis is the discovery, somewhere in Shetland, of two axeheads of porcellanite from northeast Ireland (Clough & Cummins 1988: 240, SHE 3 and R. Ritchie 1992: 216). It is known that axeheads of this material travelled northwards along the Atlantic façade of Scotland – as attested, for instance, by a complete axe found at Shulishader in Lewis (Sheridan 1992), its rosaceous wood haft radiocarbon dated to 4470±95 BP (3490–2910 cal BC; cf. Sheridan 1986). The arrival of these axeheads in the hands of immigrant farmers from western Scotland is a possibility; the sources of porcellanite are known to have been exploited during the first half of the 4th millennium.

Furthermore, if this hypothesis regarding the secondary expansion of Neolithic practices and traditions is correct, then one can add that there is no evidence to suggest that it arrived in Shetland via Caithness or Orkney; instead, a direct arrival from western Scotland is a distinct possibility. The reason for this claim – which is an important proposition since it informs our understanding of the genesis and subsequent development of the Shetland Neolithic – is that there are no signs of the stalled chamber design that forms part of the earliest megalithic tradition in both Caithness and Orkney; similarly, there is no trace of the subsequent (probably c. 3500 BC)

Fig. 1: Possibly the earliest megalithic monuments in Shetland, and *comparanda*. Top left: Ronas Hill; middle, Swart-Houll; right, Round Hill; bottom left, Balvraid, Highland (Inverness-shire); middle, Tulach an t'Sionnaich (first phase structure), Highland (Caithness); right, Marrog h, North Uist. Plans from Henshall 1963; Henshall 1972; and Davidson & Henshall 1991, reproduced with permission of Edinburgh University Press.

process of competitive aggrandisement in monument building, as seen in the massive horned cairns of both these regions (e.g. at Camster Long, Caithness: Davidson & Henshall 1991: plate 21; cf. Davidson & Henshall 1989: fig. 31 for their distribution).

Developments in Shetland c. 3600-3300 BC: Early to Middle Neolithic

In the same way that much remains to be discovered about the initial Neolithisation of Shetland, so the narrative for succeeding periods is patchy, and certain misconceptions need to be dispelled.

Positive evidence for activity between c. 3600 and c. 3300 BC has been obtained at West Voe and on Shurton Hill; additional evidence, from Modesty, will be discussed below. At West Voe, the aforementioned episode of activity featuring the deposition of pottery and associated bone and limpet shells seems to have been followed by an episode of sand deposition, probably representing a storm c. 3600–3500 BC (Melton 2009, 188). Thereafter, a cow tooth and some cockle shells were deposited, one of the latter being radiocarbon dated (allowing for the marine effect) to c. 3500–3300 cal BC (OxA-14161: Melton 2009: 188). Possibly around the same time, a pit was dug, with a cockle shell from that pit producing a date of c. 3500–3100 cal BC (OxA-14180: ibid.); and then a stone wall was constructed immediately above that pit. Further north, on the Hill of Shurton near Lerwick, organic material – presumably charcoal – preserved in sediment immediately underlying a long, sub-peat stone wall produced a radiocarbon date of 4740±50 BP (3640–3370 cal BC, UB-2122: Whittington 1978. Note that the precise nature of the dated sample is not specified in the publication). Whittington argued that the concentration of charcoal at this depth could have related to moor-burning to maintain pasture, and this is indeed a possibility; he also noted that the pollen record revealed that the landscape around the time when the wall was built was a heathland, virtually free of trees. Another palynological study undertaken during the 1970s, at Muraster, claimed a mid-4th millennium date for the establishment of a continuous record for ribwort plantain *(Plantago lanceolata)*, indicating an open environment and possibly farming activity (Jóhansen 1976; 1985).

A new and very important piece of evidence for activity that may belong within the third quarter of the 4th millennium BC has just been obtained, for the *Farming on the Edge* Project. This is the radiocarbon date of 4580±35 BP (3500–3110 cal BC, SUERC-37997), obtained from charcoal of short-lived *Maloideae* species associated with a deposit of nine felsite axeheads and 13 polished Shetland

knives, found in a long 'knoll' – probably a humanly-made mound, c. 18 x 27 metres in size – at Modesty, near Bridge of Walls (Figs. 2–5; Kinghorn 1895). The material was acquired by the (then-named) National Museum of Antiquities of Scotland in 1894. This is a particularly interesting assemblage for several reasons – not least because it is the only well-dated instance of axeheads and knives found together. The knives are in varying degrees of completeness, and not all are fully polished. Eight out of the 13 knives (Fig. 2) show clear sign of retouch along one edge, with no obvious evidence of subsequent wear (such as might be expected had they been reused as scrapers). This feature has been noted on some other Shetland knives (Mahler 2010); whether it represents a re-sharpening of a worn cutting edge, or a deliberate act of 'decommissioning', is a question that requires further investigation, by experimental archaeology and microwear analysis. Among the axeheads (Fig. 3) are two (marked AC 494 and AC 500) which may well be re-used fragments of larger axeheads, suggesting that they were not new when deposited; another (AC 495) may have been deliberately broken, and possibly slightly burnt, in antiquity. As for the rest, the largest (c. 240 mm long, AC 493) is also the finest, and another (AC 508, c. 195 mm long) is relatively fine; but most of the others could fall within the category

Fig. 2: Shetland knives of felsite from Modesty. Photo: National Museums Scotland.

Fig. 3: Axeheads of felsite from Modesty. Photo: National Museums Scotland.

of 'workaday' axeheads, and several of these retain natural irregularities in their surface.

Remains of three large, coarse pots of steatitic clay, ranging in estimated rim diameter between c. 270 mm and c. 370 mm, were also found in the 'knoll' (Fig. 4). One of these was reportedly found around 18 inches (c. 46 cm) from one of the axeheads (Fig. 3, Reg. No. NMS X.AC 508), crushed flat, and partly covered by what sounds to be a stone quern; a rubbing stone found nearby fitted the hollow in the quern's upper surface. (These stone objects, which were found 'embedded in the charred wood' – the same level as the axeheads, and presumably also the knives – were unfortunately not acquired by the Museum.) Sherds of the other two pots were also found in the 'knoll', but their spatial relationship to the axeheads and knives was not recorded. All three vessels contain appreciable amounts of burnt-out grass, which will have been used as a filler; in

Fig. 4: Potsherds from Modesty. Photo: National Museums Scotland.

Fig. 5: Lumps of burnt potter's clay (right) and fragments of carbonised roundwood (left) from Modesty. Photo: National Museums Scotland.

other words, to employ a commonly-used term, they had been grass-tempered. They have squared-off rims and appear to have been uncarinated, although there are hints of a slight carination on one sherd. Encrusted organic residue on the interior of the lower part of one pot, together with burning of its exterior, shows that it had been used for cooking; and the presence of repair holes in several sherds shows that at least two of these pots had been used for some time when deposited. Also present was one large and one or two smaller lumps of burnt potter's clay (Fig. 5.1), kneaded into dough-shaped pieces (and retaining finger impressions). These did not contain traces of burnt-out grass, although the lithic inclusions are comparable with those in the vessels.

The layer of 'charred wood' mentioned by Kinghorn is represented in the Museum collection by five fragments of roundwood (Fig. 5.2), of which one (of *Maloideae* species) provided the radiocarbon date. That fragment, plus two of the others, was identified by Dr Susan Ramsey, who found that the others were of birch *(Betula)*.

Overall, the find from Modesty is intriguing, and it raises the question of the nature of the deposit. The range of artefactual material present, and the condition of the axeheads and knives, sets this find apart from the hoard finds such as the Shurton Brae knife hoard, and the presence of cooking pots, potter's clay and a quern and rubber all point towards possible domestic activity. Clearly there had been a considerable amount of burning at this site, which led to the formation of a 4-5 inch (c. 10–13 cm)-thick layer of charred wood resting on the subsoil, and a slightly thicker layer of 'yellow peat ashes' above this. It would be worth re-investigating the mound, if any of it remains; the householder had disturbed it in making a garden for his house.

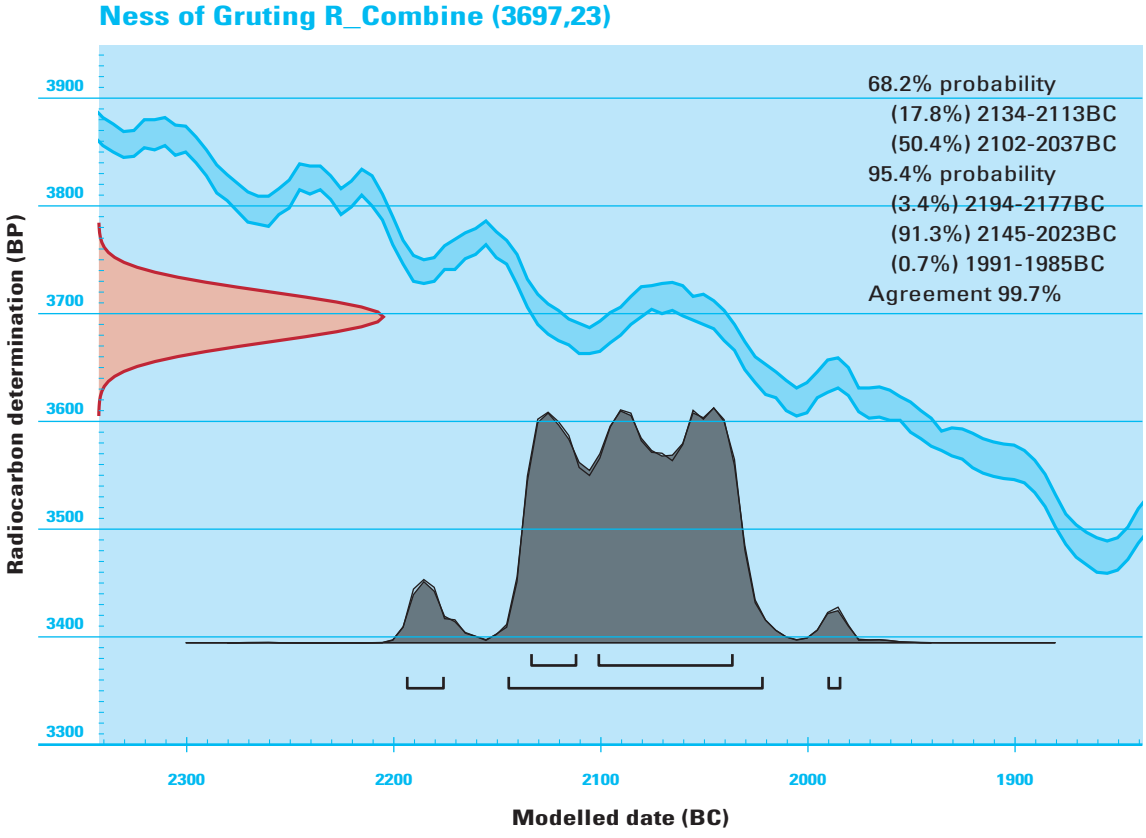
The relatively broad spread of the Modesty charcoal's calibrated date is due to the shape of the calibration curve at this point, although the fact that at the 68.2% probability level of the calibrated date range lies within 3370–3330 cal BC suggests that we are perhaps more likely to be dealing with activity within the third, rather than the last, quarter of the millennium. This date helps to dispel the uncertainty about the chronology of felsite exploitation, which had hitherto relied on observations about the discovery of fragments of felsite knives or axeheads in later sites, e.g. at Stanydale (Calder 1950), Tougs (Hedges 1986: 19 and see p.30 for further examples) and Scord of Brouster (Ballin 2005: 15 and illus. 24. Unfortunately, however, the provenance of this object within the Scord of Brouster

settlement was not recorded in detail: Ballin and Whittle pers. comm.). However, many more dates are required in order to establish the duration of felsite exploitation, and these should emerge from the planned fieldwork by Cooney et al. (as detailed in this volume). As had previously been noted (e.g. P. R. Ritchie 1968; 1992), virtually all of the products of this exploitation remained in Shetland, with only a very few reaching Orkney or mainland Scotland (P. R. Ritchie 1992: 216; note that the Shetland knife purported to be from 'Lanark' is actually from Lerwick: Fojut 2006).

One misconception about activity at this time must be dismissed. It had previously been claimed that House 1 at Ness of Gruting was of Neolithic date, on account of formal and decorative similarities between some of its pottery and Hebridean Neolithic pottery (Calder 1956: 356). Had these similarities been borne out by the other evidence from that site, then by analogy with sites containing dated Hebridean Neolithic pottery (such as Eilean Domhnuill, Loch Olabhat, N. Uist: Armit 2003; cf. Sheridan 2008), it should date to the time-frame under investigation here. However, as Audrey Henshall pointed out (Henshall 1956, 383), the ceramic assemblage – which appeared to form a unified whole, rather than the result of multiple phases of activity – also includes several vessels that can clearly be identified as Beaker domestic pottery (e.g. HD 930, HD 938 and HD 951a: Calder 1956: fig. 17). Furthermore, a recent find of pottery with herringbone-incised decoration similar to that seen at Ness of Gruting, found at Ha'Breck on Wyre in Orkney, has been dated to the end of the third/beginning of the second millennium BC (Antonia Thomas pers. comm.). Further evidence indicating that the Ness of Gruting structure post-dates the Neolithic period is the set of four radiocarbon dates from the cache of carbonised barley (of naked and hulled varieties), found inside the wall of the structure (Table 1). Two of these dates have been obtained by the *Farming on the Edge* Project; one was undertaken by the Groningen University laboratory in 1970, having been submitted by Stuart Piggott, and the fourth was obtained from the British Museum laboratory, having been submitted c. 1969 by R. B. K. Stevenson of the (then-named) National Museum of Antiquities of Scotland (Barcham 1980). It is clear from these that the Ness of Gruting structure was constructed c. 2200–2000 BC, and therefore dates to what is, elsewhere in Britain, termed the Early Bronze Age. As will be clear from the discussion below, it may be that many structures in Shetland that had initially been assumed to be of Neolithic date are actually of Chalcolithic or Bronze Age date.

Table 1: Radiocarbon dates for carbonised barley grains, Ness of Gruting, calibrated using OxCal 4.1.7 (using IntCal09, with atmospheric correction) and rounded to the nearest decade. Note: 1. the very large standard deviation in the BM-441 date reduces its usefulness. 2. GrN-6168 and BM-441 were determined before d13C values were routinely measured. 3. The dates can be combined, using OxCal 4.1.7, to produce a date of *3697±23 BP, **2140–2030** cal BC at 68.2% probability, **2200–1980** cal BC at 95.4% probability* (see diagram).

Lab No.	Barley type	Date BP	$\delta^{13}C$	Date cal BC, 68.2% probability	Date cal BC, 95.4% probability	When determined
AAR-15646	Hulled	3736±35	-20.8±0.6	2200–2050	2280–2030	2012
AAR-15647	Naked	3668±35	-21.6±0.6	2130–1980	2190–1950	2012
GrN-6168	Hulled & naked	3710±55	Not measured	2200–2030	2290–1950	1970
BM-441	[Presumably] hulled & naked	3514±120	Not measured	2020–1690	2200–1530	c1969



Among the many outstanding questions concerning this period of Shetland's prehistory is that of what kind/s of funerary monument was/were being constructed (see below). In particular, the date at which the trefoil-chambered megalithic monuments (such as the Phase 1 structure at Vementry: Fig. 6) were constructed remains unknown, although the structural history of that particular monument suggests that it pre-dated the practice of constructing heel-shaped cairns.

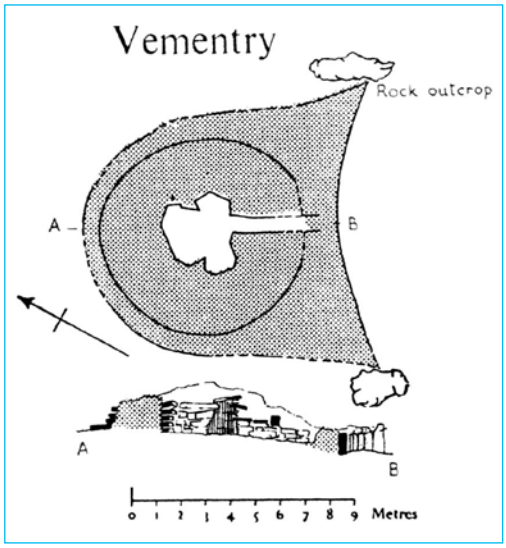


Fig. 6: The passage tomb at Vementry, showing its original circular cairn and its (presumably) subsequent transformation into a heel-shaped cairn. After Henshall 1963, reproduced with permission of Edinburgh University Press.

Developments in Shetland c. 3300-3000 BC: Middle Neolithic

The picture becomes a little clearer at this point, since we know that the communal cist at Sumburgh Airport dates to this period (Hedges & Parry 1980; Melton 2008; Melton & Montgomery in press), as does the settlement activity pre-dating stone Houses 1 and 2 at Scord of Brouster (Whittle et al. 1986, table 1) and, perhaps, the earliest settlement evidence at Jarlshof (Hamilton 1956, 12-13; Dockrill et al. 2004) – but see below regarding its dating. Similar pottery, featuring undecorated, thin-walled uncarinated bowls, was found at all three sites (Fig. 7) and appears to represent a stylistic development local to Shetland. Pottery of similar shape occurs among the artefactual finds recovered on the Hill of Crooksetter. Furthermore the aforementioned vessels found at Modesty are not dissimilar to these in overall shape, despite having flatter rims and being larger and coarser, and they also share the use of grass as a filler with pottery from the Sumburgh cist (pot 2) and from Jarlshof (Hamilton 1956, 12-13 and fig. 6). As pointed out above, the calibrated date range for the Modesty hoard extends into the period under consideration here. As with the style of this pottery, the use of grass appears to be a technical development peculiar to Shetland, not being characteristic of Neolithic pottery elsewhere in Scotland.

Melton and Montgomery's work on the human remains from the Sumburgh cist has produced seven new radiocarbon

dates, in addition to the one published by Hedges and Parry in 1980 (i.e. 4395±55 BP from unburnt bone, 3330–2900 cal BC, GU-1075 – not applying the increase in standard deviation as recommended by Ashmore et al. 2000 when dealing with old determinations). The new dates appear to extend the overall date span to c. 3500–3000 BC, although this is no doubt due to the plateau in the calibration curve. Whether Bayesian modelling could help to constrain the scatter here is unclear. Janet Montgomery's isotopic analysis of the human bones from the cist has, interestingly, identified evidence for the consumption of marine resources (Melton & Montgomery 2009) and this may well constitute the earliest dated example of this dietary characteristic in the Scottish Neolithic, contrasting with the picture obtained for Neolithic human remains elsewhere in Scotland. (See Schulting et al. 2010 for the most recent review of this evidence.)

At Scord of Brouster, the evidence predating House 1 (labelled as 'phase 1': Whittle et al. 1986: 15–19) consists of an anthropogenic layer including three hearths and a drainage gully. Three radiocarbon dates – two from charcoal of 'birch, etc.', the third of birch – produced two (CAR-244–5) that calibrate to 3350–2930 and 3340–2710 cal BC respectively, and one (CAR-243) that calibrates to 2880–2490 cal BC (Whittle et al. 1986, table 1; once again, no adjustment has been made to the standard deviation values). It would appear that CAR-243 is an outlier. The evidence pre-dating House 2 (ibid., 5–8) consists of a dark soil layer with local concentrations of ash and charcoal, together with possible stakeholes and postholes suggesting an oval structure. Three radiocarbon dates (all from 'birch etc.' charcoal, one including charred barley) produced results broadly comparable to those from CAR-244–5 (namely 3370–2930, 3350–2930 and 3500–3020 cal BC, CAR-249–251 respectively, ibid.: table 1). A date ostensibly relating to the construction of House 2 (CAR-252) is virtually identical to these and some doubt must be cast on whether it does actually date its construction, since the House 2 ceramic assemblage looks to be Beaker domestic pottery (ibid.: figs. 54, 55).

The evidence from Jarlshof comes from the excavations undertaken by Gordon Childe in 1937, where the pottery from Midden III and occupation layer III included grass-tempered pottery which was 'quite distinct from the wares found in the later levels and houses and seems to be a new variety with vaguely neolithic affinities' (Hamilton 1956, 13). Childe had remarked that this pottery 'has a soapy feel' (Childe 1938: 360) – a characteristic shared with the Modesty

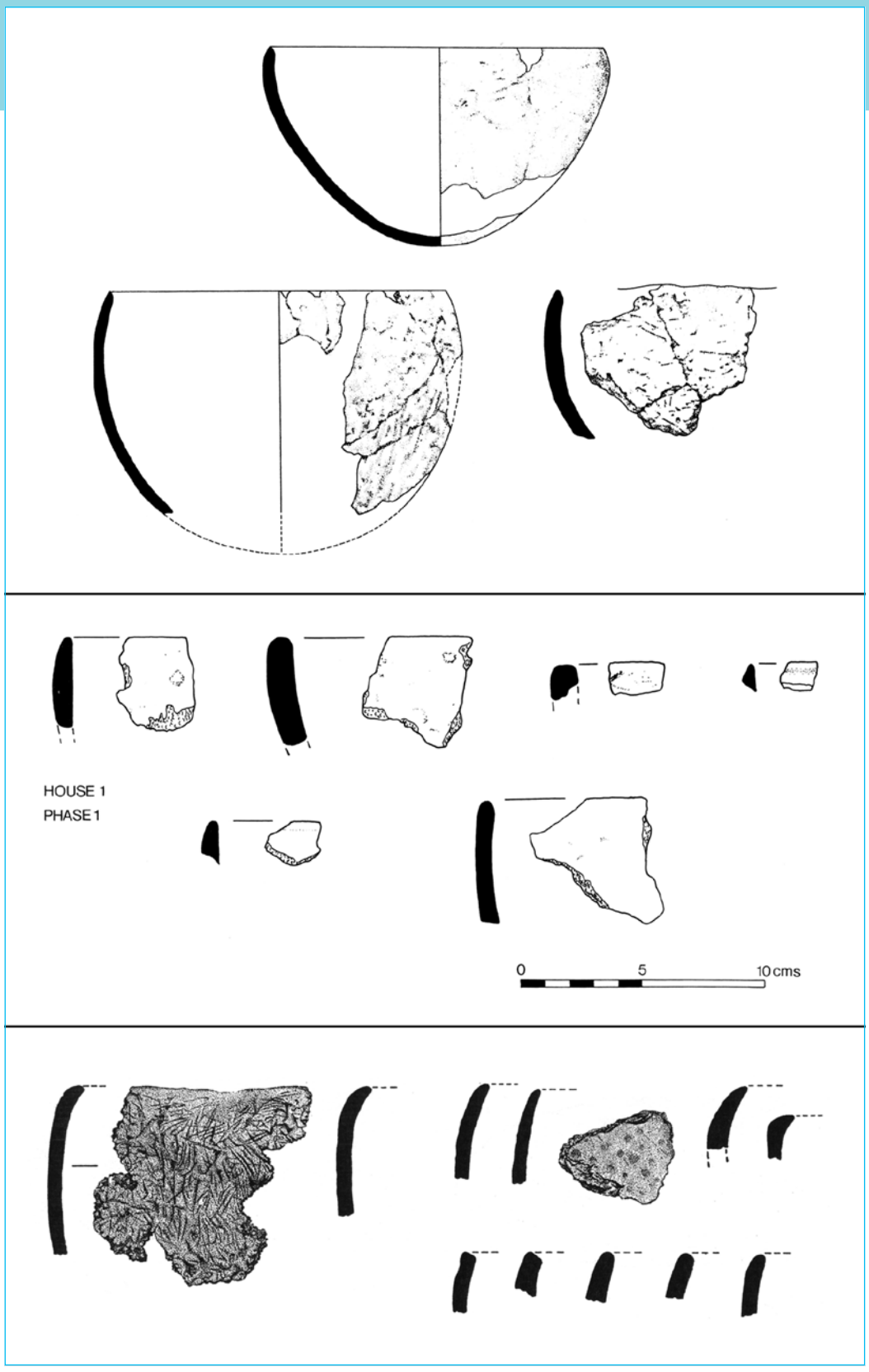


Fig. 7: Undecorated, uncarinated bowls of definite and suspected Middle Neolithic date from the Sumburgh cist (top), from Scord of Brouster (middle) and from Jarlshof (bottom).

From Hedges & Parry 1980; Whittle et al. 1986 and Hamilton 1956; various scales.

vessels. He also noted that some sherds appeared to have jabbed decoration. Further excavations undertaken by Steve Dockrill and Julie Bond in 2004, designed to elucidate the nature of agricultural activities among these early inhabitants of Jarlshof, located what was believed to be Childe's Middens II and III, and produced radiocarbon dates, from charred barley grains, of 3455±35 BP (1880–1690 cal BC, GU-12916) and 3370±35 BP (1750–1540 cal BC, GU-12915) for the lower midden (MIII) and of 3260±35 BP (1610–1500 cal BC, GU-12914) for the upper midden (MII) (Dockrill & Bond 2009: 50). *Prima facie* this would appear to place the MIII activity within the Early Bronze Age; further dating, of Childe's bone finds from MIII, would be required in order to check this since the pottery does not resemble Early Bronze Age pottery from Shetland. (This dating can be undertaken since the finds are in the National Museums Scotland collections.)

Whether the felsite sources continued to be exploited at this time remains to be demonstrated; the date from Modesty has also been discussed above. Furthermore, the knowledge that a communal cist was in use at this time raises the question of whether chamber tombs were also being constructed or used; this must remain a research question for future excavation.

Developments in Shetland c. 3000-2500 BC: Late Neolithic

The presence of seven cushion maceheads in Shetland (Fig. 8.1) – a distinctive type of object, with a wide distribution in Britain but with concentrations in the Northern Isles and the Thames valley (Gibson 1944; Roe 1968; 1979; Ritchie 1992; Simpson & Ransom 1992: no. 58) – indicates that Shetland was in contact with areas to the south during this period. That cushion maceheads date to the first half of the third millennium is indicated both by radiocarbon and by contextual evidence. At Dorchester-on-Thames (site II), Oxfordshire, an antler pick from the primary fill of the ditch surrounding a grave containing a short cushion macehead produced a date of 4230±50 BP (2920-2630 cal BC, BM-4225N; Hey et al. 2011: 309 and fig. 12.42) while at Stonehenge, another example that had been used as a grave good for a deposit of cremated bone is likely to date to between *3030-2880 cal BC* and *2570–2400 cal BC*, to judge from Parker Pearson et al.'s Bayesian-modelled dates for cremated bone retrieved from Hawley's excavations (Parker Pearson et al. 2009. The bone with which the macehead had been buried is among an undifferentiated mass of cremated bone that had been excavated from the ditch and the Aubrey Holes and subsequently redeposited by Hawley in Aubrey Hole 7). Contextually, the discovery of this artefact type at three Grooved

Fig. 8:
Top: cushion macehead, Shetland (Shetland Museum, Reg. No. ARC 65223; 130 x 40 mm max dimensions); bottom: pestle macehead from Flemington, Weisdale (Shetland Museum, Reg. No. ARC 74123, 107 x 67 mm). Photos: Shetland Museum.

Ware-associated sites in Orkney – Ness of Brodgar, Skara Brae and Barnhouse – is compatible with a date within the overall bracket c. 3100–2600 BC (extending as late as c. 2300 BC at Ness of Brodgar), with the fragment found at Barnhouse being likely to belong towards the beginning of this date bracket, and that found in the uppermost midden at Skara Brae likely to belong towards its end.

Incidentally, it should be noted that a claim that a cushion macehead found at Knock, in Lewis may have been made from riebeckite felsite, and thus had been an export from Shetland – a claim treated with caution by Roy Ritchie (P. R. Ritchie 1968: 132) – can now be discounted, since thin-sectioning has shown it to be of calc-silicate hornfels from Creag na Caillich near Killin (Sheridan 1992: 197). A second example, found in Fife (NNMS X.AH 112), had also been claimed as a potential Shetland export, and once again, Roy Ritchie had expressed caution. This rock is clearly not of Creag na Caillich rock, nor does it macroscopically offer a close resemblance to Shetland felsite; petrological analysis would be required to determine its identification and provenance.

The two pestle-shaped maceheads from Shetland (Fig. 8.2) could date to this period as well – perhaps nearer to 3000 BC than to 2500 BC – since other examples from Late Neolithic contexts elsewhere are known, e.g. in the large passage tomb at Knowth, Ireland. However, an additional, much later use of this form of macehead is attested by the miniature example found in a child's grave, associated with a Food Vessel, at Doune, Perthshire; by analogy with a miniature battle axehead found in another child's grave nearby, this may well date to c. 1800-1600 BC (McLaren 2004).

While the maceheads indicate contact with the wider world, there is no evidence that Shetland participated in the complex of activities associated with the use of Grooved Ware: there is nothing in Shetland that remotely resembles the henge at the Stones of Stenness, or the remarkable 'temple complex' at the Ness of Brodgar, for example. Indeed, there is only one claimed example of Grooved Ware pottery in Shetland – a large vessel with applied horizontal cordons, represented by sherd 404 (and perhaps also 147.1 and 535), from Sumburgh (Cleal & MacSween 1999: 203; Downes & Lamb 2000: fig. 27). Sherd 404 had been found in a Late Bronze Age/Early Iron Age house and was assumed to be redeposited. Whether this really is Grooved Ware, rather than a hitherto unrecognised form of first millennium BC pottery, or redeposited pottery from another period, is a moot point; as the excavators pointed out, Shetland suffers from the lack of a clear ceramic sequence (Downes & Lamb 2000: 60). It could also be noted that while the Ness of Gruting assemblage includes some sherds with a passing resemblance to Grooved Ware (sherd NMS X.HD 945), the Early Bronze Age date of that assemblage now seems unimpeachable.

Other evidence for activities during the first half of the third millennium comes from Scord of Brouster, where the radio-

carbon dates suggest that House 1 could have been built at this time (Whittle et al. 1986: table 1). If that is the case, then the associated assemblage of large, undecorated, globular and carinated jars and flat-based pots (ibid.: figs. 56 and 57) constitutes a distinctively Shetland style of pottery, with no obvious external comparanda.

As regards funerary monuments, the absence of dating evidence for Shetland's chamber tombs makes it impossible to say whether any were constructed or used at this time. At Scord of Brouster, a funerary monument which was described by the excavators as a kerb-cairn, but which actually looks to be a ring-cairn with an internal cairn (Whittle et al. 1986: 36–43), produced a radiocarbon date of 4220±75 BP (3010–2580 cal BC, CAR-242) from ?birch charcoal from a basal deposit. However, whether this charcoal actually related to the construction or use of this monument is unclear; unfortunately, the scraps of cremated bone found with a pot rim in the inner cairn are probably too small to be radiocarbon-dated.

Subsequent developments in Shetland: Chalcolithic and Early Bronze Age, c. 2500–1800 BC

What happened after c. 2500 BC – when, on 'mainland' Britain, metal and other Continental novelties appeared – is worthy of mention here, since it is likely that many of the houses, enclosures and field systems formerly assumed to be Neolithic date are actually of this date, or later. That Shetland was exposed to at least some of the Continental novelties that characterise the Chalcolithic period – even if no copper or early gold artefacts have been found – is indicated by a weathered sherd of international style, All-Over-Cord decorated Beaker from Stanydale. Here, the novel pottery style seems to have been used in a structure wholly of local Shetland design. A new style of funerary monument is also indicated by the cist with the inhumed skeleton of an adult male and Beaker at Fraga, Scatness (Bryce 1932), which echoes Beaker funerary practice on 'mainland' Scotland. And the small but growing number of assemblages of domestic Beaker, from Stanydale, Ness of Gruting, Scord of Brouster House 2, the timber structure at Sumburgh (Downes & Lamb 2000) and Tougs (Hedges 1986), indicates that the ceramic tradition took root, and developed along its own trajectory. The two radiocarbon dates relating to the use of the oval house and associated burnt mound at Tougs (Hedges 1986:12) are comparable with those obtained for the Ness of Gruting house.

Furthermore, it is evident that steatite vessels were in use during this period, since a steatite cinerary urn found at

Fig. 9: Bone object from Jarlshof with Beaker-like decoration. Length: 127 mm; maximum width: 38 mm. Photo: National Museums Scotland.

Quandale in Orkney – which must have been exported from Shetland – has been dated (through its associated cremated bone) to 3660±50 BP (2200–1900 cal BC, GrA-19989).

Several issues remain to be resolved, however. Firstly, whether the enigmatic bone object from Jarlshof with its Beaker-like geometric design (Fig. 9) formed part of the Beaker phenomenon in Shetland – and what it actually was – remain a moot point. It had been found by Childe in Midden II; as noted above, charred barley grain/s from material believed to correspond to MII was/were radiocarbon-dated to around the middle of the second millennium: see GU-12914 above, and Dockrill & Bond 2009: 50. However, the only way to resolve the question of the artefact's date is through direct dating, and given its thinness, it would be difficult to sample without risking damage to the object.

Secondly, the question of whether chamber tombs continued to be built within the 2500–1800 BC period – and whether it is to this period that the heel-shaped (and square) cairns were constructed – needs to be investigated through excavation. (Heel-shaped cairns are not unique to Shetland, with examples known from Caithness, Davidson & Henshall 1991: 41-2.) The parallelism between the concave façade of heel-shaped cairns and the concave façade of the large structure at Stanydale could be taken to imply possible contemporaneity, and the presence of a possible Beaker sherd at Giant's Grave may indicate that that monument had already been built, or was constructed around the same time as the pot's use. The evidence from Vementry suggests that the heel-shaped cairn represents a re-shaping of a pre-existing round cairn, thereby indicating a 'round-to-heel-shaped' sequence. Furthermore, the Muckle Heog

monument (Henshall 1963) – which features the interment of unburnt bodies accompanied by steatite vessels within cists under a heel-shaped cairn – may well date to the period 2200–1800 BC, since we know from the Quandale evidence that steatite vessels were being made at this time. (As will be seen below, however, the use of steatite vessels in the Northern Isles continued after 1800 BC; see also Foster & Turner 2009 on the use of steatite.) The Muckle Heog monument is particularly interesting as it appears to represent a fusion of traditional Shetland practice (i.e. of constructing cairns for funerary monuments) with novel practices (i.e. the use of cist graves and of steatite vessels), with the practice of using cists probably being adopted from outside Shetland. Whether this site also marks the end of a short-lived period of heel-shaped cairn construction remains to be demonstrated through excavation of other sites with heel-shaped cairns. In any case, Muckle Heog – like the (probably slightly earlier) Beaker cist at Fraga – reminds us that, during the period under consideration here, the inhabitants of Shetland probably had a choice of funerary practice (i.e. interment in a passage tomb, vs. a cist). This may relate to the exercise of choice as to whether to maintain a long-standing local tradition, or to adopt new fashions from elsewhere in Scotland.

Thirdly, as before, the question of whether felsite artefacts were still being manufactured at this time needs to be resolved; was it that people were simply re-using ancient objects?

Subsequent developments, c 1800-1500 BC

Although, strictly speaking, these fall outside the scope of this paper, certain observations can usefully be offered here.

Firstly, regarding settlements and ceramic typochronology, continuity in the general style of house construction (i.e. thick-walled and cellular) is suggested by the evidence from Scord of Brouster, where House 3 was constructed at this time. The radiocarbon dating of organic residue adhering to a large undecorated jar of steatitic clay from the Bunyie (Benie) Hoose, Whalsay (Calder 1961) – undertaken as part of National Museums' Scotland radiocarbon dating programme (Sheridan 2005) – has revealed that this house was in use during the second quarter of the second millennium, although whether it was built then, or beforehand, is uncertain. Like Stanydale, it has a concave façade. The organic residue produced a date of 3360±40 BP (1740–1530 cal BC, GrA-29373: Sheridan 2005: 183) and is useful for indicating the post-Beaker trajectory of ceramic development in Shetland.

Secondly, as regards funerary practices, the same NMS radiocarbon dating programme has shown that the tradition of cremation and deposition of the remains in a cinerary urn – a practice in widespread use elsewhere in Scotland – was definitely in use in Shetland by the first quarter of the second millennium, with cremated bone from an urn of steatitic clay from Culla Voe producing a date of 3475±40 BP (1890–1690 cal BC, GrA-24056: Sheridan 2007b: 184). The possibility that the Muckle Heog monument, with its steatite vessels, might also date to this period has also been mentioned above; we know that steatite urns continued to be exported to Orkney during this period (ibid.).

Finally, the unfinished miniature battle-axeheads found at the Ness of Gruting (together with a finished example found in the Sumburgh settlement: Downes & Lamb 2000: 67 and fig. 29) indicate awareness of, and participation in, the 'vocabulary of esteem' that was current during the early second millennium BC elsewhere in Britain. A similar miniature battle-axehead, found in a child's grave along with a Food Vessel, in Doune, Perth & Kinross, has been radiocarbon dated to 3400±35 BP (1870–1610 cal BC, SUERC-2869: Sheridan 2007b: 185) and this is consistent with the dating of full-sized versions of similar shape (ibid.: 175 and fig. 14.10). The presence of two unfinished miniatures in the Ness of Gruting house therefore suggests some time-depth to the use of this structure.

Conclusions

From the foregoing it is clear that our knowledge and understanding of the Shetland Neolithic leaves a great deal to be desired. While we can begin to sketch an overall narrative, as attempted here, the gaps in our knowledge are substantial and much targeted fieldwork will be necessary to address the many outstanding questions.

However, it is clear that a particularly interesting story is waiting to be told – of episodes of contact with the outside world (but not with Scandinavia!), interspersed with periods when a strong Shetlandic insular identity (as expressed, for example, in architecture and material culture) developed. It may be that the practice of farming, and the beliefs, practices and traditions that accompanied this, arrived in Shetland from western Scotland during the late 38th or 37th century BC; further excavation at West Voe, and investigation of the simplest passage tombs (including Ronas Hill) might help to clarify this. How these putative incomers interacted with the indigenous fisher-gatherer-hunter groups (as attested at the lowest level of West Voe) is unknown, although the 37th century activity at West Voe could conceiv-

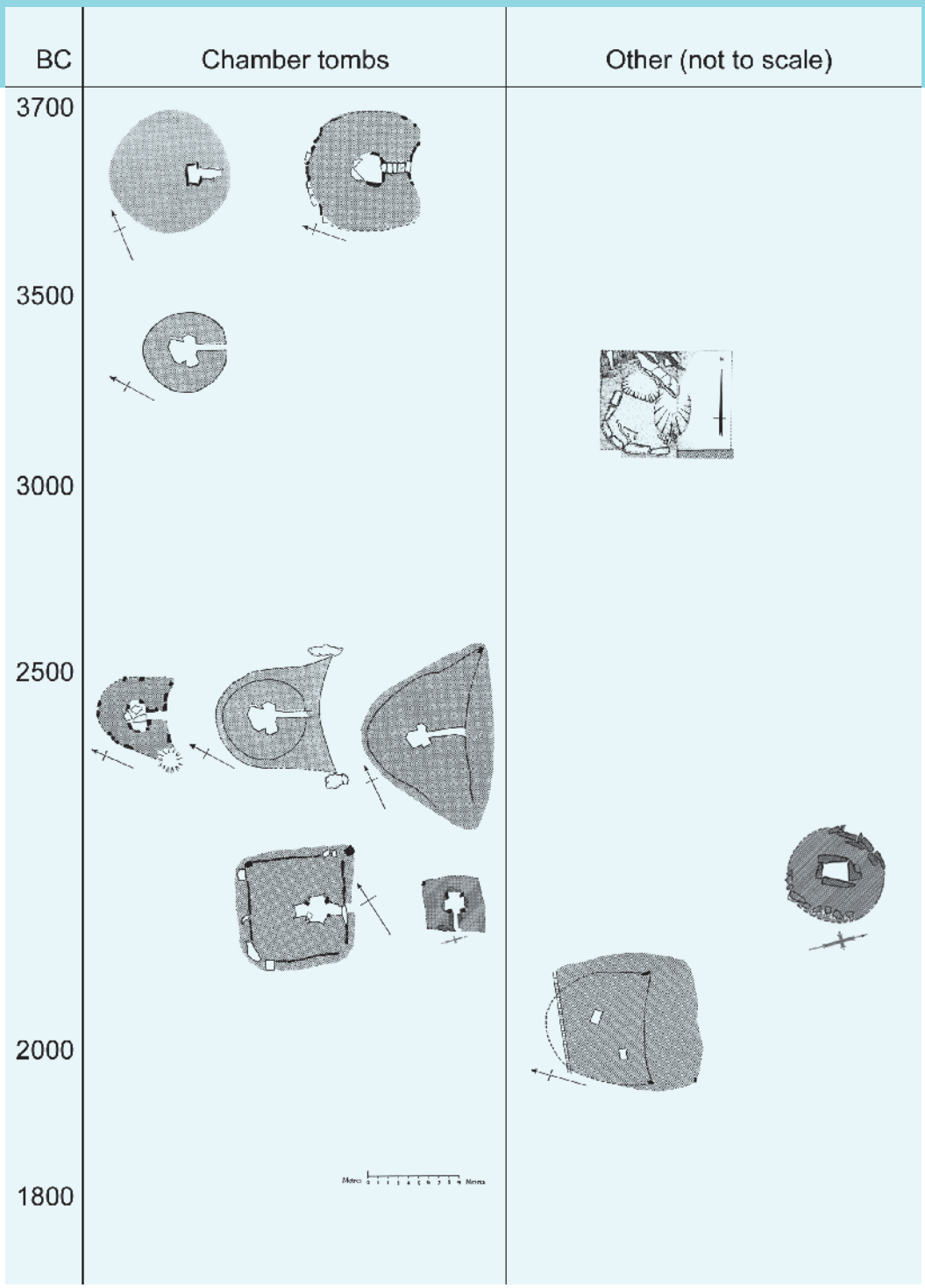


Fig. 10: Notional sequence of funerary monument types in Shetland. Sites featured, from left to right and top to bottom: Ronas Hill; Vord Hill, South; Vementry (phase 1); the Sumburgh cist; Seli Voe; Vementry (phase 2); Punds Water; March Cairn; Pettigarths Field (chamber tomb); Pettigarths Field (cist); Muckle Heog, West.Excepting the Sumburgh cist, the dating of these monuments is speculative. Site plans after Henshall 1963, Calder 1961 and Hedges & Parry 1980.

ably relate to a process of acculturation, whereby elements of the new lifestyle (principally pottery use) had been adopted by one such group. Thereafter, for over half a millennium, a process of insular development took place, as attested most clearly in the emergence of a Shetland style of Neolithic pottery and in the use of felsite to create distinctive knives and axeheads – the largest of which can only have been non-utilitarian, given the paucity of trees on the archipelago. The next evidence suggesting contact with the outside world – assuming that the north-east Irish porcellanite axeheads mentioned above had arrived as part of the initial Neolithisation process, and in the absence of dating evidence for the few felsite exports from Shetland – is not until the first half of the third millennium BC, being reflected in the use of symbols of power that have a wide distribution in Britain. Their adoption may well reflect contact with Orkney, a link that recurs at various times thereafter; but clearly Shetland did not partake in the competitive conspicuous consumption that marks out Late Neolithic society in Orkney (as seen, for example, in the complex of sites and monuments around the Loch of Stenness). Other contact with the external world, but probably not via Orkney, is attested by the presence of All-Over-Cord Beaker, albeit occurring in a Shetland-style context; and the adoption of the practice of individual cist interment represents the emulation of a Beaker-associated practice elsewhere in Scotland. However, the development of Shetland Beaker pottery is unmistakably localised.

The review of the domestic evidence as presented in this contribution indicates that there are very few settlements that pre-date 2500 BC, in contrast to the period 2500–1500 BC; if this reflects a genuine pattern, then we may be witnessing a process of population growth from a small Neolithic base. Understanding the subsistence basis and social dynamics that could have underpinned such a development will require more excavation and palaeoenvironmental work of the type undertaken by Dockrill and Bond, Edwards et al. and Melton et al.; pointers as to areas of high potential already exist in the results of field and aerial survey, as mentioned above.

In terms of funerary practices, although a sequence as sketched in Fig. 10 can be proposed, it remains to be tested through excavation and dating. Once more, a dynamic between a process of localisation and the adoption of exogenous practices can be traced.

As for the question of felsite exploitation (and indeed the use of other lithics),

it is anticipated that the research planned by Cooney et al. should clarify its chronology and nature.

There is therefore much still to do, but Shetland constitutes one of the most exciting areas in which to undertake Neolithic research, given the excellent state of preservation of buildings and land divisions. It is hoped that the *Farming on the Edge: Cultural Landscapes of the North* Project will prove to be a catalyst for the fieldwork and analysis that needs to be done.

Acknowledgements

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Pinhoulland – a multi period site, West Mainland, Shetland

Ditlev L. Mahler

Fig. 1:
Pinhoulland seen from Browland East of the voe.

Photo Ditlev L. Mahler 2011.

General introduction

The object of the three years research project *Shetland – the Border of Farming 4000-3000 B. C. E.* is to gather, analyse and document the Shetland Island's Neolithic material in order to deepen our understanding of the Neolithic process and the social impact on then existing societies within the period, both on the Shetland Islands as well as in Scandinavia. Newer research suggests that the Shetland Islands became Neolithic by several steps over a period of time (Mahler 2011: 13). The research project aims to survey the sequence and nature of the various elements in this process as a basis for a comparative analysis of the Scandinavian agrarian societies and their expansion.

The project also applies landscape analysis in order to expose the ritual landscape as well as cultural markers in the same landscape. The project could provide us with a whole new perspective on the Neolithic process in the area and provide comparative material with regards to Scandinavia. In the light of the well documented, early Neolithic Southern Scandinavian material it should be possible to create a chronological order as a basis for an understanding of the Neolithic process in general and on the Shetland Islands specifically.

With regards to the expansion of agrarian societies, the Shetland Islands were the ultimate North Western boundary lying 60° northern latitude. Within the time span 4.000-3.000 B.C.E an agrarian culture established itself on the Shetland Islands with material and immaterial elements such as ritual practices characteristic of the Neolithic process in all of Europe. Amongst these elements are monumental sites such as the chambered cairn at Caldback, Unst, which probably is the Northernmost passage grave of Europe still in existence. And also polished tools of ritual use such as point butted felsit axes and geometrically ornamented ceramic ware. A relatively large population established, at an early date, stone boundaries around their fields and across the landscape in

Photo Ditlev L. Mahler 2011.

Fig. 2: The chambered cairn at Caldback, Unst, seen from South East. The passage grave could be the Northern most passage grave in Europe still in existence.

general which could be interpreted as territorial boundaries, and there are examples that long stone dykes were build for ritual causes at Vemmentry below the cairn to the East and at Lardie Hill South of Stanydale. In both cases the dykes separate the land of the living from the land of the dead. At Stanydale a hall like construction has been uncovered, a possible parallel to the Continental gathering sites, and Surveys during 2010 and 2011 and mapping of the site suggest that the site probably was something special and contains a more complicated relative chronology (Calder 1951: 185 ff.; 1956; 1964).

Another approach is the comparative study and models for island societies and for example their demographic and economic development compared with the human intervention in virgin nature. Such a comparison can be based on pioneer societies with or without written sources on their development. An example is the Lapita dispersal in Oceania or Sarqqaq Culture dispersal in Greenland both a. 2000 B. C. E. (Mahler IP.; Kirch 1988:103 ff.; Grønnow 2004: 78; Grønnow IP.). The reason the Shetland Islands were the northern boundary for an agrarian expansion could possibly be due to a maritime technological development. Seen from a maritime aspect the Orkney Islands and Fair Isle are stepping stones in the Neolithic expansion but it is still an expansive achievement. Shetland was not a virgin land when the Neolithic people arrived (Edwards et al. 2009: 118 f.; Melton 2009: 188; Gilmore & Melton 2011: 80). We cannot be sure that there were a stable Mesolithic population, but it is highly likely that Shetland had Mesolithic visits (Bennet 1992: 241). It would be strange if Shetland was the only place in Northern Europe, which did not have a Mesolithic population at least during periods. It is unlikely though that there was a Mesolithic population, who went Neolithic (compare Sheridan 2010: 93, 101).

This summer's six week field work led to the visit of 12 Neolithic sites mainly in West Mainland and some sites on Unst. Of these 12 sites six were mapped using precision GPS among other sites we mapped Pinhoulland, which will be the topic of this article.

Pinhoulland – an introduction

The site has been known for a long time, so that is not the reason for mentioning Pinhoulland once again. One unroofed structure is thus depicted on the first edition of the OS 6-inch map from 1882, and the survey from 1968 mentions nine oval houses, enclosures and a large field system. Already at this time it must have been clear that Pinhoulland represented one of the largest prehistoric settlements of Neolithic/Bronze Age nature on Shet-

land. Whittle (1979: 167, 1986: 53f, Fig. 47 & 49) has an interesting map showing seven to nine house sites or structures at Pinhoullend, a house site at South Stany Fields further North besides Scord of Brouster. Together with the house sites at Loch of Grunnavoe, the map illustrates very well the extensive prehistoric settlement systems in this part of West Mainland, though it is obvious that the picture must be diachronic. It is also very understandable that many archaeologists have been fascinated by the site (Turner 2011: 22, Fig. 2b), and the following description and interpretation of Pinhoulland must be seen as one in a long row to be followed, and only massive excavations will reveal the actual nature and chronology of the site. This ought not to prevent us from having a look at our present knowledge of Pinhoulland.

The first time I visited Pinhoulland was during summer 2010 approaching the site from the coast line of Voe of Browland. At first glance the many structures were quite overwhelming, and beside a krobb and the 19th Century pen down at the coast, the site seems rather undisturbed which of course is deceiving. Most of the structures are placed on the gentle Eastward slope down to Voe of Browland, but dykes, structures and clearance cairns continue on the other side of the hill as implied above. It was clear from the beginning that we had to concentrate on a minor part of the cultural landscape and chose the Eastern slope for mapping. The site consists of rather acidic grassland with areas of very wet and peaty ground being the remains of now fossile small water courses. In all we mapped 360 x 215 m^2 during the five days spent there in 2011. At the time before the growth of the blanket peat, Pinhoulland must have been a very suitable area for agriculture. Originally the area must thus have been well drained representing a nice agricultural potential. In this light the many structures and house sites are not surprising (compare Edwards & Whittinton 1998: 17).

In the following I shall try laying down the questions and doubts of the interpretation of the structures. I willingly admit that many of the interpretations invite discussion and fruitful disagreements, and this will continue as long as no excavations have been carried out. We have very few excavations as a whole of the Neolithic structures on Shetland – C.S.T. Calder's post-war investigations, then a long pause before Alasdair Whittle's excavation during 1979 and then recent investigations at Sullom Voe – not yet published (Fojut 2006). This also means that we may expect many surprises about the nature of Shetland's Neolithic Period, and with Orkney and Caithness in mind we must keep an open mind.

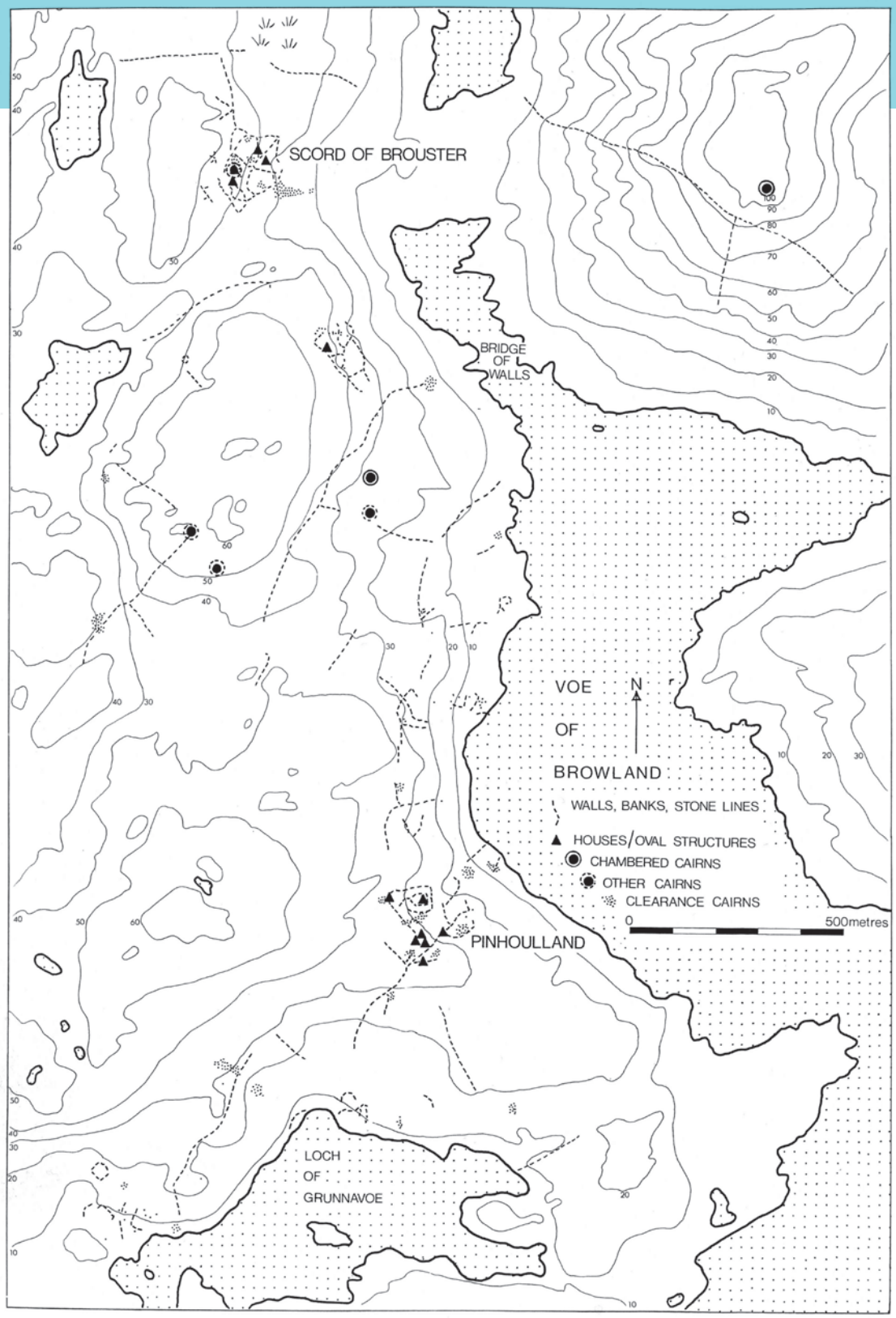

Fig. 3: Map of the area around Pinhoulland and Scord of Brouster. After Whittle 1986, fig. 47.

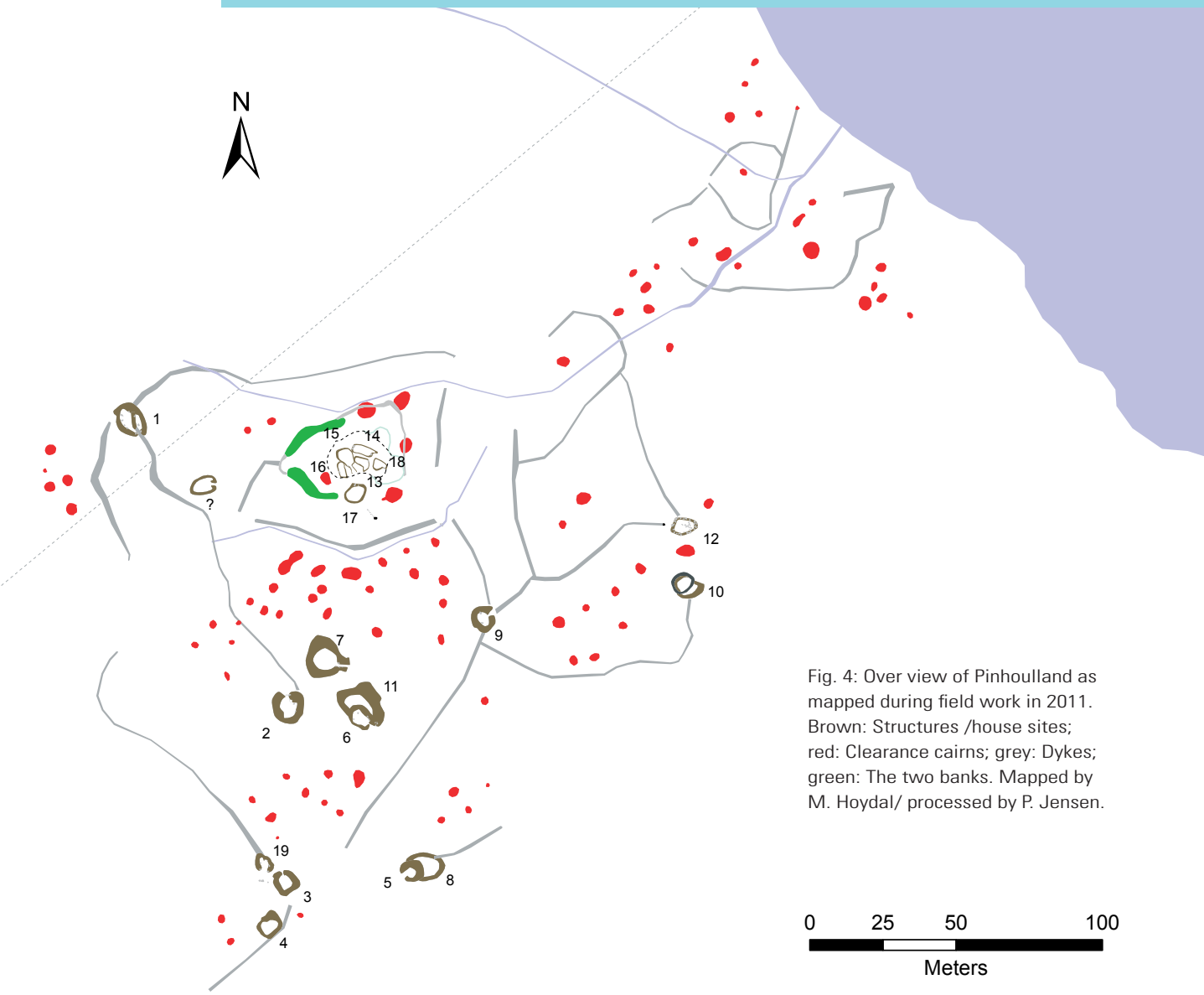

Fig. 4: Over view of Pinhoulland as mapped during field work in 2011. Brown: Structures /house sites; red: Clearance cairns; grey: Dykes; green: The two banks. Mapped by M. Hoydal/ processed by P. Jensen.

The site

Alasdair Whittle has of course also mapped the site (1986, fig. 49), but strangely enough he did not discuss the interpretation of the more dubious structures or especially the large mound to the North (1986: 54 f.). Fig. 4 shows the area mapped this summer, especially the large mound, which in the following will be one of my focus points. The many clearance cairns indicate that the area must have been intensively farmed either for grazing or for producing barley. Many of the cairns measure several meters in diameter.

Most of the house structures are rather clear, and in at least two cases it is possible to distinguish several phases. House 1 has been rebuilt at least once but has kept the same entrance towards the South or South East. The small house 6 which measures about 6, 5 m internally has been built on an older and larger structure measuring about 10, 5 m in length. Structure 11 could very well be the remains of an older house site. On the other hand, the relationship between structure 5 and 8 are unclear. We could be facing two house structures as is the case with house 6 and 11. On the other hand both structures consist of rather large stones tumbled together, which could be the remains of one or two cairns.

In connection with his map (1986: fig. 49) Whittle does not interpret what he calls turf banks, and I call structure 3, 4 and 19. Structure 4 could be a pen built on to the dyke running towards the Loch of Grunnavoe, but the two other structures are more likely to be house sites. Structure 4 could even be of much younger date. The structures 3, 4, 5, 8 and 19 are all high lying with a wide view to Voe of Browland to the East and Loch of Grunnavoe to the South West, and this could indicate that one or more structures in fact are the remains of very dilapidated burial cairns.

House 10 lies beneath a krobb and is rather dilapidated because of being robbed of stones; the same goes for structure 12, but both 10 and 12 are likely to be house structures. In front of house 12, to the North West, there is a standing stone; one of the two ortholits (standing stones) at Pinhoulland. One of the most central house structures is house 9 as the connected dykes bind many of the other structures together with house 9, and the dykes could have chronological implications.

The questionmark South of house 1 marks an oval structure measuring around 8 m and with protruding stones indicating that the small mound must be manmade and may be covering a house structure. East of the mound and somewhat lower down the slope there is a cluster of houses surrounded by dykes and two banks. Five of the houses are built together, and at least four have entrances pointing to the South, towards house structure 17, where protruding stones indicate an entrance pointing to the North. This gives an impression of the existence of a kind of passage between the houses indicating that they were in function at the same time. South of house 17 there is a stone paving leading up to the other standing stone.

The water courses look as if they have been regulated, and West of the dyke

between house 1 and 2 there is a very wet area, and some of this dyke could have been damming a small lake at the time of the prehistoric use of Pinhoulland. Any kind of farming and especially the keeping of livestock demands a certain and steady amount of water (compare Edwards & Whittington 1998: 16; 17).

Dating Pinhoulland

In the case of Pinhoulland, dating can only be verified through coring or excavation, but it is very likely that Pinhoulland was in use during the Neolithic Period and during the Older Bronze Age. House 2, 6, 7, 9 and 11 belong to the pre-blanket peat strata, and thus must be older than Late Neolithic time or Older Bronze Age (compare Whittington 1980: 35). The many dykes connecting the house structures may indicate a relative chronology, as mentioned earlier. Preliminary analyses indicate at least a relative chronology in three phases. A scenario could be that House 6, 7 and 11 constitute phase 1 seen as single lying structures. It is impossible to say whether they could be contemporary other than 6 is younger than 11.

Phase 2 could be the houses which are interrelated with dykes forming three groups of houses: House 1-2 as one; 3, 4, 19 and 5 as another interrelated group and last House 9, 10, 12 as the third. Fig. 7 The chronology between these groups

is yet unknown, but what we see today is very probably a diachronic picture. The cluster of houses (House 13, 14, 15, 16, 17 and 18) are built together and with the exception of house 14 could have been in contemporary use and constitute the third phase. The nearest parallels to the cluster of houses are

Photo Ditlev L. Mahler.

Fig. 5: House 12 seen from South East. The house mound with the cluster of houses is seen behind house 12.

Jarlshof house 8 and settlement types such as Skara Brae from Orkney (Hamilton 1956: 9 ff.; Childe 1931: Plan of Village). Fig. 8 Jarlshof house 8 dated to the Older Bronze Age, and Skara Brae is dated between c. 3100 and 2500 cal. BC (Shepherd 2000:139; Clarke 1976: 26; Ashmore 1998: 142-147; 2000: 299-308).

Thus it is reasonable to presume at least as a model that Pinhoulland actually began some time during the Neolithic Period, and considering the number of houses, it could be quite early.

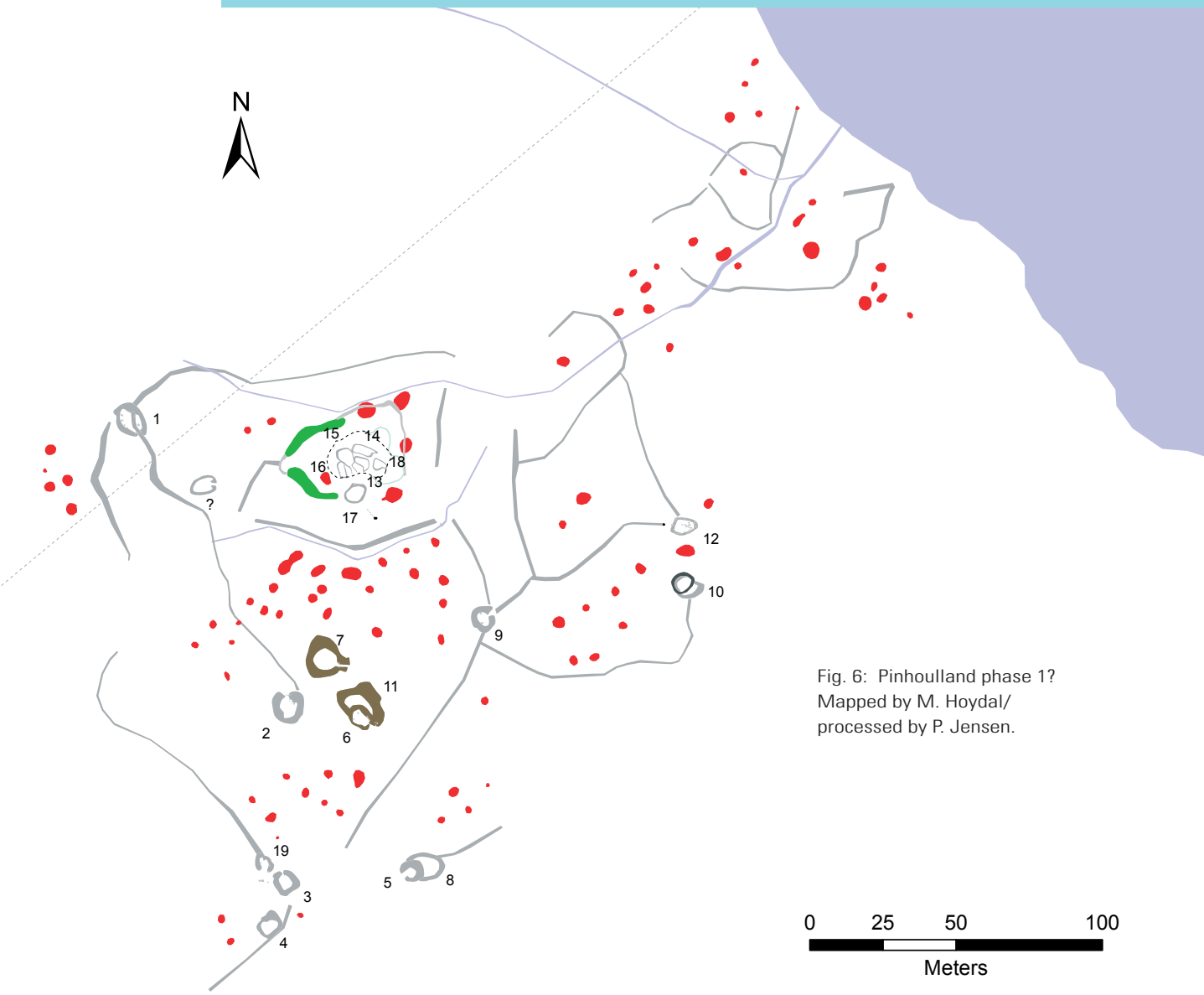

Fig. 6: Pinhoulland phase 1? Mapped by M. Hoydal/ processed by P. Jensen.

Further considerations

During 2011 field work, many more sites were visited and surveyed but not necessarily mapped if the preservation conditions were estimated to be poor or the vegetation was an obstacle as was the situation in the valley at Burwick, where heather prevented a more thorough survey. At Stanydale there are at least four house structures which are likely to being older than the hall. One lonely structure not far to the West of the hall and three house structures to the North of the hall are bound together by dykes.

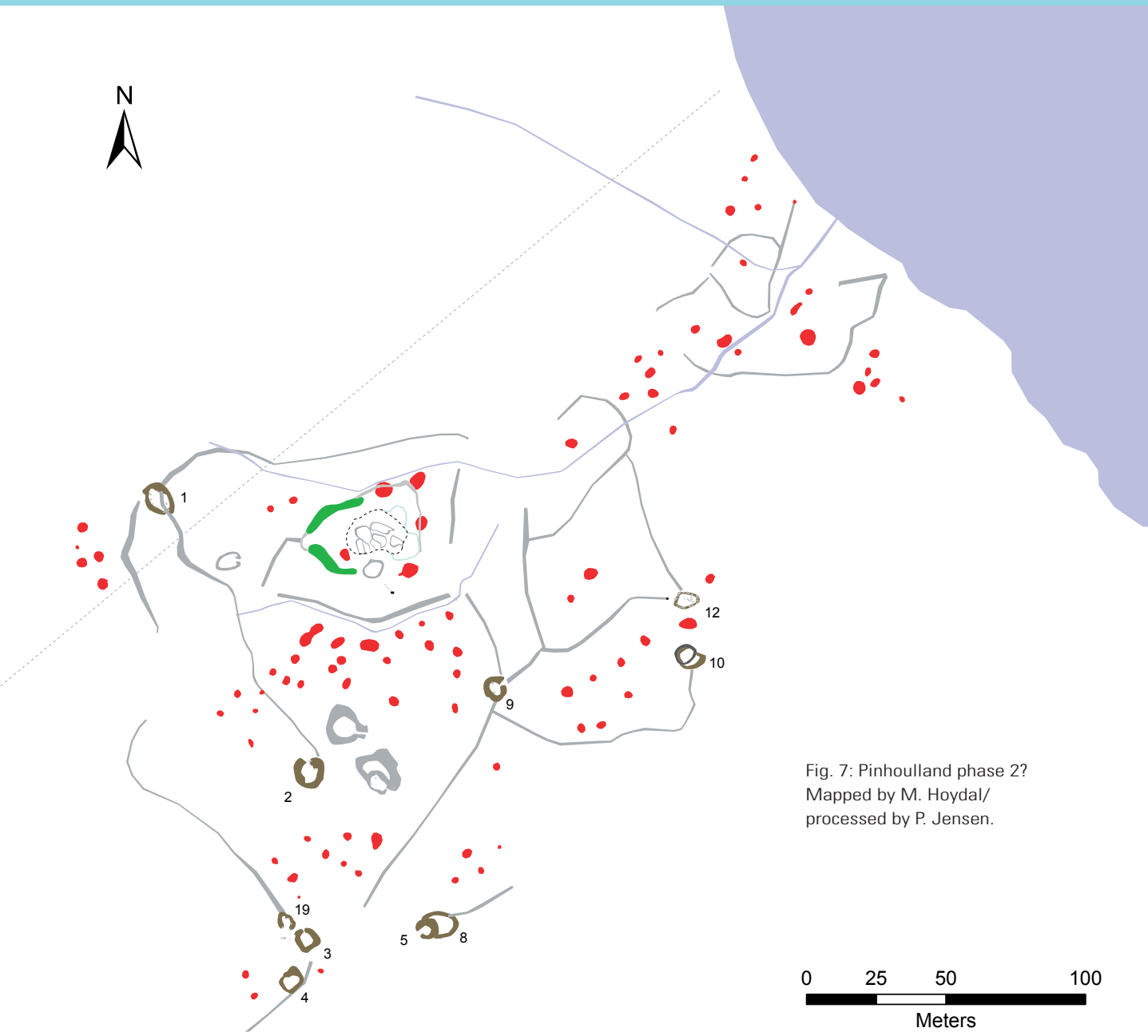

Fig. 7: Pinhoulland phase 2? Mapped by M. Hoydal/ processed by P. Jensen.

There are also known house structures to the South which will not be further mentioned here. The single house structure and the three bound together by dykes – and two round field systems - are interesting parallels to the suggested relative chronology at Pinhoulland. At Skiords in Aithsting to the West of Loch of Vaara on the way to Noonsburgh we mapped a single house site and sev-

eral dykes among which was a smaller circular dyke. The house is somewhat dilapidated with many boulders tumbled in and the site could be of a somewhat younger date. Further to the West at Ness of Nounsbrough and down to Gruni Gill, by Ini Fiord and exposed to the South we mapped two house structures, a circular dyke and other dykes indicating that the two houses could be contemporary. Fig. 9

These few examples give a picture of a variation in settlement structures: Single house structures lying alone; small communities consisting of two or more households with field systems; and finally clusters of houses such as the one at Pinhoulland consisting of five to six structures. As far as I know the house cluster at Pinhoulland stands alone on Shetland, but further surveys and mapping will undoubtedly reveal that this kind of settlement type is more widespread.

Conclusion

I have concentrated my work on West Mainland, Shetland and I am thus unable to say whether the above sketched picture is representative for the settlement structure on Shetland as a whole during the Neolithic Period or Older Bronze Age. It looks as if Shetland has a much more complicated settlement structure during the Neolithic Period than earlier observed. It is also suggestive that the nearest parallel to the cluster of houses at Pinhoulland – as far as the surveys indicate – is Skara Brae and other of the clusters/villages of Late Neolithic or Older Bronze Age origins from Orkney. This also implies that we have to reconsider the cultural connections between the North Atlantic islands, which challenge the idea of isolation during this period. We should all be well aware that all these indications are based on surveys and therefore are built on peaty ground – so to say in "Shetlandic" terms.

Orkney has a rich and varied Neolithic Period, which among other factors is caused by the intense interest from antiquarians and archaeologists in Orkney prehistory over a considerable span of time. Shetland on the other hand has lacked the same magnetism seen from a 19th and 20th Century view, which is no critique of the archaeological investigations in Orkney, but may be more an indication of where the prestige has been placed. The last 15-20 years has changed much both concerning published excavations (Turner 1998; Fojut 2006; Dockrill et al. 1998: 61; AOC Archaeology Group), excavations especially of Iron Age – Viking Age structures and exhibitions among other things thanks to the investments in Hay's Dock.

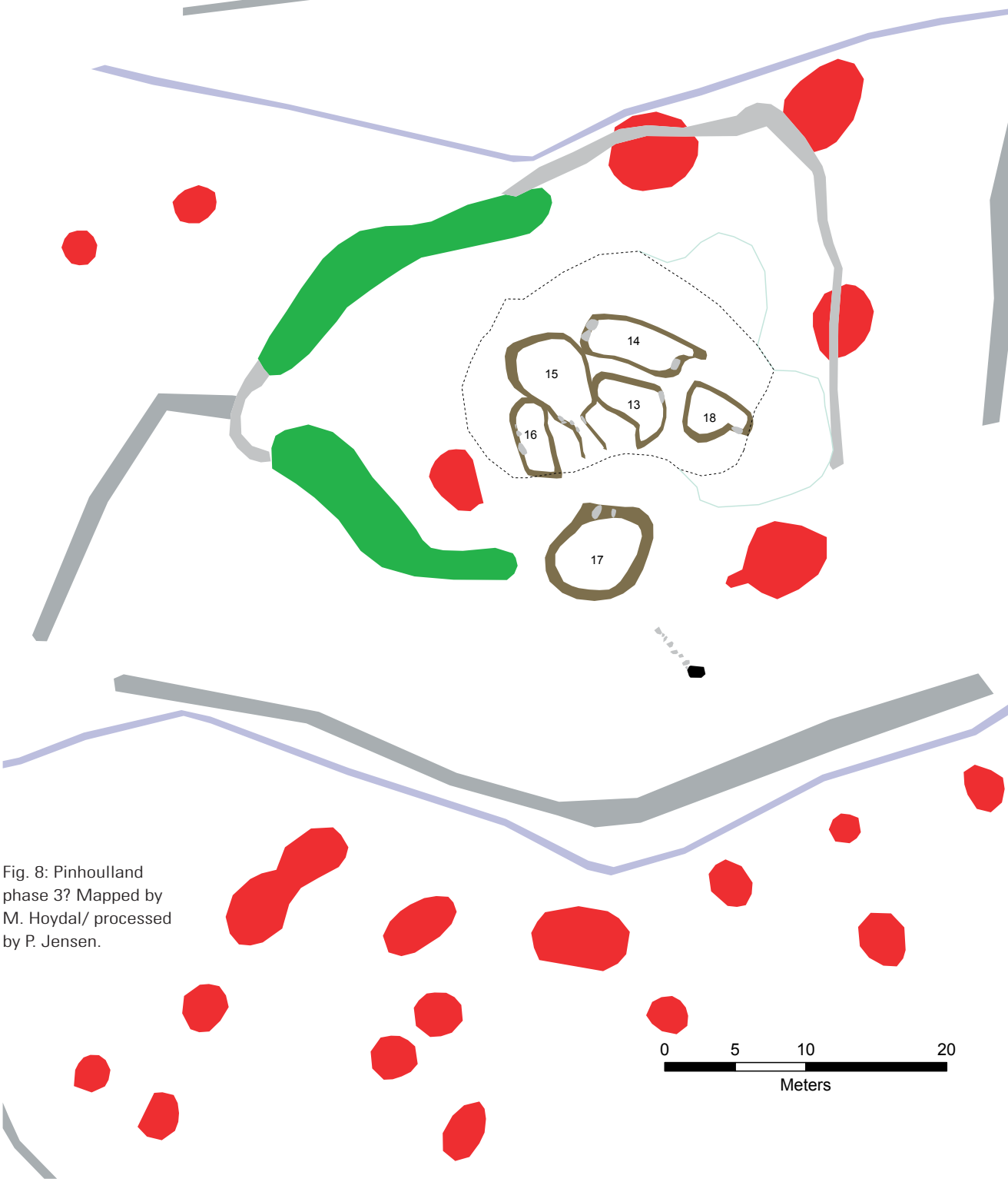

Fig. 8: Pinhoulland phase 3? Mapped by M. Hoydal/ processed by P. Jensen.

Gruni Gill, Longaness, seen from the East. The site contains at least two house structures and a number of dykes among others a circular dyke as can be seen in the centre of the photo.

Photo Ditlev L. Mahler.

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Sacred Work: Cultivating the soil in prehistoric Shetland

Jenny Murray

The Shetland Isles are the most northern archipelago in Britain; an exposed situation where the North Sea meets the Atlantic, offering little relief from the numerous gales that blasts its shores. Yet, people have farmed this small group of islands for thousands of years. The landscape is peppered with small clearance cairns and field boundaries; a testament to the Neolithic population who first delved its soil, clearing areas to plant and nurture a life sustaining crop. This paper will explore the tools these early farmers may have used to break the ground and till the soil. It will also explore the possible symbolic significance of these tools to the people who used them.

The Shetland museum has a vast collection of stone tools which have survived from various prehistoric sites around the isles. Many of these may have been used to delve the land, but recent research has revealed a small collection of wooden tools which date to the Iron Age, suggesting that early farmers could have had access to organic implements which may not have survived in the archaeological record.

Today the Shetland landscape offers limited areas of fertile ground. Arable pockets of land lie close to the shoreline and palynological studies suggest some of these green patches have been farmed since the Neolithic period (Whittle et al. 1986, Owen & Lowe 1999). The earliest signs of anthropogenic impact on the landscape include deposits of charcoal underneath a prehistoric stone dyke on Shurton Hill near Lerwick. Radiocarbon dated to c. 2800 BC (UB2122), this evidence of deliberate burning may suggest heathland clearance in an attempt to maintain grazing pasture (Whittington 1977: 33). Early farmers at the Scord of Brouster were also clearing land for agriculture by burning, around 3000-2500 BC (Whittle et al. 1986:

Photograph by the author.

Fig. 1: Stone ard share from Scord of Brouster.

108,146). Cultivation by ard at this site is evident from five broken stone ard points recovered from the construction of the earliest dwelling (House 2) and charred barley, radiocarbon dated to 2590 ± 65 BC (CAR-251), (Whittle et al 1986: 112). A total of 75 ard points were recovered from Scord of Brouster, last occupied around 1400-1300 BC (Rees 1986: 74, Whittle et al. 1986: 34-37).

Further emphatic evidence for early cultivation includes ard marks or plough furrows discovered in the subsoil during excavations of Bronze and Iron Age sites at Sumburgh, Fair Isle and Kebister (Lamb & Rees, 1981: 117, Hunter 1996: 51, Owen & Lowe 1999: 281).

Photograph by Dr. Simon Clarke.

Fig. 2: Ard marks clearly visible in the ancient soils at Scatness, Shetland. These marks predate the settlements defensive ditch which cuts through them.

Stone tools

While evidence for ploughing by ard is reliable on Neolithic sites such as Scord of Brouster, tools used to break the fallow land are not so obvious in the archaeological record. There are a range of stone tools that could have been used to manually break the sod including a selection of 'spades' on display in the Shetland Museum (see fig. 2). This includes a heart shaped tool with a hole at the top which may have been handheld. Several of these were found in the 1930s by A. O. Curle who was excavating at the multi-period site at Jarlshof in Sumburgh. He concluded their shape was reminiscent of a labourer's shovel which suggested they may have been used to work the soil (Curle 1933: 101). However, he found there was little evidence of wear around the edge to sug-

Photographs by the author.

Fig 4:
Heart shaped 'shovel' (ARC 65323).There is little evidence on the cutting edge to suggest it was used for this purpose.

Fig. 3 (left): A selection of possible rudimentary 'spades' on display in the Shetland Museum.

gest this employment; in fact the only wear appeared to be at the handle edge (as evident in fig. 4). These tools were looked at again by lithic specialist Ann Clarke, who suggested they may not have been shovels but rather a veggewol, a stone object that was built into the walls of the byre to secure an animal, this would explain the wear at the handle and not the cutting edge. (2006: 38)

Another group of tools which may have been more suitable for breaking ground are the flakes stone bars, of which there are many hundreds in the museum collection. Ann Clarke's research showed that many of these presented signs of being hafted, and wear was noted at one side of their cutting edge which may suggest these were used as a rudimentary mattock or hoe (2006: 30). She further proposes that flaked stone bars and ards should be considered together as tools for cultivation as both are commonly found placed together as inclu-

Fig. 5: Flaked stone bars from House 2, Scord of Brouster.

Photograph by the author.

sions into stone structures at Neolithic and Bronze Age settlement sites. They appear together at the Scord of Brouster as early as 3500 BC (2006: 111,130). This practice may allude to the important social value of these agricultural tools to the people who relied on them.

The profile of other stone tools in the Scord of Brouster assemblage lend themselves to be hand-held and may have been practical for breaking up clods on very small plots (see fig. 6). This would have been arduous work, but work was most likely done in groups.

Fig. 6: Hand-held tools from Scord of Brouster and Sandsting (ARC 8056). Could these have been used to break up clods?

Photographs by the author.

Wooden and bone tools

From the Neolithic period, as noted above, tilling of the soil was done by ard, but recent evidence also suggests that, by the Bronze Age, some turning of the soil was done by other tools. Spades are almost absent from the archaeological record but inferential evidence for their use is observed in ancient field systems. Grooves in the Bronze Age subsoil during excavations at Cornwall, in southern Britain, suggest the soil appears to have been broken by a spade or hoe rather than the ard (Rees 1979: 329; Lerche & Steenberg 1980: 63). Similar ridges and furrows dating to 1500 BC have been uncovered in areas of blanket-bog in Western Ireland (Mitchell 1978: 27). Likewise, similar evidence was noted in Iron Age field systems in Denmark (Lerche & Steenberg 1980: 63). In Scotland, patches of cord rig, that resemble miniature rig-and-furrow, have been revealed in Iron Age field systems; these appear to have been hand dug (Armit & Ralston 2005: 190).

Further north in Shetland, excavations of a Bronze Age house at Mavis Grind revealed features similar to spade-dug lazy beds, dug through several centimetres of accumulating peat (Cracknell & Smith 1985: 91). Also, recent excavations at Old Scatness revealed marks in the sub-soil which were shorter and less sharp in profile than ard furrows – these

Fig. 7: Shetland spade from the Late Iron Age period.

Photograph by Lizzie Ratter.

Fig. 8: Iron Age clod breaker found buried with the wooden spade in Fig. 7 (ARC 65122).

Photograph by the author.

suggest spade use in an Early/Middle Iron Age context (Dockrill et al. forthcoming).

Within the museum collection are two wooden foot-spades and a clod breaker, uncovered from deep moor by people cutting peats on the hillside (see figs. 7 and 8). One of the spades, from the island of Unst, was buried with the clod breaker suggesting these tools were used together. Another spade was buried on the nearby island of Yell. They are all in excellent condition having been perfectly preserved in the anaerobic conditions which peat moor offers. Recent radiocarbon dating showed these tools to be much earlier than previously anticipated. A sample from the Yell spade was sent to the laboratory for dating and returned a date from Shetland's Late Iron Age period – AD 570±30 (GU23299). The Unst clod breaker was dated a little earlier, 240-400 cal AD (GU23300).

Evidence from the field, plus the recent dating of these tools, may suggest that wooden spades could have been used in Shetland since the Bronze Age period. It has been suggested that the spade is more effective than the ard for tilling the soil, in terms of output per acre

(Steensberg 1986: 110-111). This method would certainly be appropriate for smaller areas of arable ground. While turning the soil you could pulverise lumps and turn in manure, providing the perfect tilth for crops to grow (ibid). Again, teamwork would have been applied making the task easier and less boring as shown in recent times when groups of able Shetlanders gathered to delve their fields by spade (see fig. 9)

Fig. 9: In modern times, tilling the land was traditionally done by the Shetland spade as seen here at Springfield in Fair Isle, taken circa 1920. Image courtesy of Shetland Museum and Archives.

While the evidence for wooden spade use does not date back to Shetland's Neolithic period, other wooden implements such as digging sticks may have been utilised, similar to the example discovered in a bog at Døstrup, Denmark, dating to cal.810 BC (K-3266), (Lerche 1995: 180). These simple but effective tools could have been manufactured in Shetland using small trees and branches. Unfortunately these are absent from the archaeological record in places such as Scord of Brouster; they may have not survived, perhaps ending their useful life as fire wood.

Other organic implements, such as bone tools, may have also been lost to the record due to the acidic soil conditions in certain areas. Excavation of the earliest layers at Jarlshof revealed two shovels crafted from the shoulder blades of oxen (Hamilton 1956: 12). Unfortunately, excavations at Scord of Brouster produced a very small assemblage of bone due to the acidic conditions of the site (Noddle 1986: 132). Despite the small sample analysed, the majority appeared to be cattle (ibid). It is therefore possible that bone shovels may well have been used at this settlement to break the fallow, but have not survived. Anna Ritchie's excavations at the Neolithic site at Knap of Howar, on Papa Westray, in Orkney revealed a possible whalebone hoe (Ritchie 1983: 52), and these examples demonstrate that a variety of faunal material may have been utilised in the construction of cultivation tools.

The examples explored above highlight three very different resources used in the manufacture of tilling implements. Stone examples have survived in their hundreds; while many others, such as bone and wood, may have been lost in time.

The significance of agrarian tools in prehistoric Shetland

Many of the tools discussed have been uncovered, not in fields and cultivated areas where you would expect to find them, but from the walls of structures in settlement areas and further afield and in deep moorland. They have been carried back from the fields by early farmers and deliberately placed there. The reasons for this may be quite significant.

Ritual deposition of tools and everyday objects is well known throughout prehistory. When C.S.T. Calder excavated Neolithic period remains on the west side of the Shetland mainland during the 1950s, he found the house walls were simply littered with rude stone implements; 600 were recovered from the Ness of Gruting and a further 250 from Stanydale (Calder 1955: 356). Similarly, clearance cairns from the surrounding field systems in all the areas looked at by Calder also contained deposits of stone tools; one local man who demolished a clearance cairn at Lower Gruniquoy collected 26 rude implements (Calder 1955: 357). Ann Clarke suggests the inclusion of ard points and flaked stone bars into structures afforded them a deeper meaning, 'as a symbol of place, or of the past' (2006: 125).

Ritual offerings with agricultural connotations, linked with cultivation and human fertility, become more evident from the Bronze Age and continue into the Iron Age period (Bradley 1998: 183). These offerings, such as the wooden tools, were often placed into wetland localities, often bogs, streams, rivers or lakes. Were these perhaps an offering to higher powers to ensure future successful harvests from the surrounding fields? Two millennia later, these boglands offered Shetlanders a valuable resource for peat cutting, and the eventual uncovering of these votive deposits which lay hidden in their depths.

These physical components of everyday life appear to have taken on a symbolic role as metaphors for regeneration, not only for the land but also the fertility of the community. Archaeologist Richard Bradley suggests these offerings associated with agricultural produce laid a special significance on the land as well as the people (1998: 171,183). These, he states are a series of rituals that stressed the importance of food production, especially in Iron Age society, and the deposition of agricultural equipment ensured the fertility of the crops was protected (Bradley 1998: 170-171).

Conclusion

Food production forms the very basis of a settled society, and from field systems of prehistoric Shetland we have, in the local museum, a large selection of tools used

to cultivate the land by early farmers. These include the large assemblages of rough stone tools; skillfully produced ard shares; finely crafted wooden spades; the clod breaker and rare bone tools. These have all survived because of their significance to the community who used them, by building them into the walls of their dwellings and field systems, and by offering them to higher powers in the surrounding landscape. The study of these not only offers us an insight into the cultivation tools used in Shetland's prehistory, but we can now gain a deeper understanding of the lives and beliefs of those who last touched them.

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The distribution of worked felsite – within and outwith Neolithic Shetland

Torben Bjarke Ballin

Introduction

In a previous paper (Ballin 2011d), the author discussed the dating and character of the initial colonization of Shetland. This discussion was based on the presence and absence of diagnostic material culture elements, with the evidence suggesting rather late colonization, possibly around the Mesolithic/Neolithic transition, and with the bulk of the earliest evidence dating to the later part of the Early Neolithic period. The almost complete absence of Shetland artefacts south of the island group, in conjunction with the almost complete absence of artefacts from southern Scotland in Shetland, indicates that Neolithic Shetland may have been in a state of complete or partial isolation, in contrast to for example Neolithic Orkney which boasts numerous exotic objects, such as artefacts in Arran pitchstone and Yorkshire flint (Ballin 2009; 2011c), clearly showing that Orkney formed an integral part of an extensive exchange network.

One of the key artefact groups discussed in Ballin (2011d) was felsite implements. They almost exclusively include axeheads and Shetland knives, with some scrapers, and possibly arrowheads, having been made on the basis of fragments of recycled polished axeheads. The aim of the present paper is to gain more insight into the dynamics of Shetland's Neolithic society by analyzing the procurement and distribution patterns of felsite – from the quarries in North Roe to the end-users, within as well as outwith the Shetland Isles.

The organization of the North Roe mining operations

When the physical features of prehistoric quarries are characterized, analysts tend to follow classification schemas

Fig. 1: Axehead production at the Beorgs, showing crude waste, as well as one of several oval shelters. Courtesy of Gabriel Cooney, University of Dublin.

like that of Schneiderman-Fox & Pappalardo (1996), emphasizing the following activity areas:

- the quarry itself where material is extracted;
- the tailing pile, just below the quarry face, containing blocks of quarried material;
- the ore dressing, milling, or transition area, located below and within 50 m of the quarry face, where large blocks are broken down for transport; and
- the lithic reduction site above the quarry face or on a level terrace adjacent to the quarry face, where reduced blocks are further reduced into preforms or final tools.

In his various papers on the North Roe quarries (Ballin 2011a; 2011b), the author has tended to characterize much of the area's felsite debris as forming tailing piles, supplemented by a number of ob-

vious workshops. This, however, is not an entirely acurate depiction of the North Roe situation. In many cases, the quarry waste does appear to form down-hill screes – that is, traditional tailing piles – but in most cases, the linear character of the debris is a result of the size and shape of the outcrops, mostly occurring as kilometre-long dykes, and not gravity. Basically, it seems, dykes were mined, and quarry waste deposited either behind the on-going quarrying operation – that is, on top of already emptied sections of the dykes – or next to the exhausted dykes, resulting in linear accumulations of waste.

Immediately adjacent to the felsite dykes, workshops were organised to allow further reduction of selected blocks of raw material.

Detailed surveys of the main North Roe procurement centres – the Beorgs of Uyea ridge in the north and the Midfield hill in the south – showed that some specialization may have taken place in prehistory. The former centre appears to have focused predominantly on the production of axeheads, and the latter on the production of Shetland knives. Indicators of this are many, such as axehead

Fig. 2: Denticulated boulder on Midfield – probably an abandoned waste 'core' from the production of knife tool blanks. Courtesy of Gabriel Cooney, University of Dublin.

Fig. 3:
Shetland knife workshop on Midfield, with knife rough-out and production waste. Courtesy of Ditlev L. Mahler, The National Museum of Denmark.

and knife preforms and different forms of waste. The waste relating to axehead production is generally somewhat larger and cruder than that relating to the production of knives, fig. 1.

Although the construction of truly reliable operational schemas for the two different types of production will have to await the excavation and analysis of different (axehead and Shetland knife) workshops, there are indications that the two manufacturing forms may have followed fundamentally different schemas. Most likely, the production of felsite axehead was generally carried out in the form of 'core production' and the production of felsite knives as 'flake production'. The former is based on the removal of flakes from a block of rock, where the flakes represent waste and the core becomes the intended implement, whereas the latter is based on the procurement of flake tool blanks, with the resulting core being the waste product.

Fig. 1 shows debris from axehead production (blocks, large misshapen flakes, and bro-ken or rejected axehead rough-outs), whereas figs. 2 and 3 show waste from the production of Shetland knives. The denticulated boulder in fig. 2 may represent the manufacture of flake blanks for knives, where large flakes were detached from the edge of this impressive parent piece (technically, an over-sized 'core'), whereas Fig. 3 shows small-sized production waste surrounding a Shetland knife rough-out, immediately left of centre. Fig. 2 & 3

Fig. 4: Almost finished (not ground or polished) felsite axehead. Courtesy of Ian Tait/Jenny Murray, Shetland Museum.

However, operational specialization did not only take place within the North Roe quarrying complex. It is also obvious that differential specialization characterized the relationship between the North Roe area and domestic settlements outside this area. Till this day, no pol-ished felsite axeheads or Shetland knives have been recovered from North Roe, with all polished felsite objects having been recovered from sites, or as stray finds, south of Ronas Voe. This suggests that, in North Roe, blocks of felsite were mined and axehead and knife rough-outs produced, but that these preforms were ground and polished (that is, made into final tools) outside the quarrying complex. Fig. 4

There may be many reasons for this separation of processes, either practical and/or ideological, but it is almost certain that the procurement of felsite in North Roe included some religious considerations, and that the quarrying of felsite was, at least to a degree, ritualized. Pete Topping's (2005) analysis of flint quarrying at Grimes Graves in Suffolk suggests ritualization of flint procurement at this extensive location, and he presents the following generalized 'cycle of events': 1) cleansing rituals, 2) offerings, 3) extraction, 4) post-extraction prayers and offerings, 5) artefact production, 6) ceremonial use of [some] artefacts, and 7) rites of renewal.

Scott & Thiessen's (2005) analysis of catlinite extraction (for ceremonial pipes) at a location in Minnesota puts forward

a list of rituals to be carried out in connection with the pro-curement of this raw material. Although it should be remembered that catlinite was intended exclusively for use in the ceremonial sphere, their account of the social context of the quarrying operations is in line with the social contexts defined in relation to the mining of 'general purpose' raw materials (such as Grimes Graves flint; Topping, above). Consequently, their list of 'attendant rituals' may have implications for the understanding of prehistoric raw material procurement in general: 1) the quarry is sacred and the quarriers therefore camp away from the outcrop; 2) a three-day purification ritual is carried out; 3) offerings are made to propitiate the guardian spirits and seek permission to extract the wanted stone; 4) sexual relations with women are to be avoided during this period; 5) exclusion of women from the quarry while mining was on-going; and 6) the quarrier had to be a man above reproach (compare this list with Topping's'cycle of events', above).

The Distribution of felsite across Shetland – further modification, use and recycling

So far, no maps have been produced to show the distribution of worked felsite not to mention: the different classes of felsite implements across Shetland, and it is presently uncertain whether there are more felsite in some parts of the Island group than in others. However, it is clear that felsite occurs throughout Shetland in a number of different contexts, namely 1) as part of assemblages from domestic settlements, 2) as burial goods, 3) in the form of caches, and 4) as stray finds.

At domestic settlements, felsite is usually either absent, or it occurs in small numbers. The settlement finds usually include fragments of felsite, a few axehead or knife fragments, or a limited number of smaller tools, frequently based on parts of cannibalized felsite axeheads (eg, at Scord of Brouster in West Mainland, and at Scatness Brough in Sumburgh; Ballin 2005 [Scord]; 2008 [Scat rep]). The cist burial at Sumburgh (Hedges et al. 1980) includes one small axehead which has been classified as felsite; however, this classification is based on simple visual inspection and the piece should be either thin-sectioned or analysed by XRF. The most well-known felsite deposition is arguably the cache from Stourbrough Hill in West Mainland (Fojut forthcoming), where Noel Fojut came upon 19 finely polished unused Shetland knives, stacked vertically like books on a shelf. It is uncertain whether this is a 'trade' cache or a ritual deposition. However, the most numerous group of felsite objects are the stray finds, which include many fragments, as well as intact implements.

The Shetland axeheads (almost all stray finds) were examined and summarily characterized by Ritchie (1992). He notes that the Shetland axeheads are generally considerably larger (in several cases with lengths of 200-300 mm) than the axeheads from, for example, Orkney, and that felsite axeheads are generally considerably larger than pieces in Cumbrian tuff or Antrim porcellanite. They are also usually neatly finished. He states that '... the purpose of the Shetland axeheads in general poses questions. Such information as is presently available shows that [Shetland was] typified by birch-hazel scrub, and one wonders why early Shet-landers needed such large axeheads. Apart from being large, many of the Shetland axeheads are very well made, sometimes with splayed cutting edges. They show little or no sign of use and give the impression of being ceremonial or prestige pieces'.

The latter may be an over-generalization, as some of the smaller felsite axeheads are obviously functional implements. Particularly small adzes seem to be functional pieces, being not only smaller and less elegantly shaped/finished, but also occasionally with marks from use. An assemblage from Lagan Tormore at Sullom Voe (presently being processed; Ballin forthcoming [LT rep]) includes two intact adzes, as well as several other felsite implements and various froms of felsite waste (some probably from adjusting the adzes' butts for haft-ing). The author characterized the two objects in the following way (ibid.):

'In functional terms, both pieces are adzes (L = 118 mm and 136 mm), and they were hafted with their working-edge at a perpendicular angle to the axe-shaft. This is indicated by their cross-section (plano-convex), edge-shape

Fig. 5; Adze from the stores of Shetland Museum – the axeheads from Laggan Tormore belong to this formal category. Courtesy of Ian Tait, Shetland Museum.

(hollow-edged), profile category (asymmetrical), and working-edge profile (asymmetrical). Fig. 5 Both axeheads are fully polished, but they also differ on several points: where one (CAT 1078) has a splayed edge, the other piece (CAT 1079) has parallel lateral sides, and where the former has a rounded/pointed butt, the latter has a flat/flat butt – that is, flat seen from above and flat seen from the side. CAT 1078 needed minimal additional modification to allow it to be fitted into an existing axe-shaft, whereas CAT 1079 was substantially altered: to allow hafting, its butt was made considerably narrower by the detachment of several relatively large flakes by strikes to its lateral sides. This probably indicates that 1) these axeheads were working-implements, and not pieces for ritual deposition, and 2) on Shetland with its sparse growth of trees, good wooden shafts were more valuable than the polished working-axeheads'.

As mentioned above, it is thought that Shetland axeheads and knives in felsite were polished outside the main procurement area in North Roe, but at present it is uncertain whether this happened at specialized sites - for example in coastal parts of North Roe – or at ordinary settlement sites. So far, there is no evidence to support large-scale polishing of felsite artefacts at any of the known domestic sites from Shetland.

To fully understand the production, distribution and use of felsite artefacts within Shetland, it is essential that, in the future, felsite axeheads and knives are subdivided into formal classes some possibly being functional and some ceremonial, and that distribution maps are produced, showing the exact dissemination of these pieces across the island group.

The distribution of felsite outwith Shetland – comparison of the felsite exchange net-work with other contemporary networks

As mentioned above, felsite practically never left Shetland (no knives and very few axe-heads), and an effort was apparently made to retain artefacts in this raw material within the Shetland social territory. Below, a number of other raw materials and their distribution pat-terns are investigated to find out whether this practice was common in Neolithic times, or whether it sets Shetland apart as in some way following a different – more isolationist – path to paths chosen by other social groups in Britain and Northwest Europe.

The main factor influencing the exchange of raw materials in the Neolithic period was probably whether the individual raw materials were associated predominantly with functional or symbolic values. Exchange of raw materials asso-

ciated with functional values tends to be characterized by gradually declining fall-off curves, whereas exchange of raw materials asso-ciated with symbolic values tend to be characterized by more complex fall-of curves (cf. Ballin 2009 [pitch]).

The distribution of Cambrian (or Kinnekullen) flint in central Sweden is an eminent example of the first form of regression. This type of flint, which was used and exchanged in the Late Mesolithic Lihult period of western and central Sweden, is characterized by conchoidal fracture as well as numerous cracks, and it is generally perceived as a relatively poor raw material (Kindgren 1991; Högberg & Olausson 2007: 132). It is found at the Kinnekullen peak, near the Hornborga Lake, from where it was distributed throughout a zone with a c. 100 km radius, Fig. 6. The fall-off curve for this resource, whether linear or logarithmic, is gradually as well as steeply declining, and both curves are associated with a high correlation coefficient, showing an almost perfect relationship between distance and quantity (R2 = 0.91 and 0.86, respectively). It is clear that, in this case, a particular low-grade raw material was ex-ploited heavily near the source but, with growing distance to source, it was gradually replaced by other raw materials which were obtainable at a lower price if obtained by exchange or input of labour if obtained by direct procurement. The exaggerated steepness of the curve is an indicator of the relatively low value of this resource.

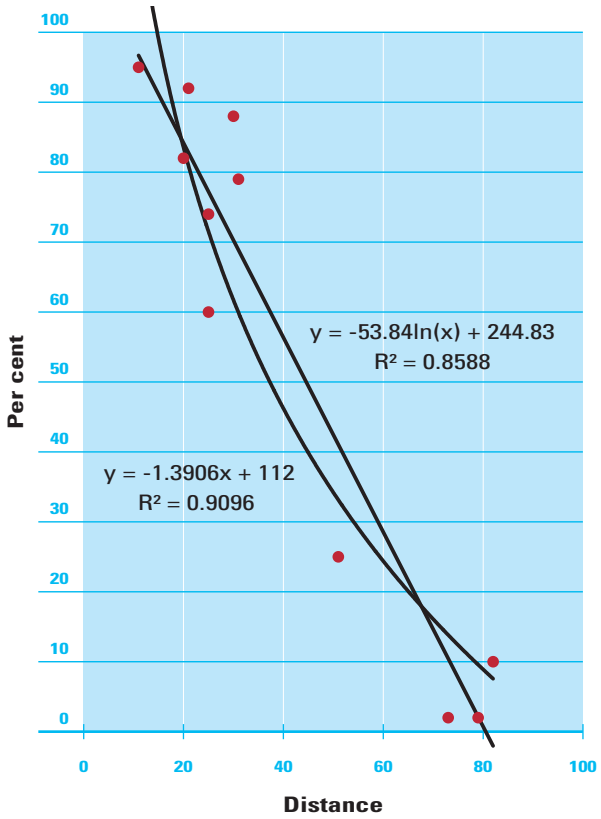

Fig. 6: Linear and logarithmic fall-off curves for Cambrian flint from the Kinnekullen peak in central Sweden (based on information from Kindgren 1991, Table 4). The correlation coefficients of the two curves have been calculated.

Chert another somewhat flawed raw material from southern Scotland (Ballin & Johnson 2005) is characterized by a similar form of fall-off curve, where settle-

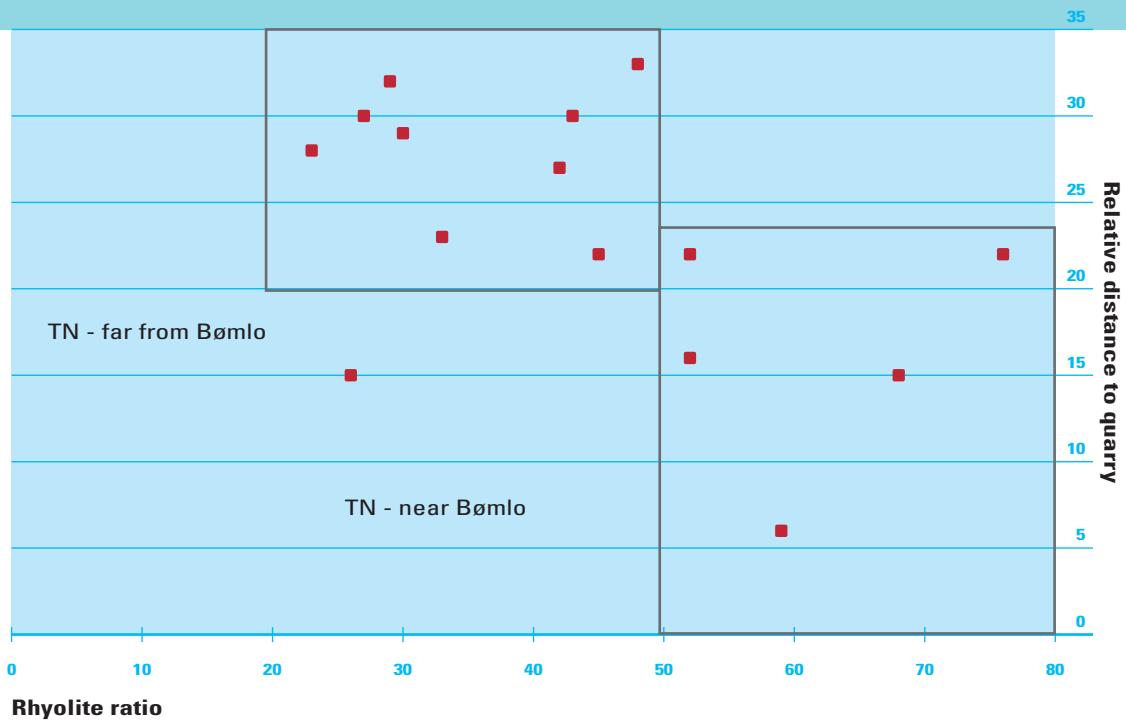

Fig. 7: The distribution of worked rhyolite in relation to the Bømlo quarry complex.

ments in the interior of this region are dominated completely by the use of the locally abundant chert, whereas the proportion of this raw material declines gradually and rapidly towards the coastal zone where pebble flint with considerably better flaking properties and offering more durable cutting edges was available.

With an abrupt stop to the exchange of felsite at the coastal borders of the Shetland social territory, it is almost certain that felsite was considered more than simply a functional raw material, and it is therefore most appropriately compared to exchanged Neolithic raw materials with similar non-linear fall-off curves, such as Bømlo rhyolite (Early Neolithic), Arran pitchstone (mainly Early Neolithic), and Yorkshire flint (mainly Late Neolithic).

In Southwest Norway, Bømlo rhyolite was introduced quite rapidly at the beginning of the Early Neolithic, and it was used for blade and small-tool production throughout this period. Fig. 7 shows the distribution and ratio (rhyolite proportion of assemblage) of worked rhyolite in relation to the Bømlo quarry complex, and it is possible to note several trends – although the relatively low number of sites should be borne in mind: 1) Near the quarry complex, rhyolite makes up c. 50-80% of assemblages; 2) further from the quarries, rhyolite makes up c. 20-

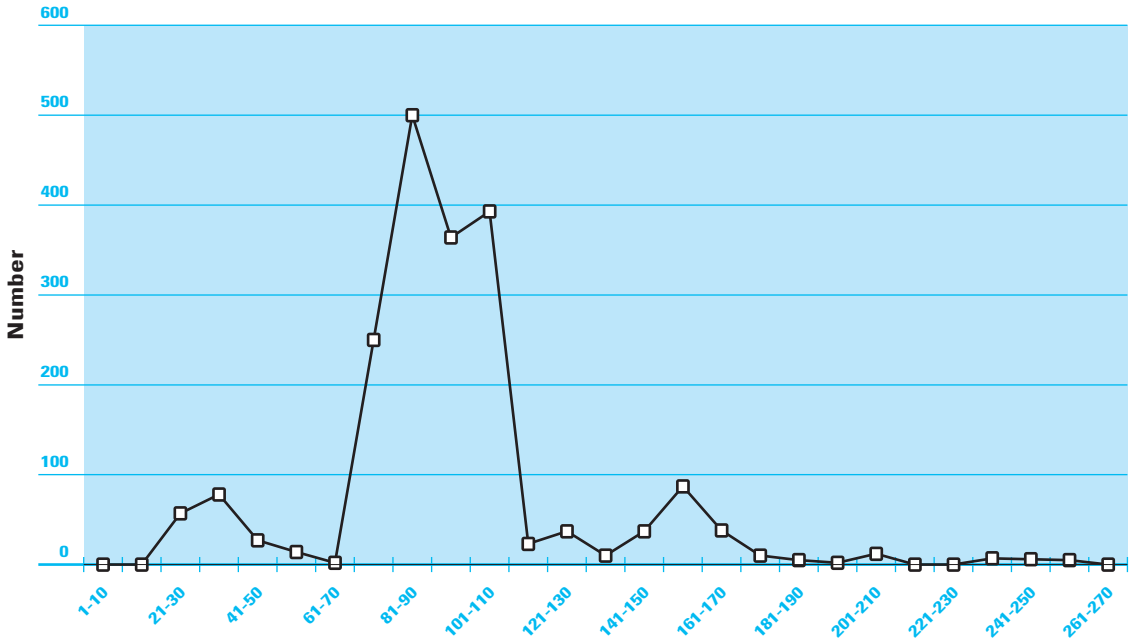

Fig. 8: The distribution of pitchstone outwith the central area (Arran/Argyll and Bute) of the exchange network.

50% of assemblages; 3) at a certain distance, the rhyolite ratio drops abruptly to 0%. Fig. 7 If addition of further evidence supports this pattern, the following could be suggested: 1) The distribution of rhyolite is most certainly not linear (in contrast to the distribution of Cambrian flint, above), and the relatively high rhyolite ratio throughout Southwest Norway, in conjunction with the abrupt drop in ratio at a certain distance, indicates that rhyolite may have had an emblematic function, that is, as a material marker of group identification; 2) the two-step distribution pattern in Fig. 7 may indicate that Southwest Norway represents a social macro-territory, which was sub-divided into several social micro-territories possibly representing the 'tribe' and either 'clans' or 'lineages', respectively.

The abrupt drop in the rhyolite ratio apparently coincides with natural markers in the landscape, such as deep or broad fiords. Although the topography of Southwest Norway and Shetland differ somewhat, the two distribution patterns have obvious similarities, like the abrupt drop in frequency at a potential territorial border, with near-zero distribution outwith this area. Pitchstone, a raw material for small-tool production, was used on the source is-

	Cambrian flint	**Southern Scottish chert**
Period	Mesolithic	Mesolithic/Early Neolithic
Used for	Small tools	Small tools
Extent of exchange network	The Kinnekullen area (radius c. 100km)	Central and southern Scotland
Distribution pattern	Steep linear regression when alternative raw materials become available	Steep linear regression when alternative raw materials become available
Perceived as	Largely functional	Largely functional
	North Roe felsite	**Bømlo rhyolite**
Period	*Later Neolithic*	Early Neolithic
Used for	*Axeheads and Shetland knives*	Small tools
Extent of exchange network	*Shetland Islands*	SW Norway
Distribution pattern	*Shetland only*	SW Norway only
Perceived as	*Emblematic (social ID)*	Emblematic (social ID)
	Arran pitchstone	**Yorkshire flint**
Period	Early Neolithic (off Arran)	Late Neolithic
Used for	Small tools	Axeheads and small tools
Extent of exchange network	Northern Britain (less Shetland)	Northern Britain (less Shetland)
Distribution pattern	Multi-peaked fall-off curve	Excl. use in S / centralized distr. in N
Perceived as	Emblematic / prestige-related exotica	Functional / prestige-related exotica

Table 1. Brief summaries of the exchange networks discussed in this section.

land of Arran possibly including Argyll & Bute throughout prehistory, Fig. 8. The exchange in pitchstone outside this area is mainly an Early Neolithic phenomenon, and it is characterized by several peaks. The distribution is extensive, with finds of pitchstone having been made as far to the north as Orkney and as far south as the Isle of Man and southern Cumbria (Ballin 2009).

It is thought that the exchange of Arran pitchstone may have been organized in a complex network based on redistribution centres. The fall-off curve in Fig. 7 suggests that, on the Irish and British mainlands, redistribution occurred via very large centres, supplying extensive areas of hinterland. The frequency of pitchstone clearly declines with growing distance to the sources on Arran, and it is possible to suggest a zonation of Scotland / northern Britain based on this fact: Arran itself represents one zone, characterised by very high proportions of pitchstone and use of volcanic glass throughout the Mesolithic, Neolithic and Early Bronze Age periods; a zone around Arran – involving the western half of southern Scotland and Northern Ireland – is characterised by the presence of vast centres, each counting more than 500

pieces within one 10 x 10 km square (Fig. 8); in a third zone – Southeast Scotland and the area around the Firth of Forth near Edinburgh – pitchstone is still relatively common, but it does not occur in these exceptional numbers; and in a peripheral zone up to 400 km from Arran, pitchstone-bearing sites are characterised by the presence of, at most, one or two pieces apart from on Orkney, where pitchstone artefacts are relatively numerous in assemblages from ritual and high status sites. Table 1

This distribution pattern differs considerably from those of the rhyolite and felsite exchange networks. Pitchstone may have had an emblematic function to the people (tribe) controlling the raw material sources (with Arran/Bute being the only part of Scotland where assemblages may be exclusively in, or dominated by, pitchstone, possibly identifying people within this social territory as 'those who use pitchstone'), but in the bigger picture pitchstone exchange may have been the 'glue' by which numerous social territories were held together in a single over-arching social structure or contact network. Within Scotland, only Shetland has no pitchstone-bearing assemblages.

The exchange of Yorkshire flint was discussed by the author (Ballin 2011c) in connection with his work on the lithic finds from the Overhowden Henge in the Scottish Borders. This raw material was used during the Late Neolithic period for the production of small-tools as well as flint axeheads, and, towards the north, the exchange network extends from the greater Yorkshire area to Orkney as in the pitchstone case, Shetland seems to have been excluded from the exchange network.

It is difficult to fully comprehend the meaning of the Yorkshire flint exchange, as the Late Neolithic sites investigated in Scotland may not be representative of the full range of site types: apparently, many known locations are either ritual sites or high-prestige settlements rather than traditional domestic sites. Presently, finds from southern and northern Scotland suggest that Yorkshire flint may have been perceived differently at the centre, and near the periphery, of this vast exchange network: in southern Scotland – that is, the Scottish Borders, South Lanarkshire, and the Lothian counties – lithic assemblages are almost exclusively in this material, indicating that it may have been perceived predominantly as a functional mate-rial, whereas in the north – for example on Orkney – it may have been perceived as imbued with symbolic meaning, representing contacts with 'strange' far-away places, and probably obtained at a premium. On Orkney, sites near the ritual centres may include approximately 50% Yorkshire

flint and some Arran pitchstone, whereas sites near the island group's periphery – such as, Pool on Sanday and Links of Noltland on Westray (Hunter 2007; Moore 2011) – contain no or very little Yorkshire flint and no pitchstone.

Conclusion

As explained above, the distribution of felsite is complex and highly structured, with the dis-tribution of felsite indicating multi-layered organization of the reduction process and exchange. It has been possible to identify several levels of organization:

- Within the North Roe quarry complex, two main forms of reduction have been recognized so far (more may be defined in the future) – the quarrying of crude blocks/flakes, and the production of axehead and knife preforms.
- It appears that the Neolithic quarriers defined the different forms of felsite as more or less suitable for the production of axeheads and Shetland knives, respectively, and the concentrations of felsite waste may be subdivided into 1) 'tailing piles', with waste having been deposited on top of, or alongside, the dykes, and 2) specialized workshops for the production of axehead and knife preforms.
- The reduction of felsite included not only North Roe, but Shetland as a whole, with the polishing of felsite implements probably having taken place 'off the mountain', that is, either in the coastal parts of North Roe, or south of Rona's Voe; it is uncertain whether this took place at specialized sites or at the domestic settlements.
- Although the exchange network of felsite may only cover Shetland itself, prehistoric considerations regarding the distribution of felsite must have included 'the outside world', with decisions having been made, effectively restricting the exchange to the parent territory.

The comparison of the felsite exchange network with other early prehistoric networks from Scotland and NW Europe identified important differences and similarities. Three main forms of distributional expressions were identified, namely: 1) simple linear regression; 2) abrupt, or stepped, termination of the distribution; and 3) highly complex patterns, usually characterized by multiple peaks and different forms of distribution in different parts of the network.

Simple linear regression seems to characterize raw materials which were generally per-ceived in prehistory as functional, and the territories tend to be relatively small, forming parts of larger social territories. Abrupt, or stepped, termination of the distribution usually

characterizes raw materials which were perceived as emblematic, that is, they defined particular social groups and their territories ('our tribe uses felsite, rhyolite, etc., but other tribes don't, as we have restricted the distribution of this raw material'). And the more complex exchange networks included several social territories and several forms of distribution, with people in the various territories (at varying distances to the source) possibly perceiving the raw material in question differently:

1) at the centre of the pitchstone network – that is, on Arran – pitchstone was used al-most exclusively, and it was probably perceived in emblematic terms, defining people on Arran as 'those who use pitchstone'; off Arran, objects in this raw material are likely to have been seen as precious exotica, with the value growing towards the network's periphery;
2) the somewhat later Yorkshire flint network has a considerably larger core area characterized by the almost exclusive use of this raw material; this core area has a radius of c. 500 km, where the exclusive pitchstone centre had a radius of c. 50 km. It is possible that Yorkshire flint may have been perceived in functional terms in this area, whereas objects in this raw material were perceived as precious exotica at greater distances to the source, as indicated on Orkney where high-prestige central sites have much 'imported' Yorkshire flint and Arran pitchstone, and ordinary domestic sites have none .

Combined, the above suggests that, despite the limited geographical size of the felsite exchange network, the reduction and distribution of North Roe felsite was highly and tightly organized, and the Neolithic society responsible for the dissemination of felsite probably quite sophisticated. However, compared to the neighbouring Orcadian social territory at the same time – that is, during the Late Neolithic period – with its complex ritual centres and a seemingly clear hierarchical structure, the Shetland society appears somewhat simpler. Where the Orcadian Late Neolithic society almost has the appearance of a budding chiefdom, the contemporary Shetland society has the appearance of a more egalitarian tribal society. However, much more research needs to be carried out before any firm conclusions can be made regarding any differences between these two interesting island groups.

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Axes from islands: the role of stone axeheads from insular sources in the Neolithic of Ireland and Britain

Gabriel Cooney

Introduction

A notable feature of the Neolithic (4000-2500 cal BC) of northwest Europe is the exploitation of lithic sources on islands for the production of stone axeheads and other artifacts. Examples include Hespriholmen in western Norway (Alsaker 1987; Bergsvik 2006), Helgoland (Germany) off the coast of Denmark (e.g. Wentink 2006) and sites on the Channel Islands (Patton 1991). This paper focuses on work being carried out by the author and colleagues on three such islands; Lambay (source: porphyry) in the Irish Sea off the east coast of Ireland, Rathlin (source: porcellanite) in the North Channel off the northeast coast of Ireland and the island group of Shetland (source: felsite) between the North Atlantic and the North Sea. The evidence from quarry sites on these islands will be used to discuss the significance of island stone quarries and the distribution of objects from these sources as an aspect of the introduction of farming and the development of Neolithic societies in the Irish Sea Zone and North Atlantic. Relevant issues to be considered include the date at which organized quarrying commenced, production processes and the spatial location of different stages of production. These issues will be linked to the examination of the extent and character of the distribution of axeheads from the sources and the social networks involved.

Lambay, local lives and wider landmarks

Lambay is located about 11 km north of the peninsula of Howth, which forms the northern edge of Dublin Bay, and 8 km from the nearest part of the Dublin coast-

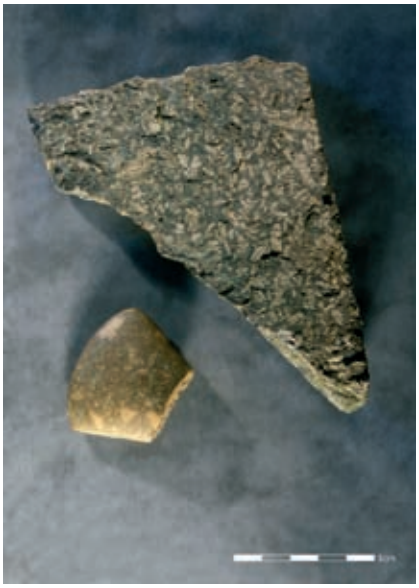

Fig. 1 (left): Lambay porphyry (porphyritic andesite) , a piece of outcrop and an axe produced from the same material. Photo: Gabriel Cooney

Fig. 2 (right): Excavated quarry face and surface of working floor with debitage, Eagle's Nest site, Lambay. Photo: Gabriel Cooney

line. It is the largest island off the east coast of Ireland and has a dramatic skyline, created by the fact that the island is largely volcanic in geological origin (Stillman 1994), added to by a large cairn on the highest point of the island, Knockbane (the white cairn). Excavation has been carried out at a Neolithic axe quarry site known as the Eagle's Nest, close to the centre of the island (e.g. Cooney 1998; 2005; 2009). There is clear evidence on the site for material culture and events in the Neolithic that seem both to evoke the particular character of Lambay as an island but that also link it to a wider world. Examining such evidence one is reminded of Broodbank's (2000: 363) description of island people as people who are neither entirely different from the rest of the world nor yet wholly similar.

We can say something about the lives that Neolithic people lived on Lambay from surface collections of lithics (Dolan and Cooney 2010). The storm beaches on the west and south coast appeared to provide the most abundant source of flint, which was the dominant lithology used for small stone tools. The heaviest concentrations of lithics occurred in the same general area as the flint sources, although there was a widespread distribution of material across the island. Indeed the largest assemblage came from a terrace on the east-facing slope of the upland core of the island. It would also appear that there were persistent places that were used in the island landscape, as on the southern coast near the headland known as Black Point. The diagnostic artifacts were dominated by Neolithic

material but there were a couple of possible Early Mesolithic cores and a Late Mesolithic butt-trimmed flake.

What this material helps us to appreciate is the human context of the use of the Eagle's Nest quarry site during the Neolithic. Here a distinctive medium-grained volcanic rock, porphyry, or porphyritic andesite, was exploited for the production of stone axeheads (Fig. 1). The primary process of production was by hammering and pecking followed by grinding. All stages of axe production took place at the site. Radiocarbon dates indicate that quarrying started around 3800 cal BC (Early Neolithic) and there is evidence of the (episodic?) use of the site well into the later part of the fourth millennium cal BC (Middle Neolithic) (Cooney et al. 2011). Quarrying activity (Fig. 2) is complemented by deliberate deposition, both in the quarry areas and on the floor of a small valley between two worked outcrops. On this valley floor there is a sequence of features that begins with the digging and filling of pits, some which appear to be deliberately cut into by later pits. Then there is a switch to the placement on the ground of features (Fig. 3) and a range of cultural material was deposited in a number of events, for example at some point in the Middle Neolithic a hoard of objects including a pestle macehead, a porphyry roughout and axehead was deposited.

Fig. 3: Middle Neolithic setting of stone focused on a large slab, Eagle's Nest site, Lambay. Photo: Gabriel Cooney

Some of the contemporary features are reminiscent of the settings outside passage tombs. One of the notable features of the material culture is the deposition of jasper; broken and tested pebbles and a small number of beads and pendants, the latter of a type that are typically found in deposits in passage tombs (e.g. Eogan 1986). The evidence indicates that jasper outcrop veins and beach pebbles were being worked, either at the site or elsewhere on the island. Deposits of beach gravel at the site are another indicator of the deliberate deposition of material brought up from the coast. Ultimately this buildup of material resulted in the creation of a low cairn, at maximum about 10m in diameter.

It is attractive to think of the Eagle's Nest site as a place where porphyry was worked and deposited and where other material was brought and also deposited. In these actions the connections between a range of material culture, and the people involved, was reworked. The place-

ment of material on or under the ground may have been viewed as making linkages through a powerful conduit to the realm of the supernatural (La Motta and Schiffer 2001). In the deposition of porphyry axes and roughouts we see the beginning and the end of the biographical cycle of objects happening at the same location. Utilizing Bradley's (2000) test of the significance of natural places, his three major signifiers occur at the Eagle's Nest site: distinctive deposits, the embellishment of the landscape and artifacts made at special locations. It should also be noted that the majority of porphyry axeheads that can be said on the basis of petrological and geochemical analysis to definitely originate from the Eagle's Nest quarry were actually found in the excavation at the quarry.

Moving away from the quarry site it is worth noting that there are quarried porphyry pieces in the makeup of the cairn at Knockbane, the most notable prehistoric landmark on the island. Knockbane also takes us out to the wider world, it is placed to be seen. To the northeast on a clear winter's day the Isle of Man is visible. Looking north from Knockbane there is a distant view to Slieve Gullion (with a passage tomb on the summit) and the Carlingford and Mourne mountains (including Slieve Donard with the highest hill-top passage tomb in Ireland). Given these kinds of links it is obvious that the Neolithic activities on Lambay cannot be seen in isolation. What we are seeing are the links between activities on a specific island and the wider cultural setting in which they took place. In the Middle and Late Neolithic a term which Cunliffe (2001) has used for this wider cultural setting is the Boyne-Orcadian axis (see also discussion in Cooney 2000: 224-8). As a specific example the pestle type macehead (and there are fragments of others) from the Eagle's Nest site can be compared with those found in settlement and tomb contexts in Orkney and with the only example found in secure archaeological context in Ireland, from outside the outer sillstone in the passage of the western tomb structure under the main mound at Knowth (Simpson and Ransom 1992, 227). Interestingly in the surface collected material from close to the harbour on the western side of the island there was a worked piece of pitchstone from the the island of Arran (see Ballin 2009), providing another sign of a link with the Irish Sea world.

What we have at Lambay then in the form of the quarrying and depositional activity and the construction of Knockbane is the material manifestation of what Robb (2001: 196) has called the 'reworking of a regional symbolic heritage into a local, cosmologically grounded identity'.

A centre of island life, axe production on Rathlin Island

Gabriel Cooney, Stephen Mandal, Emmett O'Keeffe and Graeme Warren

Rathlin lies just over 10 km off Fair Head at the northeast corner of Ireland. An outstanding feature of the range of evidence for Neolithic activity on the island is the quarrying and production of porcellanite at Brockley (Fig. 4). Porcellanite accounts for at least 50% of the total number of Irish stone axeheads (Cooney and Mandal 1998), with a significant number known from Britain (Sheridan 1986; Sheridan et al. 1992: 410; porcellanite is labelled as Group IX in the British scheme for the petrological classification of stone axeheads and their sources). It takes a conchoidal fracture when struck, hence the chaîne opératoire by which porcellanite was shaped and transformed from raw material to cultural product can be followed (Bradley and Edmonds 1993; Mallory 1990).

There are two known sources for porcellanite axe production, at Tievebulliagh near Cushendall in Co. Antrim and Brockley on Rathlin. Cooney and Mandal (2000: 52–55) have reviewed the petrography of porcellanite axes and the sources. Trace-element geochemical (XRF) analysis has been applied to differentiate the two known sources and products from them (Meighan et al. 1993; Mandal et al. 1997). The results of this work have demonstrated that the traditional focus on Tievebulliagh, which has also been the subject of greater archaeological research (e.g. Jope 1952; Morey and Sabine 1952; Sheridan 1986; Mallory 1990), needs to be re-assessed. This is supported by the extent of quarrying at Brockley, and of the evidence for the processing and use of porcellanite from across the island.

Fig. 4: View of the porcellanite outcrop at Brockley from the south. Photo: Emmett O'Keeffe.

The porcellanite at Brockley was formed by the metamorphism of an interbasaltic horizon laterite in situ by a large dolerite intrusion (Dawson 1951). At the foot of the south-east side of the rock face, two

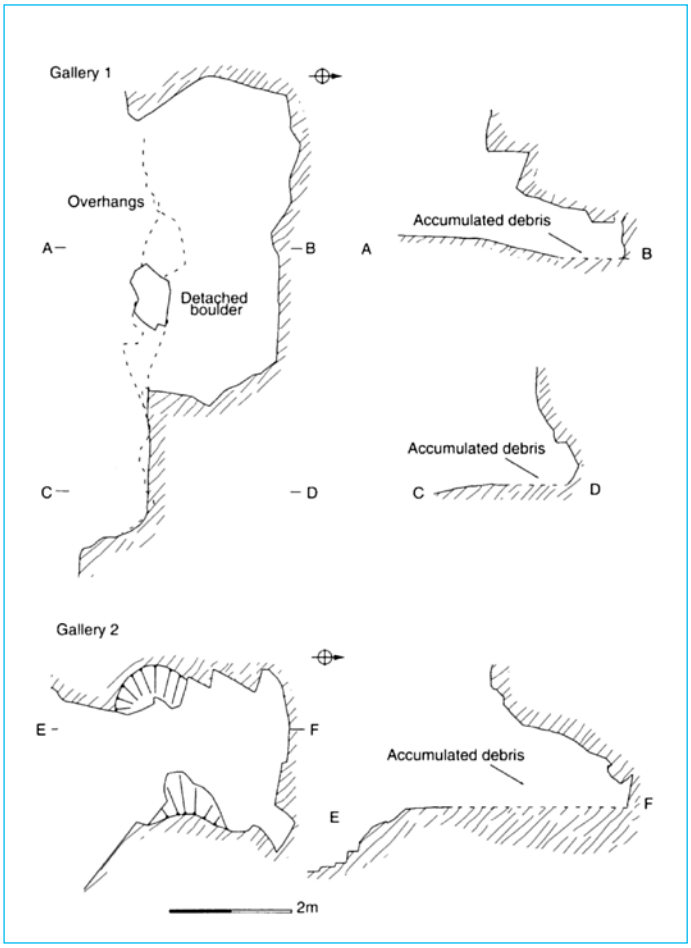

Fig. 5: Plan and section of galleries 1 and 2, Brockley. Drawing: Conor Brady

extraction sites (galleries 1 and 2; Figs. 4 and 5), some 5 m apart, are visible where rock extraction has created clear overhangs. They face almost due south and are clearly the result of quarrying the lowest part of the porcellanite outcrop. Conchoidal fracture scars can be seen on the roofs and sides of both. Fifteen metres to the north-east of gallery 1 is what appears to be an almost completely infilled quarry area (gallery 3).

Galleries 1 and 2 resemble the primary extraction sites at Top Buttress, Pike of Stickle, Great Langdale in Cumbria. These were excavated (Bradley and Edmonds 1993) as part of the project to understand the process of Neolithic extraction of volcanic tuff for the production of Group VI axes, the single most important stone source for axeheads in Britain. While there has been no excavation at Brockley itself, it is clear from the evidence of porcellanite objects that the primary purpose of quarrying was the production of roughouts for stone axeheads. Flaking was the predominant primary treatment, with minor evidence of pecking and cleaving (Cooney and Mandal 1998: 60).

The most widely occurring evidence for the process of axe production comes from the very large number of porcellanite roughouts in museums and other collections. Analysis of the Irish Stone Axe Project (ISAP) database suggests that there are a number of recurring roughout types. A feature that should be noted is the relatively high percentage of porcellanite axeheads with oblique-shaped butts. While some 9% of Irish stone axeheads in general have this form of butt, the figure rises to 16% for those of porcellanite (Cooney and Man-

dal 1998: 61). It is clear that that this feature had stylistic value, as many of the finest polished porcellanite axeheads have oblique butts (Fig. 6).

There are significant numbers of porcellanite roughouts (over 250) and finished axeheads (over 100) known from Rathlin and these along with porcellanite debitage have been found at many different places (Fig. 7). In addition, recent excavations at Knockans (Conway 1996) and Craigmacagan (Logue 2005) have revealed significant evidence for debitage, roughouts and finished axeheads. The evidence for the working of porcellanite from these and older excavations matches the range of

Fig. 6: Porcellanite roughout from Rathlin with an oblique butt. Photo: Wes Forsythe.

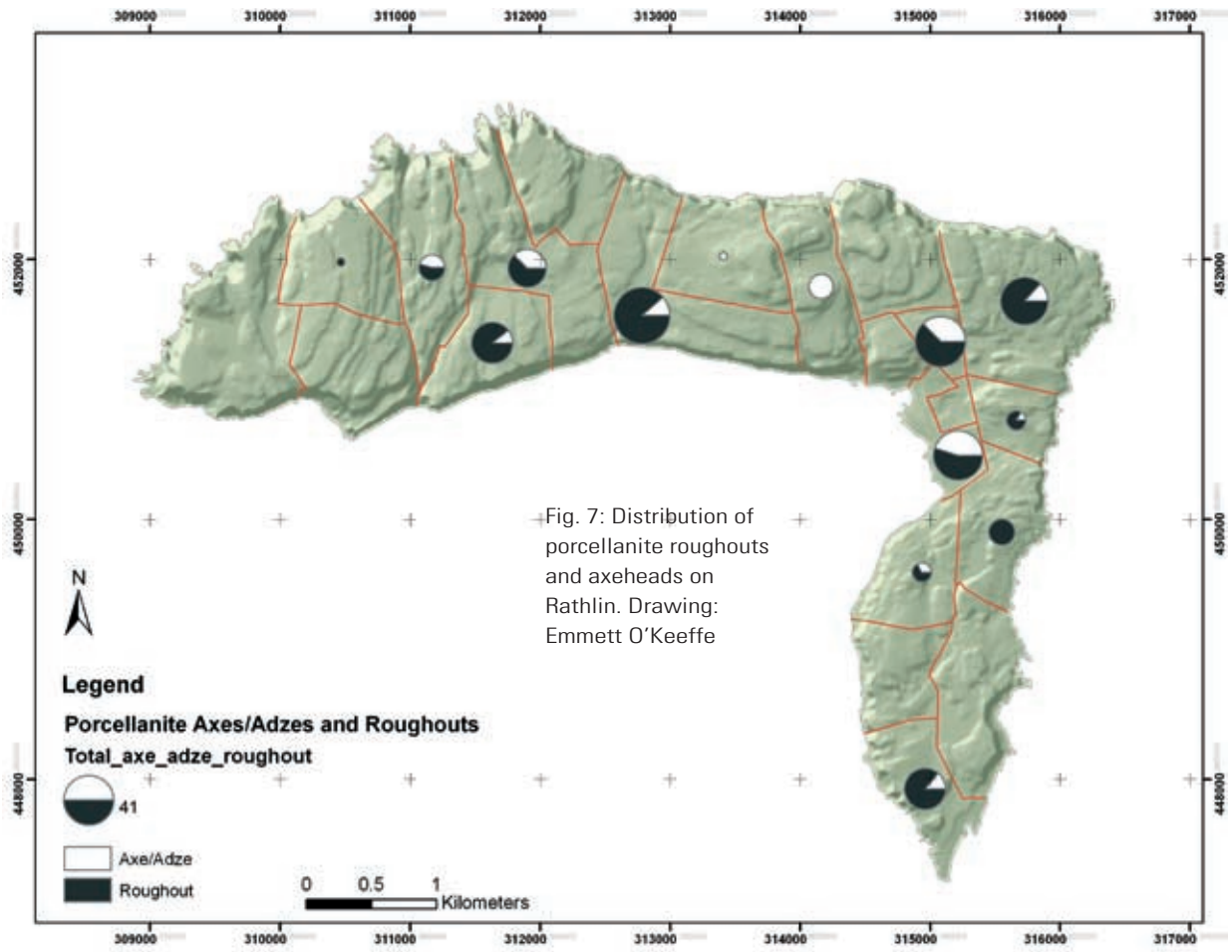

Fig. 7: Distribution of porcellanite roughouts and axeheads on Rathlin. Drawing: Emmett O'Keeffe

forms in museum collections. Hence the extraction site at Brockley was linked into a process of axe production that was spread widely across the island. The distribution patterns suggest most of the activity took place to the east of Brockley. The evidence from excavations indicates that following on from quarrying, all stages of axe production took place at different locations on the island. About 30% of the porcellanite axeheads from Rathlin have been ground and polished. Given the number of ground and polished axeheads now known from the island, it is clear that there was no spatial separation of the primary (flaking) and secondary (grinding/polishing) stages of production. This indicates that a much higher percentage of finished axeheads was exported from the island than was previously believed, based on a model emphasising the transport of roughouts to coastal locations on the mainland.

That axeheads from the Brockley source were transported off the island has been confirmed by trace-element geochemical (XRF) analysis of samples taken from the two sources at Tievebulliagh and Brockley and from a selection of porcellanite axeheads (Meighan et al. 1993; Mandal et al. 1997). Tievebulliagh and Brockley samples have different strontium levels, hence it is now possible, using Sr as a discriminant, to relate porcellanite axeheads to their respective sources. Of the 32 axeheads analysed (Mandal et al. 1997: table 2), the five from Rathlin all have Sr values correlating with the Brockley source. Of the 27 other axeheads, 13 fall within the Brockley source field and a further two probably originated from the Brockley source. This strongly supports the view that the importance of the Brockley source has been greatly underestimated in the literature.

Recognising that it is only a very small sample, looking at those axeheads that appear to have originated from Brockley and have provenances off the island allows us to make further comments about the character of porcellanite stone axe production on and distribution from the island of Rathlin. They provide support for the suggestion by Sheridan (1986: 22) that some of the material from Rathlin was transported by sea along the north coast of Ireland. The identified Brockley artefact that is the greatest distance from the source is an axehead from Clonsilla, Co. Dublin (NMI 1942:715). This is 18.7 cm in length. and argues against a simple down-the-line exchange process which would tend to see small axeheads dominant with increasing distance from the source as the axeheads are re-worked (see discussion in Chappell 1987: chapter XI). Conversely there are porcellanite roughouts from Rathlin that are only 9-10 cm in length, indicating that small axeheads as well

as larger ones were being produced on the island.

On Rathlin there are a small number of axeheads made from non-local stone sources; two gabbro axeheads and two shale axeheads which could have been produced from a number of sources in Northern Ireland, but not on the island. One of the shale axeheads from Rathlin appears to have come from a hoard of five axeheads (Briggs 1988: 7), the other four being of porcellanite. The shale axehead is complete and is ground and polished, as are two of the porcellanite axeheads, one complete, one the lower portion of an axehead. The other two porcellanite objects are roughouts. What is interesting here are the physical connections made between the different stages of axe production and an axehead made of a different lithology. Bradley (1990: 33) has commented that archaeologists actually observe only two stages in the life cycle of an artifact: its production and final deposition, we have to work much harder to actually understand how axes were used and moved. What we can observe from the archaeological record of axe production on Rathlin is that it was both an important aspect of island life and that it provides us with a physical, material reminder of a wider world of contacts and movement to and from the island.

Objects for an island world, North Roe Felsite, Shetland

Gabriel Cooney, Torben Ballin and Will Megarry

While not widely known or discussed in the archaeological literature, the felsite quarries of the North Roe peninsula, mainland Shetland probably represent the most extensive and best-preserved Neolithic quarry complex in Britain or Ireland. As detailed by Ballin (2011a) the term felsite is used to refer to a number of related rock types. Ritchie (1968) singled out riebeckite felsite, due to its spectacular appearance but it would appear that a number of forms of felsite were exploited. Felsite dykes, as mapped by Phemister et al. (1952) are orientated north-south and visually (as grey, blue, bluish-green or purple) stand out against the red granite bedrock (Fig. 8). Ritchie (1968; 1992) noted the significance of the exploitation of these dykes for the production of axeheads and Shetland knives. Varieties of felsite are visually spectacular when polished. Ballin's (2011a) examination of felsite implements in the Shetland Museum suggests

Fig. 8:
The contrast between granite and felsite outcrops, North Mavine, Shetland. Photo: Gabriel Cooney

that axeheads were made from generally homogeneous forms of felsite, without spherulites, but with small phenocrysts of quartz and feldspar. The knives are more striking in appearance, with above-average size spherulites, but mostly containing few phenocrysts. Hence the aesthetic appearance of the artifacts appears to have been a very significant factor across the Shetland archipelago.

Ballin (2011a; 2011b) has undertaken several short reconnaissance survey stints. This work indicates that different types of felsite were used in the production of tools. There are areas where felsite appear to have been exploited extensively and others where activity seems to have been more sporadic. Different kinds of quarry activity areas have been recognised: quarries, tailing piles with quarried material, block reduction sites and work sites where

the tool pre-forms or rough-outs were produced. Potentially related features such as small shelters and cairns can be recognized and at the Beorgs of Uyea there is the well-known lintelled gallery, with one lateral side formed by a worked felsite dyke (Scott and Calder 1952). Three distinct zones can be recognized in the quarry complex; The Beorgs (of Uyea) / Pettadale Water, Midfield (east of Ronas Hill) and the central Lakelands (the area between the two main quarry complexes). An important factor to be considered is the presence of blanket peat over much of the complex, particularly the lower-lying areas. There are locations where the peat has been eroded and felsite can be seen but it is difficult to characterize the nature of this material. More broadly the issue is the amount and character of evidence that may be concealed by the blanket peat cover.

Preliminary analysis of museum collections indicates that the distribution of felsite products was widespread within but restricted to the Shetland archipelago (see Ballin 2011c: 38-9). Combined with the exceptional quality of the evidence for quarrying and production in North Roe this geographic context facilitates following the cultural life of felsite objects through extraction, production, use-life and deposition, in some cases as spectacular caches or hoards and in other cases in houses, where they mainly occur in fragmentary or re-used form. The distribution and context of these artifacts can be taken as a proxy for the amount and nature of exchange and contact within and between island communities in Shetland and how this changed over time. This evidence provides a critically important research opportunity to examine the dynamics of island life and compare and contrast it with Neolithic societies elsewhere in Europe.

Fig. 9: Palimpset with multiple episodes of quarried blocks, Beorgs of Uyea. Photo: Gabriel Cooney

During September 2011, following up on earlier reconnaissance work, selected areas of North Roe were inspected as part of the definition and planning of a project investigating Neolithic felsite quarrying in North Roe. The foci of this project will be: felsite quarrying technology and organization; felsite blank, preform and tool technology and organization; felsite exchange within North Roe/Shetland, and beyond; dating the exploitation of felsite; and finally, building on the evidence-base of the project, the social role of felsite in Neolithic Shetland.

As previous years' archaeological activity in North Roe (Ballin 2011a; 2011b) had shown that felsite dykes in the central (Lakelands) parts of the peninsula had been prospected by prehistoric people, but not subjected to organized exploitation, work focused on selected locations on the Beorgs of Uyea ridge (northern North Roe) and along the elongated summit of Midfield (southern North Roe) east of Ronas Hill. Scrutiny of axehead and knife rough-outs and production waste, as well as the different types of felsite available in the selected areas, indicates that axeheads and Shetland knives were manufactured in both locations. However, it was also possible to characterize the two areas as having different potential value for archaeological investigation. The Beorgs of Uyea, for example, is defined by extensive exploitation, probably over a prolonged period of time, and the deposits of quarrying waste have a clear palimpsest appearance (Fig. 9). By contrast, the Midfield summit, or ridge, is characterized by the presence of many discrete, probably single-event, workshops and clusters of workshops.

Looking at Midfield in more detail, it was possible to define two main areas of activity, associated with two parallel felsite dykes. Midfield 1 (western dyke) is characterized by two main quarry pits and one main large workshop, probably representing repeated exploitation (although not to a degree comparable to that seen at the Beorgs), relating to combined axehead and knife production. Midfield 2 (eastern dyke), on the other hand, is characterized by four or five quarry pits along a felsite outcrop (Fig. 10), with discrete, probably single-event workshops, located on either side of the dyke. This eastern dyke follows the landscape contours, and workshops defined by coarse waste from axehead production were found on the eastern (downslope) side of the dyke, whereas workshops defined by finer waste from knife production were found on the western (up-slope) side of the dyke (Fig. 11).

The Midfield 2 quarry pits and workshops have been identified as an initial

Fig. 10: Quarry pits along the eastern dyke at Midfield, looking south. Photo: Gabriel Cooney

Fig. 11:
Knive workshop at eastern dyke, Midfield.
Photo: Gabriel Cooney

focus of the project. Understanding discrete activity areas will facilitate analysis and interpretation of other areas of the quarry complex which have a palimpsest character and the wider role of felsite artifacts in Neolithic Shetland. Key objectives of the project are the detailed survey, mapping and characterisation of the quarry complex. This will be combined with an analysis of museum collections. A project GIS (Geographical Information Systems) is being developed and is seen as essential for the effective and accurate survey of the quarry complex. The multi-scalar and reflexive character of the GIS means that it can facilitate research at differing scales and assist in research design.

As mentioned above the aim of the project is to understand the role of this distinctive local island stone source – felsite, which Neolithic people physically and culturally transformed into axeheads and the highly distinctive Shetland knives. It is recognized that Shetland is the northernmost part of Europe where farming was practiced during the Neolithic (3800-2500 cal BC). In the archipelago there is widespread evidence of the stone houses, settlements, field systems and tombs that early farmers built and used. The quarrying, production and use of felsite objects from North Roe provides an opportunity to explore the links between these different nodes of Neolithic activity and to understand how felsite quarrying formed part of Neolithic society in Shetland.

Stone: Bringing the notion of special places and inter-connection together

Gabriel Cooney

It is now recognised that for prehistoric societies stone was 'symbolically meaningful, ritually powerful and deeply interwoven into not just economic and material, but also social, cosmological, mythical, spiritual and philosophical aspects of life' (Boivin 2004: 2). Recognition that objects can be animate and regarded as active makes it useful to think of them from a biographical perspective (Kopytoff 1986; Gosden and Marshall 1999; Davis and Edmonds 2011). The character of the archaeological record at and from sites where stone was quarried and worked has potential to contribute to wider issues, for example how materials were engaged with in specific social and historical contexts (Ingold 2007; O'Connor and Cooney 2009: xxii; Cooney 2011)

While understanding of the archaeological record is based on quite different histories of research in each case, the three island case studies discussed above demonstate both the significance of the use of stone and its place in the Neolithic world and how we can use island lithic sources to address the complementaries recognised in the literature between notions of islands as fixed, bounded places and the fluidity and inter-connectivity of islands and mainlands created by the movement of people, the central importance and role of the sea and contact with other places in island life (see discussion in Van de Noort 2011). Study of the use of stone by island communities provides us with the opportunity to explore both these elements of island life. Objects of stone brought from or to islands literally carry their sense of place and history with them. The movement of material between locations and sources provides us with the opportunity to think about exchange systems.

Ballin (this volume) has suggested that we should think of the exchange of felsite as having an emblematic social function within Shetland and that more broadly the main factor influencing the exchange of raw materials during the Neolithic was whether they had functional and/or symbolic values. Looking at Lambay porphyry the very restricted distribution of objects from the Eagle's Nest site allied to the visually distinctive character of the axeheads seems to

support a symbolic interpretation. While the density of porcellanite from Rathlin and Tievebulliagh does generally decrease with distance from the known quarries, there are some concentrations at distance from the sources, suggesting that it was an important component in contact networks both within Ireland and across the Irish Sea.

Going back the critical issue of the relationship between these exchange networks and the establishment of the Neolithic, it will be clear that our state of knowledge is quite different for the three islands. In the case of Lambay there is direct evidence of quarrying from early in the Neolithic. There are no dates directly related to porcellanite production, but porcellanite axeheads and related debitage are known from key early Neolithic sites in Ireland such as Magheraboy (Danaher et al. 2007) and Donegore Hill (Mallory et al. 2011) causewayed enclosures suggesting that porcellanite production was a feature of how relationships were developed and maintained within and between the earliest farming communities in Ireland. In both cases it is clear that there was significant, continued use of the sources in the Middle Neolithic. In this context one of the key questions to be asked about the North Roe felsite quarry complex is whether, as the current view suggests it forms part of the established Neolithic in Shetland or whether, like on Lambay and Rathlin the quarrying and procurement of axes from special sources may have defined from the start of what it was to be 'Neolithic' (Cooney 2008).

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Multi-period construction of megalithic tombs – and the megalithic tombs in Shetland.

Flemming Kaul

Introduction

Around 4000 BC the agrarian economy swiftly spread over large areas of North-west Europe. Both in North Germany, South Scandinavia and on the British Isles and Ireland an economy based on hunting, fishing and gathering was replaced by farming and animal husbandry. This change had of course far reaching consequences for the Stone Age societies. The Neolithic way of life required other sorts of planning than the Mesolithic. A given area could produce more food, and the population density must have increased dramatically during the 4th Millennium BC. With the Neolithization the societies became more sedentary, and much work and planning were invested into a certain territory. An increasing need for marking the territory was a natural consequence of this development. Important places in the opened landscape became focus for the first monumental architecture. The landscapes were changed into ritual landscapes – from natural landscapes to cultural landscapes. Today we can still see the megalithic tombs in our landscapes, standing as the most solid testimony of these changes that took place almost 6000 years ago.

Almost everywhere in Western Europe the introduction of agriculture was followed by this first monumental architecture in the shape of megalithic tombs with stone-built chambers and heavy kerb stones. However, the megalithic tombs were not built immediately after the primary Neolithization. A couple of hundred years, at least, should be allowed for an establishment or initial phase of agriculture before the large megalith building activity began. It seems to be close to a rule of thumb that 300-500 years should elapse before the Stone

Age societies reached this point of monumental activity. In Denmark the building of dolmens began around 3500 BC, while the larger passage tombs were constructed at 3300-3100 BC (Jensen 2001: 359 ff.; Dehn & Hansen 2006). The stone-built tombs do not represent the earliest monumental burial architecture. During the preceding centuries earthen long barrows were built, often with monumental timber facades (Kaul 1988; Kjær Kristensen 1991; Andersen & Johansen 1992). However, there still seem to be a gap of a couple of centuries after 4000 BC, before this building activity commenced. The same pattern seems to emerge in England. Here the general assumption has tended to be that monumental architecture – long barrows and stone chambered tombs – was introduced at the very beginning of the Neolithic. However, among others a recent ^{14}C-dating programme has yielded results that make it unlikely that long barrows and long cairns appeared in southern Britain before 3750 BC (Thorpe 2009: 30). The building of smaller megalithic tombs in western Britain, such as the portal dolmens, may have begun a bit earlier.

Denmark should be highlighted as the country or region in Europe with the highest density of megalithic tombs. Today around 2400 dolmens and passage graves are – more or less – preserved, and under national guardianship. Due to an intensive and systematic recording programme of all prehistoric monuments, initiated in 1873, and directed from the National Museum, we have knowledge of many megalithic tombs that have disappeared since then: Altogether c. 7000 megalithic tombs have been registered (Ebbesen 1985: 12; Dehn, Hansen & Kaul 2000: 7). Earlier recordings of tombs not registered during the large campaigns of the National Museum hint at a much higher numbers of megalithic tombs than 7000. Many dolmens and passage tombs must have been destroyed already during the medieval period giving building material for churches; other tombs must have served as quarries for building of castles and manor houses of the 16th and 17th century. Consequently, it seems to be a sound estimate that around 25000 megalithic tombs were built in what is now Denmark (about 43000 square kilometers). About a tenth of what was originally built has survived till today (Ebbesen 1985: 37-40; Kaul & Krogh 1990: 245-257; Dehn, Hansen & Kaul 2000:7; Ebbesen 2007: 30-33).

When considering the time brackets for the building period of the megalithic tombs – 3500 BC-3200/3100 BC – a relatively short period of 300-400 years, then the megalithic achievement seems to be even greater. In average about 150 megalithic tombs should have been completed every year, and considering a

certain building period especially for the larger passage tombs, then in every 'parish' one would have seen building work in progress.

Compared with other megalithic regions, such as Ireland, the recorded number of tombs of Denmark – c. 7000 – is quite high. In Ireland 'only' c. 1450 megalithic tombs have been recorded (Shee Twohig 1990: 8). On the other hand, Denmark (and South Scandinavia) can not present enormous labor consuming monuments or monument complexes such as those from Ireland. Scotland can boast of around 600 megalithic tombs, with a much varied density. In certain areas of Brittany, and in Spain and Portugal the monument density is as high as in Denmark. That goes also for Orkney, but even Shetland with the northernmost megalithic tombs, including around 55 recorded sites (Henshall 1963), should be anticipated as a 'high density area'. And of course, as in South Scandinavia, many more monuments must originally have been constructed.

The northernmost megalithic tombs of Scandinavia

Denmark, South Sweden (Scania) and parts of North Germany represent the core areas of the megalith building achievement of the people of the Funnel Beaker

F. Kaul Photo.

Fig. 1:
The Skjeltorp dolmen, Østfold, South Norway, reconstructed and removed some meters from its original location.

F. Kaul Photo.

Fig. 2:
The northernmost passage tomb of Scandinavia, Massleberg, Skee Parish, Bohuslän, Sweden.

Culture. In South-western Scandinavia, the Neolithic expansion of the Funnel Beaker Culture halted close to what is now the Swedish-Norwegian border at Svinesund. Just north of this border, on each side of the Oslo Fjord, we find the northernmost dolmens of Continental Europe. At Holtnes on the Hurum Peninsula at the western side of the Oslo Fjord there are two small dolmen chambers where some of the kerb stones of the mound are preserved. In one of the chambers amber beads of types related to the Funnel Beaker culture have been found, and a 14C-sample has yielded a date to around 3500 BC (Østmo 2007; Glørstad 2009). On the eastern side of the Oslo Fjord, a bit further south, at Skjeltorp in Østfold, there is a partly preserved dolmen, with finds of Funnel Beaker pottery (Fig. 1). It should be noted that the megalithic tombs of Shetland are situated higher North than the northernmost ones from Norway (Kaul 2011: 46).

F. Kaul Photo.

Fig. 3:
The passage tomb, Snedstenan, Tanum Parish, Bohuslän, Sweden. One of the capstones, now tilted, is covered with later Bronze Age cup marks.

These few South Norwegian dolmens are relatively small, and even though some more megalithic tombs must have been built, the building activity here at the border of the Neolithic expansion was seemingly not overwhelming. But as soon as we go further south, crossing what is now the Norwegian-Swedish border, moving into Bohuslän, we find more megalithic tombs including a number of large passage graves. At Massleberg, just south of the border, a typical passage grave should be highlighted as being the northernmost of this type of monument (Fig. 2). Even larger is the passage tomb Snedstenan in Tanum Parish (Fig. 3). Further south, in Fallbygden, Västergötland, within an inland triangle of fertile land of c. 50 by 30 km there is a remarkable concentration of large passage tombs (Fig. 4). Around 300 megalithic tombs are recorded here, most of them being passage tombs (Persson & Sjögren 2001: 6). From Gothenburg there is not far along the Halland coast before reaching Scania and the core area of megalithic tombs.

Multi-period construction in Denmark

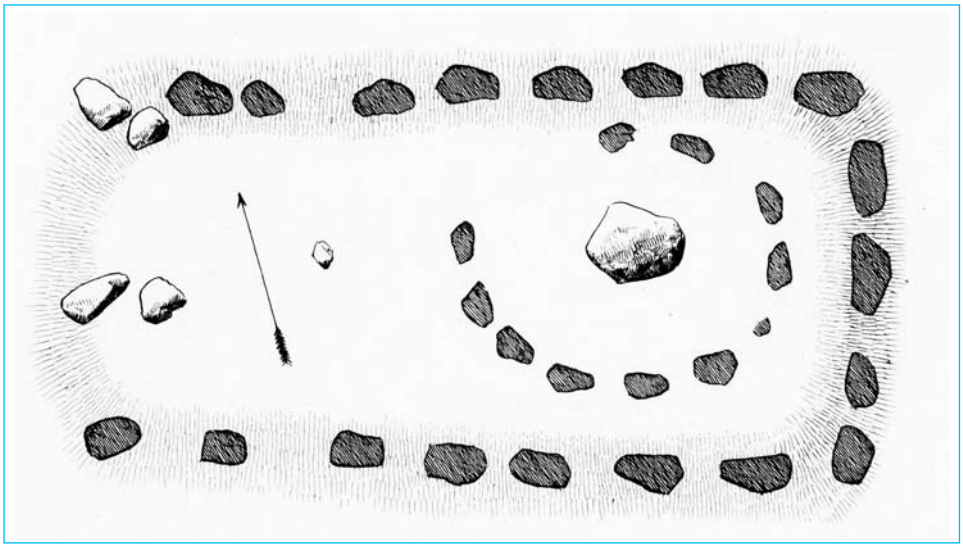
Even though many or most of the megalithic tombs seem to have been constructed within one building phase, as one single lay-out, in particular the larger

monumental passage tombs, a smaller number of monuments are characterized by showing distinct separate building phases.

Firstly, there are earthen long barrows, which at a later time became incorporated in and covered by a larger megalithic structure. A good example is the long barrow from Bygholm Nørremark, with wooden burial structures and other mortuary structures, themselves demonstrating a complicated sequence – later covered by a large long barrow with huge megalithic kerb stones, and a passage grave chamber. Outside these kerbstones the excavation revealed a row of free standing stones (Rønne 1979). Another example is a long dolmen from Troelstrup in northern Central Jutland. It all began with a long barrow with wooden revetment and a half wooden, half stone-built chamber. In the following sequence the long barrow was extended in order cover succeeding chambers, both megalithic and 'half-megalithic'. The last two chambers are true megalithic dolmens chambers, the one being

F. Kaul Photo.

Fig. 4:
Large passage tomb, Karleby, Fallbygden, Västergötland, Sweden.



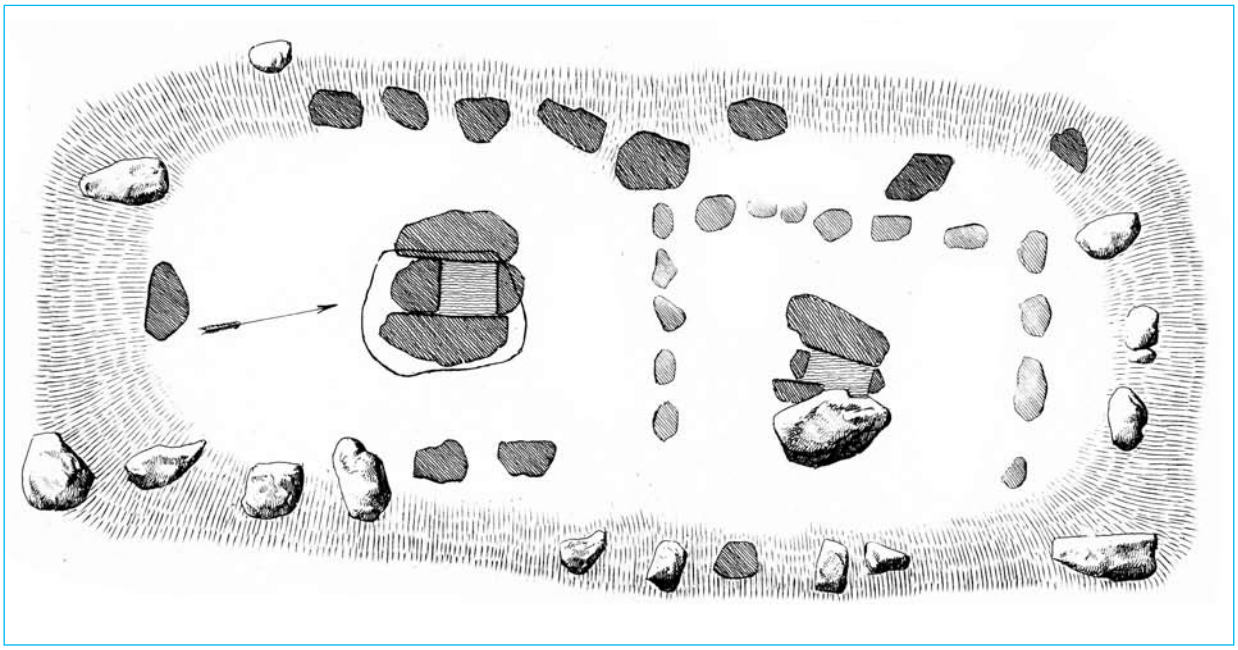


Fig. 5: Multi-period construction of Danish Dolmens; upper: Dolmen from Frejlev, Lolland, Denmark; lower: Dolmen from Lerbjerg, Central Zealand, Denmark. After A. P. Madsen 1896).

rectangular the other polygonal. Finally the enlarged long barrow was framed by large megalithic kerb stones (Kjærum 1977).

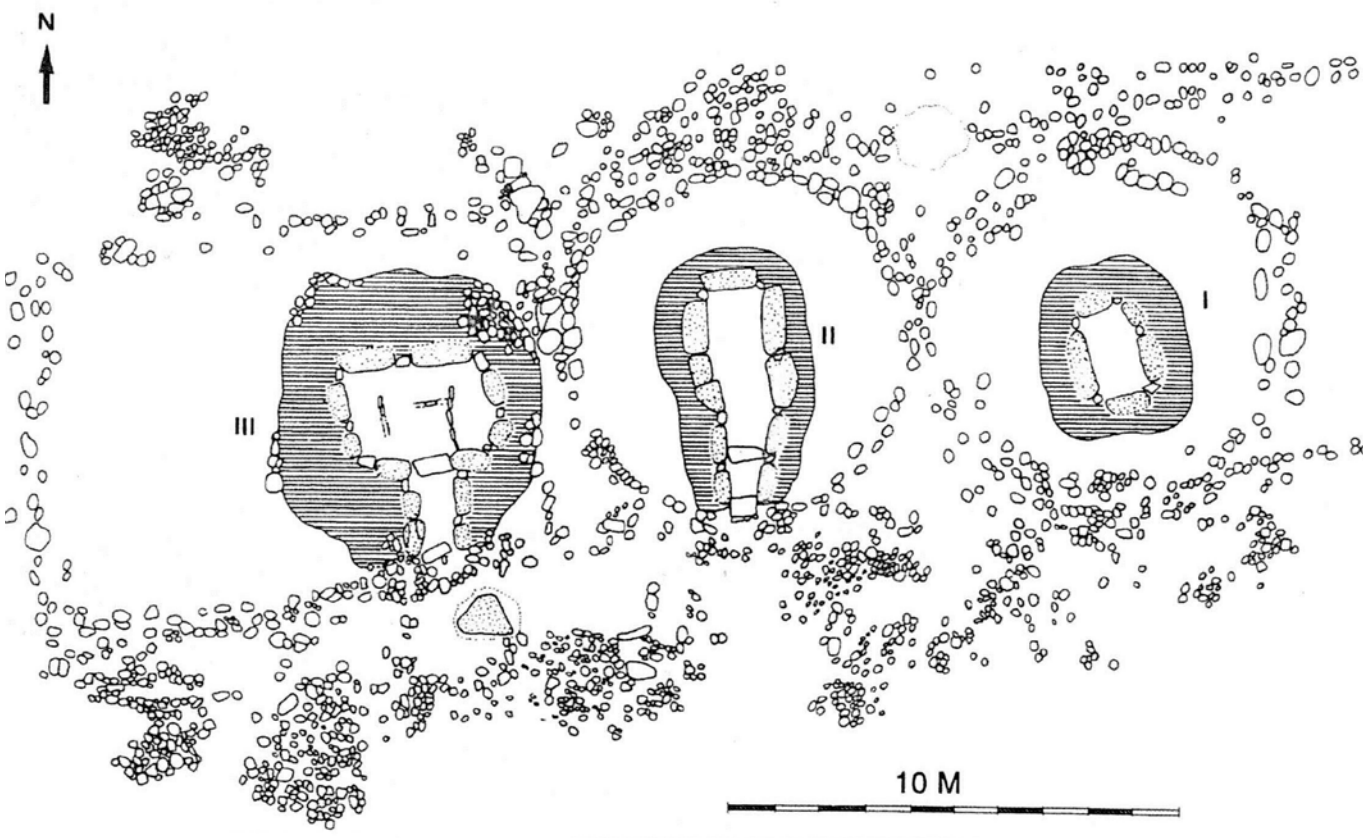
In a number of cases traces of multi-period construction of megalithic tombs themselves can be observed just by considering the immediately visible remains.

F. Kaul Photo.

Fig. 6: Dæmpegårds-dyssen or Kongedyssen, Tokkekøb Hegn, West of Copenhagen, Zealand, Den-mark,

At Gundsømagle, North Zealand, and at Frejlev, Lolland, the primary structure was a dolmen chamber with its small barrow surrounded by an oval setting of megalithic kerb stones, subsequently being enlarged by a rectangular setting of kerb stones making it into a long dol-men (Madsen 1896: Pl. XVI). Another ex-ample is a dolmen from Lerbjerg at Hval-sø, central Zealand, with a rectangular inner kerb, the barrow subsequently en-larged into a long dolmen (Fig. 5). Dæm-pegårdsdyssen west of Copenhagen provides yet another example. Here the primary structure is a rectangular dol-men chamber surrounded by a small oval mound with small kerb stones. A larger rectangular dolmen chamber was added and the fist oval mound became incorporated in a large long dolmen with huge kerb stones (Fig. 6).

The finest Danish example of a mega-lithic tomb showing multi-period-con-struction comes from Lønt, South Jut-land, where a totally ruined tomb was excavated during 1987. The excavations revealed a long building sequence of four separate construction phases, each reflected by its own megalithic tomb (Jørgensen 1988). When the monument was complete it was a 40 meters long and 8 meters wide long barrow sur-rounded by large kerb stones. The oldest phase, structure I, was a round dolmen surrounded by large megalithic kerb stones. In the middle of the barrow there was a small square stone chamber with-out a passage. Immediately west of it lay a further round dolmen, structure II. The mound was similar to the first one, but the chamber had a short passage. Structure IV and structure III, both pas-



sage tombs, were placed in mound extensions to the east and to the west of the earlier dolmens, and a full long mound was being created (Fig. 7).

Multi-period construction in Britain

From Britain, in particular from Wales and Scotland, excavations have revealed evidence of multi-period megalithic tombs from a larger number of sites. Such composite tombs are now established as being a widespread phenomenon, and examples are known throughout the British Isles (Smith & Lynch 1987: 31). Often a small round cairn with one relatively simple megalithic chamber comprises the primary monument. After a certain interval of time the monument was enlarged, and the original round barrow became incorporated in a long cairn, often with a distinct facade at the opening of a chamber.

This is the case at the megalithic tomb of Trefignath on the isle of Anglesey, North Wales, where the first phase consists of a small round cairn (Fig. 8). The

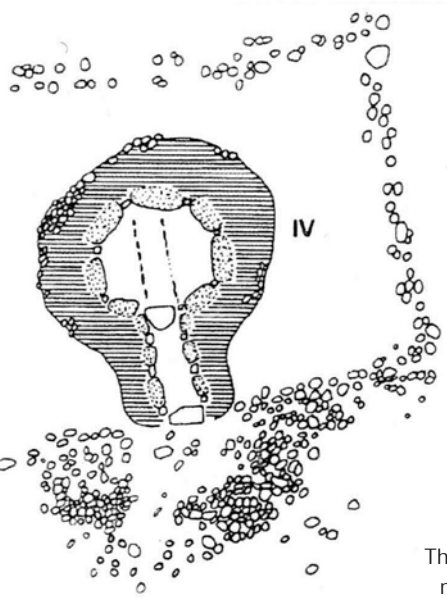
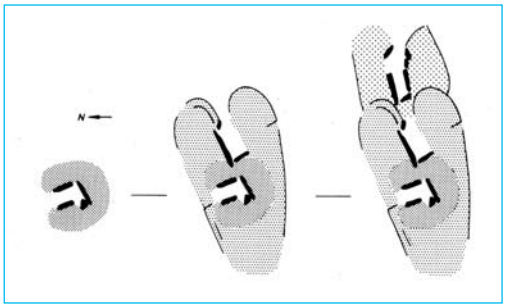


Fig. 7: Plan drawing of the multi-period megalithic tomb from Lønt, South Jutland. Incorporated in one megalithic long barrow we can follow the development of the megalithic tombs, from the oldest, closed rectangular dolmen chamber to the fully developed passage tombs. The hatched areas represent clay packing around the chambers. After Jørgensen 1988.

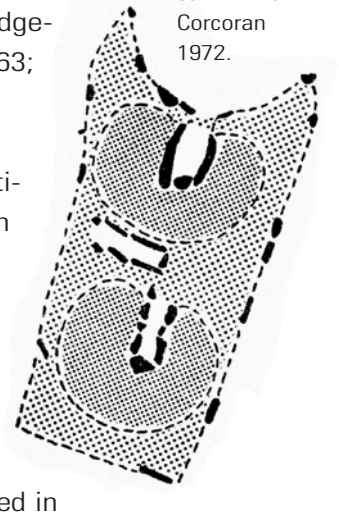
Fig. 8: The sequence of the megalithic tomb of Treffignath, Anglesey. Wales. After Smith & Lynch 1987.



next phase saw the addition of a second chamber and re-planning of the cairn, now a long cairn of wedge shape. The 'new' chamber opened in a deep, almost funnel-shaped forecourt/facade marked by revetment walls of dry-stone walling. After a further interval a third chamber was constructed to the east, partly within the forecourt of the second chamber and blocking access to it. At the same time the cairn was extended eastwards so as to incorporate the new chamber. The former front and forecourt was obscured by the enlargement of the cairn and a new revetment wall marked its eastern part (Smith & Lynch 1987: 10 ff.).

A somehow similar arrangement is seen at Dyffryn Ardudwy in southern Wales, where the primary chamber was a portal dolmen. This chamber originally possessed a small round/oval cairn. A much larger two compartment chamber was after a certain period constructed east of the first chamber, and the original chamber and cairn became incorporated in a long, slightly wedge-shaped cairn (Powell 1963; Lynch 1969: 133-135).

Fig 9: Mid Gleniron I, Wigtownshire, Scotland. Two small cairn with a megalithic chamber became incorporated in a long cairn. After Corcoran 1972.



The same sequence of multi-period construction has been observed in Scotland where the evidence from Mid Gleniron, Wigtownshire, South-west Scotland, is of particular interest (Fig. 9). Mid Gleniron I comprised two small oval/round cairns arranged in tandem, each containing a rectangular chamber, which had subsequently been

incorporated in a short straight-sided long cairn with a megalithic concave façade at the northern end. A third chamber, set between the oval cairns, appears to have been built contemporaneously with the long cairn (Corcoran 1972: 36). Here, apparently, a concave façade is an addition to a chamber in a round cairn.

A similar arrangement, though only with one chamber, has been observed much further north along the west coast of Scotland, in the cairn at Balvraid near Glenelg, West Inverness-shire (Fig. 10). The original structure was a passage tomb, enclosed in a circular cairn, to which an almost square cairn with a slightly concave façade had been added (Corcoran 1972: 34-35).

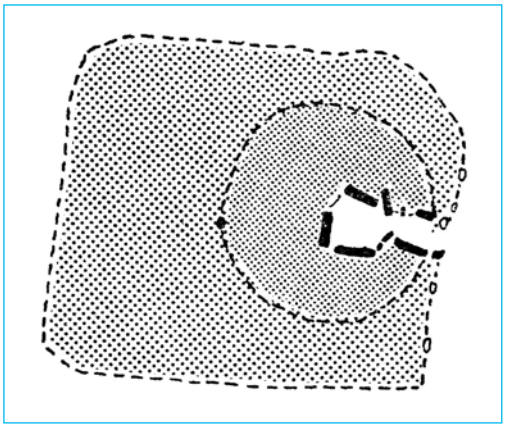


Fig. 10: Balvraid, Inverness-shire, west coast, Scotland. A small round cairn has been incorporated in a larger cairn with a façade. After Corcoran 1972.

Caithness, multi-period construction

One of the most interesting megalithic tombs showing multi-period construction is the long cairn of Tulach an t-Sionnaich at the northern Caithness coast, excavated during 1961 (Corcoran 1966: 1-22; Corcoran 1972: 32-34; Henshall 1991:146-149). The primary structure was a round cairn with a rectangular passage grave chamber to which a heel-shaped cairn with a concave façade had been added. The term 'heel-shaped' refers to the shape of a shoe's heel, the oval/roundish cairn with its concave façade making this shape (Fig. 11). Corcoran expresses himself as follows: "There is nothing to suggest, however, that the heel-shaped structure at Tulach an t-Sionnaich was not added to a circular cairn after the latter had already enjoyed an independent, although possibly short, existence. Without the heel-shaped structure the latter is a simple Passage Grave, set in a circular cairn..." (Corcoran 1966: 16). Naturally it should be a matter of debate how much time has elapsed between building the round cairn and the subsequent addition of the heel-shaped cairn with its concave façade – 10 years, 50 years, 100 years, or more? – The multi-period construction of the heel shaped cairn at Tulach an t-Sionnaich might even consist of

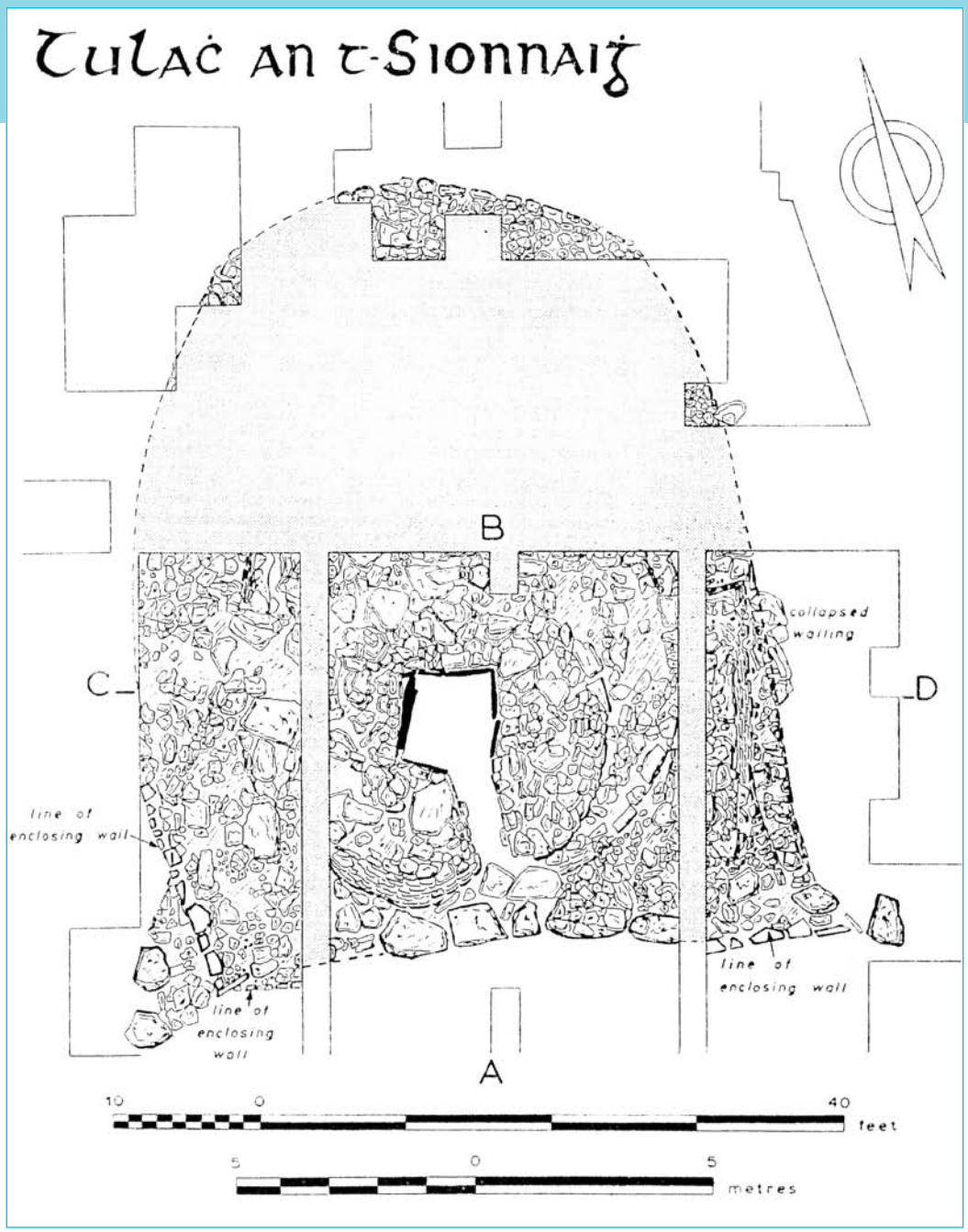


Fig. 11: Tulach an t-Sionnaich, Caitnhess, Scotland. Excavation plan of the heel-shaped cairn. After Corcoran 1966.

more elements, since there were found parts of both an inner and an outer revetment wall of the round cairn. The inner wall has been regarded as a part of the construction proper, intended to absorb some of the thrust from the apparently corbelled chamber (Corcoran 1966: 10; 1972: 32). But could it be totally excluded, that we are dealing with an independent building phase, where this "inner revetment wall", also including some larger kerb stones, for a certain span of time marked the outer limits of the monument?

The heel shaped cairn with its concave façade did not represent the end of the building sequence. Subsequently a large long cairn was added to the heel-shaped cairn, with a slightly different orientation (Fig. 12). The long cairn in its final appearance then looks like a typical Caithness long cairn.

The Cairn Tulloch of Assery A not far from Tulach an t-Sionnaich provides an example of a round cairn with a passage grave chamber that has been incorporated into a cairn of partly heel-shape, or a horn-shaped cairn, here even a double horn-shaped cairn (Corcoran 1966; 1972).

Some of the long cairns of Caithness should hide similar building sequences: The primary round cairns with their chambers often being higher than their long cairn extensions, and the concave facades or horns with platform arrangements belonging to subsequent building phases. The great majority of the long cairns seem to be composite structures (Davidson & Henshall 1991: 47 & 55-59).

As an example the long cairn of South Yarrows North could be mentioned. The monument appears as two distinct elements, in the east a pear-shaped cairn with a complex passage grave chamber, to the west a long cairn extension. Between these two elements a gap is visible, and even though some robbing of stone material has taken place, the gap is considered as a possible original feature (Davidson & Henshall 1991: 140). This might indicate that the long cairn is a later addition. At Warehouse South, not far away from South Yarrows, a steep-sided mound with a complex passage grave chamber constitutes the north-eastern part of the monument. A rectangular long cairn extends 37 m southwest of the chamber. By an early investigation of the monument remains of a double wall were found, which seem to have surrounded the round mound. This may indicate that the long cairn was a later addition. A similar situation seems to be represented at Na Tri Shean, where a wall face is visible at the edge of the round cairn element, also indicating that the long cairn is a later addition (Ibid.: 154-155 & 128-129).

Another arrangement is seen at Camster Long where two round cairns originally covered two passage grave chambers. Later these two round cairns were incorporated in a horned long cairn with 'false' façades. When the two round cairns with their chambers became enclosed in the long cairn, access to the chambers was still required, and the chamber passages were consequently extended to the line of the new outer revetment (Corcoran 1972: 43; Davidson & Henshall 1991: 96-102).

Among the remarkably few horned long cairns in Orkney the monument at Head of Work, Mainland, seem to provide possible evidence of multi-period construction similar to what has been observed in Caithness. Towards the south-east end the long cairn rises into a prominent steep-sided slightly oval cairn. In various places short lengths of wall-face are exposed in the sloping surface of the round cairn element (Davidson & Henshall 1989: 118-119), seemingly forming its original revetment wall, later being included by the long cairn extension.

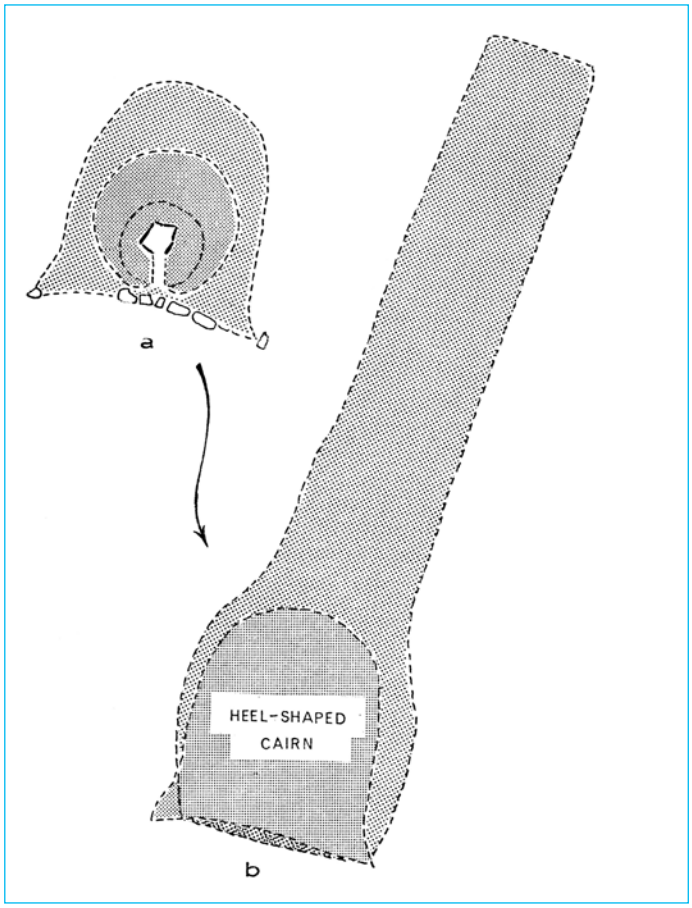


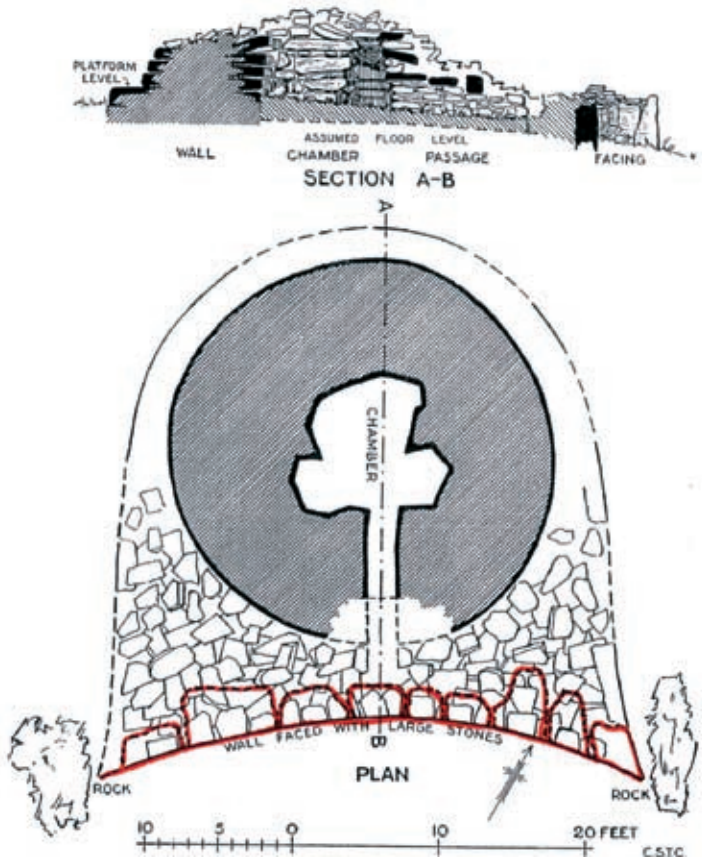
Fig. 12: Tulach an t-Sionnaich, Caithness, Scotland. Schematic drawing of the full multi-period sequence including the long cairn extension. After Corcoran 1972.

Shetland

Shetland can boast of more than 50 megalithic tombs. They represent the northernmost expansion of the Neolithic monumental architecture. Typologically they form a particular group of megalithic tombs, even though some features show similarities with particularly the megalithic tombs of Caithness. The development of the megalithic tombs of Orkney followed other paths. The majority of Shetland's chambered cairns are described as heel-shaped (Turner 1998: 42), the oval/roundish cairn with its concave façade making this shape. Some of the chambers are of trefoil shape. Altogether this means that a 'typical' Shetland megalithic tomb should be a passage grave with a trefoil-shaped chamber in a heel-shaped cairn with a concave façade. However, there is a great variation among the Shetland megalithic tombs, and very few, or perhaps only one, Vementry, combines these features in one monument. The chambers are either trefoil-shaped or rectangular in plan (Henshall 1963: 139-141), but also some polygonal dolmen-like chambers occur. Still, the trefoil-shaped chamber seems

to be a Shetland peculiarity. Most of the cairns are – as mentioned – heel-shaped, but there are also some round cairns, and even almost square cairns are represented (Calder 1963: 37-40; Turner 1998: 43).

One of the most well-preserved passage graves is located on the Isle of Vementry. It is evident, that this monument is of multi-period construction, when observing the outline and section plan measured by Calder in RCAHMS 1946 (Fig. 13).



The first phase is represented by a round cairn of 6.3 metres in diameter, enclosing an approximately 2.3 x 2 metres large trefoil shaped chamber, out of which a 2 metres long passage leads south-east. Subsequently more cairn material was added, particularly to the south-east, where a concave orthostatic façade was erected. Also a lengthening of the passage must have taken place, even though the concave façade blocks the passage opening (Henshall 1963: 177-178; Fojut 2006: 25; Mahler 2011: 12-14).

Other larger cairns might have been built in two stages (Fojut 2006: 25). The heel-shaped cairn on Ness of Nounsbrough (Henshall 1963: 171) seems to provide a situation similar to that of Vementry. In the cairn there is an inner row of kerb stones, probably marking the perimeter of the primary round cairn. The outer kerb, probably reflecting an enlargement of the cairn, is concave on the south-east landward side, thus defining the heel-shaped cairn with its typical façade (Fig. 14). The heel-shaped cairn at Punds Water may hide an inner primary round cairn (Fig 15). Some visible wall faces inside the heel-shaped cairn might indicate a multi-period construction of this monument, originally

Fig. 13: The Vementry cairn, Shetland, with its multi-period construction. The additional façade marked with red. After RCAHMS 1946, Vol. III.

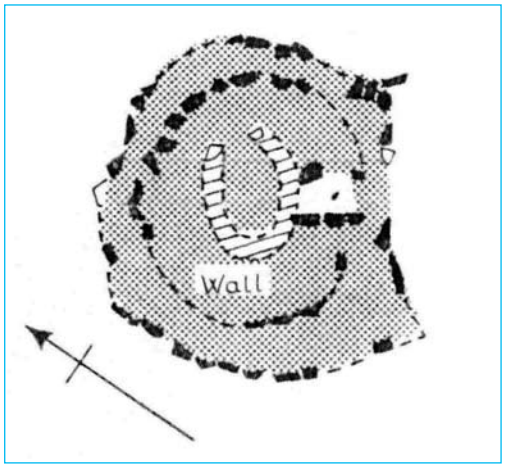


Fig. 14: Plan drawing of the Ness of Nounsbrough heel shaped cairn with its two rows of kerb stones, the chamber area obscured by a wall of a modern watch tower. After Henshall 1963.

being a round cairn. It is also suspicious that the long passage changes its orientation a bit. On the other hand such a wall face could be seen as an (inner) constructional part belonging to one building sequence solely. The evidence from Vementry does not exclude that most of the Shetland monuments were actually constructed in one flow of work. It seems unlikely that for instance the small heel-shaped cairn at Islesburgh should incorporate more building phases (Calder 1963: 45-47).

The evidence of multi-period construction of the Vementry passage tomb has not remained unnoticed, including the striking similarities with the shape and sequence of the Tulach an t-Sionnaich heel-shaped cairn, Caithness (Corcoran

F. Kaul Photo.

Fig. 15: The heel-shaped cairn at Punds Water, Shetland.

1966: 15-16; 1972: 32-34). At both sites a circular cairn was incorporated in a heel-shaped cairn. Also the sequence and shape of the cairn at Balvraid, Inverness-shire, shows similarities with Shetland (Corcoran 1972: 34-35).

Discussion

When dealing with multi-period construction and cairn morphology there is one dissimilarity of great importance between Caithness and Shetland. As we have seen, the final phase of for instance Tulach an t-Sionnaich includes the addition of a long cairn. No-where in Shetland an addition of a long cairn has been observed, and probably no long cairn like the Caithness cairns was ever built in Shetland. There are three cairns, which may have been built in the style of Orcadian cairns, that is with the chambers being divided into compartments, formed by slabs on end (stalled cairns) (Turner 1998: 43). But possible remains of a stalled chamber do not guarantee the presence of a long cairn. The stalled chamber at Houstry cairn, Caithness, is placed in a roundish cairn with traces of a straight to slightly concave façade, the monument close to being a heel-shaped cairn (Davidson & Henshall 1991: 117-118). At Warehouse South, Caithness, there is a central, almost stalled chamber in a round cairn, where a long cairn seems to be a later addition (ibid.: 154-155).

Even though there must have been connections with Orkney as shown by the domestic architecture, the similarities with the especially the Caithness megalithic monuments should be noted. Heel-shaped cairns should not be regarded as being unique for Shetland, and a number of Caithness candidates could be highlighted. When they are a component of long cairns it is difficult to detect the heel-shaped cairns (Davidson & Henshall 1991: 41-42). More heel-shaped cairns should hide underneath the higher 'round-cairn' elements of the long cairns. The evidence from the meticulous excavation of Tulach an t-Sionnaich should be regarded as representative rather than unique.

When considering that there must have been close bonds between Shetland and Caithness as to the development of megalithic architecture including multi-period construction of similar sequences (see above), the missing long cairns in Shetland is a conspicuous fact that deserves attempts of explanation. It seems that Shetland became rather isolated in the Bronze Age (Turner 1998: 51 ff.), but also during the Neolithic contact was seemingly highly restricted, and only very few objects of 'foreign' lithic material reached Shetland (Ballin 2011). The absence of long cairns in Shetland could indicate the time when these distant isles became more isolated, that is

just before the time when the Caithness megalithic tombs became enhanced with their long cairn extensions. It should not be excluded however, that we are simply dealing with a deliberate choice by the Shetlanders. They did not create long cairn extensions due to the setting of their Shetland cairns in the landscape, on distinctive knolls and hilltops, where a long cairn addition, lower and behind the land mark, would not yield any further architectural zest. On the other hand, some monuments like the heel-shaped cairn at Islesburgh would architecturally benefit by a long cairn addition up the hill.

When: concluding remarks

The evidence from the excavations of the kitchen midden at West Voe near Sumburgh could indicate Neolithic settlement in Shetland around 4000 BC (Ballin 2011: 33; compare Gilmore & Melton 2011: 69 f.; Melton 2009: 184). The evidence is sparse for Early Neolithic settlement on Shetland, and it has proposed that the introduction of agrarian economy first took place at 3700 or 3600 BC (See Alison Sheridan, this volume, with further references). When its seems to be close to a rule of thumb that 300-500 years should elapse from the first neolithization until the Stone Age societies reached the point of megalithic building activity, the creation of stone monuments being an integrated part or climax of the Neolithization process. Then, accordingly, many megalithic tombs were erected in Shetland around 3300, and perhaps the typologically latest tombs were built one or a couple of hundred years later. The peak of megalithic activity might have been earlier if the Neolithic began here a bit earlier.

At Sumburgh Airport a stone cist has been excavated containing the disarticulated bones of at least 18 individuals. 14C dates demonstrate that the chamber was in use about 3300 BC (Turner 1998: 41; Mahler 2011: 12). The burial structure is described as "an unusually large cist" made by boulders set on edge, which may originally have been covered by a mound (Turner 1998: 41). When using the word 'cist', a Late Neolithic or Bronze Age dating might be hinted at. However, why not consider this tomb as a megalithic tomb proper, belonging to the 'mainstream' of megalithic tradition? It could very well be classified as a rectangular dolmen-like chamber – and – within a mound.

When returning to the Scottish mainland in general, farming was present at some stage soon after 4000 BC (Ashmore 1996; Warren 2004: 96), while a statistical reassessment of the 14C dates may indicate a major shift in the economy around 3800 BC (Ashmore 2004: 125 ff.). Available 14C dates of

charred barley are concentrated in the archipelagos and in eastern and south-eastern Scotland, and they suggest that barley was grown from about 3700 BC. Most of the dates obtained from cattle bones come from Orkney, and they seem to show that the practice of depositing these bones at settlements and other sites started about 3500 BC (ibid.: 127-129). The large timber house or hall from Balbridie, Aberdeenshire as well as a similar construction from Claish Farm, Stirling, may have been built in the first or second quarter of the 4th Millenium BC. 14C dates from the stone-built houses of Knap of Howar, Papa Westray, Orkney, suggest that they were constructed about 3500 BC (ibid.: 133).

When the statistical 'weakness' of the 14C dates is considered there is no evidence that chambered tombs were built in Scotland before about 3700 BC. A human bone from Tulloch of Assery A, Caithness, has yielded a date between 3950 and 3300 BC, and an animal bone from at Tulloch of Assery B has yielded a date between 3990 and 3520 (Ashmore 2004: 130). These dates are from chamber deposits, and they do not date the construction of the tomb, but the use of the tomb, even though they could mark an early use of the tomb. There are other 14C dates from Scottish megalithic tombs that suggest the same time for (early) use of the chambers, including Tulach an t-Sionnaich; that is the time around 3500 BC (Davidson & Henshall 1991: 83-84; Ashmore 1996: 29-33).

It seems difficult to say whether there was a delay of the Neolitization of Shetland as to mainland Scotland. Since some of the megalithic tombs of Shetland seem related to these of Caithness they may have been built within the same period of time. What we need is more precise dates for the long cairn extensions of Caithness. Then we would perhaps be able to give a clearer estimate of when the Shetlanders 'jumped off' the development. Would the years around 3400 BC be a compromise for the time being, or perhaps a century later? Was it from then that Shetland became increasingly isolated, when not introducing long cairns? Other questions remain. Would it be possible to include other evidence of contacts or lack of contacts in order to confirm such possible dates, for instance the presence or absence of exotic lithics in Shetland.

As mentioned above the possibility remains that the absence of long cairns was not due to isolation but as a deliberate choice by the Shetlanders. However, it is the hope of the present author that this analysis of megalith typology and the evidence of multi-period construction could make a small contribution to the discussion of the cultural processes and connections of the Neolithic societies at the border.

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The northernmost Bronze Age Farms

Preben Rønne

Introduction

The first Bronze Age house remains in Southern Scandinavia were excavated in 1955 in Fragtrup Western Jutland – Fragtrup House I (Draiby 1985: 127-216). It was found by pure chance by the farmer, who found the stone built fireplace, and it was later excavated by the son of the local teacher. The house was a three aisled longhouse, 18 m long and 7 m wide and relatively well preserved with a fireplace, clay floor and culture layers. House II was excavated some years later by the National Museum of Denmark during 1957. The Bronze Age farm houses from Fragtrup were not published until 1985 maybe because they differed from what was expected of the Bronze Age architecture during the 1950'ies. (Draiby 1985: 127-216)

During 1967 new finds made it generally accepted that Bronze Age houses were well built, three aisled and with strong roof-bearing posts. Many times in archaeology the new finds were uncovered by pure chance. Professor C.J. Becker from Copenhagen was excavating late Stone Age graves near Ristoft in western Jutland, and it was necessary to move the top soil from a large area. By doing this he uncovered the remains of three house sites appearing as discoloration in the yellow subsoil. The house remains, fig. 1, were of the same type as at Fragtrup and almost of the same size, dated to the Late Bronze Age Period IV (Becker 1968: 79-88). Between 1968 and 1972 another six house remains were excavated at Hovergård, and not far from Hovergård at the village of Spjald more than 40 house remains were uncovered together with 30 found at Bjerg some kilometres north of Spjald all in western Jutland and from the Late Bronze Age (Becker 1972).

The result of these large scale excavations using a mechanical excavator to strip off the top soil, more than 80 house remains were found within a few years, all from the late Bronze Age, per V-VI, c. 900-500 BC and all were built by the same pattern.

Norway – the first remains of farm houses

The Danish large scale excavations from the 1960'ies and early 1970'ies were of course known in Norway, but only a few Norwegian archaeologists tried to copy it. It was not until a research project on Forsand in Rogaland, using a mechanical excavator to strip off the top soil the method was more generally introduced in Norway. The method became more common from the middle of the 1990'ies and since then used regularly. Then – of course – Bronze Age houses were found. During the years 1980 to 1990, 1992 and 1994 about 80.000 m^2 were examined at Forsand and approximately 250 house remains were recognised whereof 20 were dated to the Bronze Age (Løken 1998: 170–171).

The houses in Rogaland were all of the same type and construction as the South Scandinavian house remains. Within a few years more than 300 house remains from the Bronze Age and Early Iron Age were discovered. The development of house types in Rogaland is shown in fig. 2.

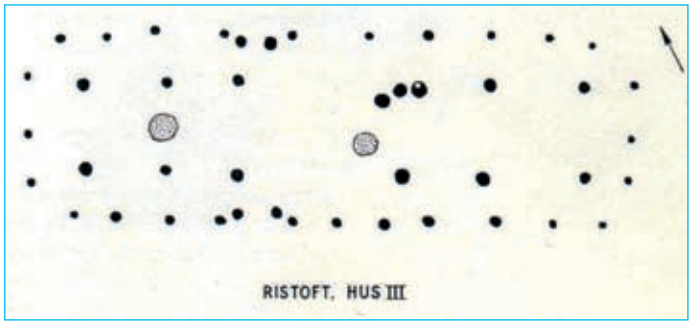

Fig.1 (top right): Late Bronze Age house from Ristoft, Western Jutland. The remains indicate a house measuring 19,5 m by 6 m. Courtesy Becker 1968.

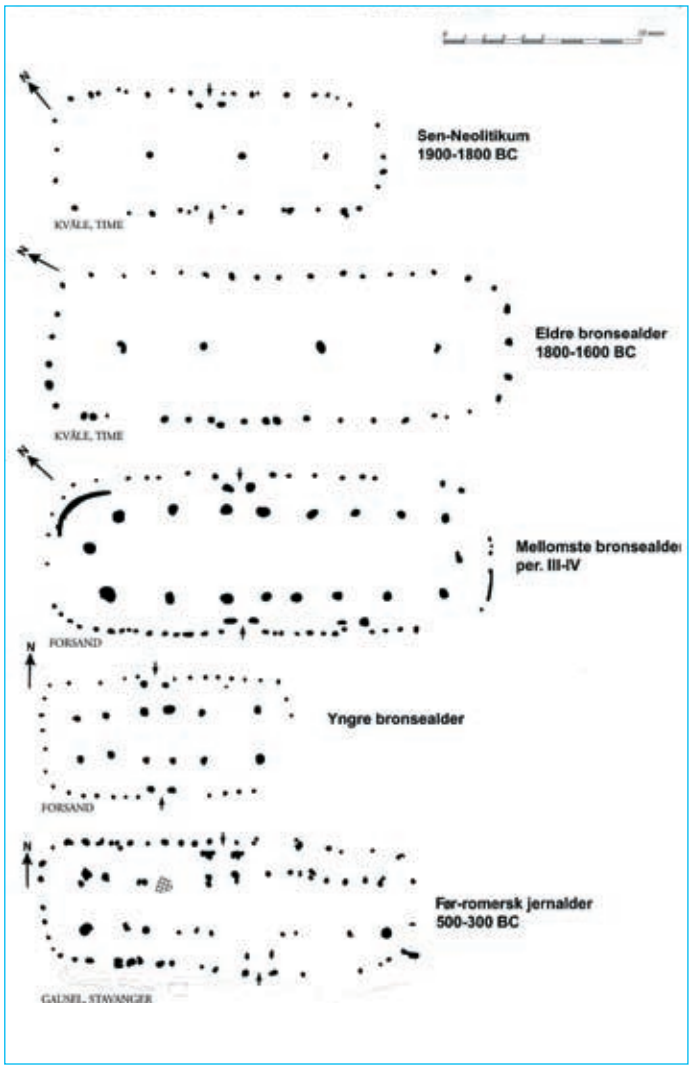

Fig. 2: House types from Rogaland from Late Neolithic to Pre-Roman Iron Age. Courtesy Østmo, Hedeager 2005:186.

Northern Norway

The northernmost Bronze Age Farms

One of the most spectacular finds is the Bronze Age house from Kveøy, Troms County (fig. 3). It was excavated in 2008 and 2009 (Arntzen and Sommerseth eds. 2010). The house was partly disturbed by a road, and only traces of six post holes were left. It was not possible to establish the length or how broad the house structure originally had been, and no traces of the walls had survived, but it is estimated that the house originally must have been longer than 12 m and might have been c. 5–7 m wide (fig. 4).

The house remain is dated by a radiocarbon date from charcoal from one of the postholes, and gives the date between 900-770 BC or the Late Bronze Age. The construction is just like the Bronze Age houses further south, which clearly shows the connections with the traditional Nordic Bronze Age societies from Rogaland and South Scandinavia. Furthermore, the nearest house remains dated to the Bronze Age are laying c. 1000 km South of Kveøy near Trondheim! Near the house remains at Kveøy an old cultivation layer was excavated, dated to the Late Bronze Age and containing grains of barley and wheat presumably showing what had been cultivated in the area.

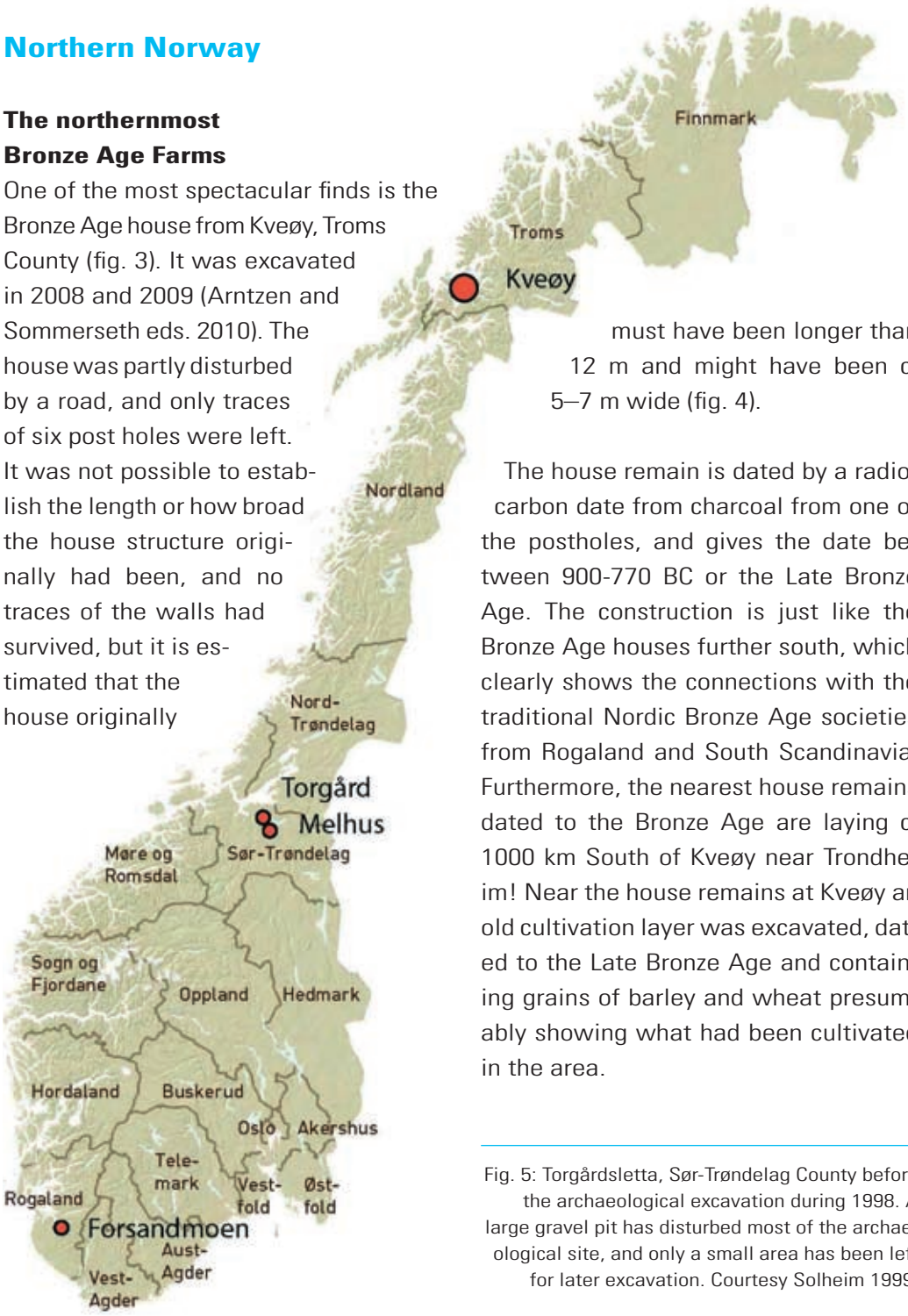

Fig. 3: Sites with Bronze Age house remains mentioned in the text.

Fig. 5: Torgårdsletta, Sør-Trøndelag County before the archaeological excavation during 1998. A large gravel pit has disturbed most of the archaeological site, and only a small area has been left for later excavation. Courtesy Solheim 1999.

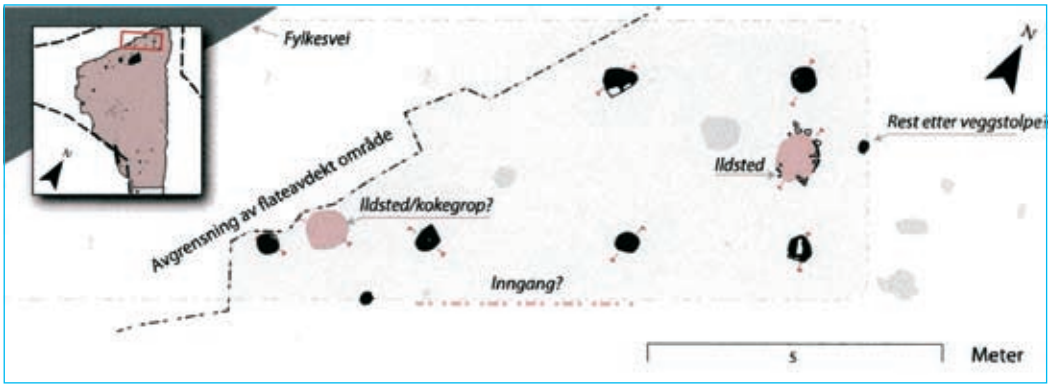

Fig. 4:
The northernmost house remains from the Bronze Age, excavated on Kveøy, Troms County. Courtesy Arntzen 2010a.

Central Norway

Torgårdsletta, Kvenild, Sør-Trøndelag County

The remains of several Bronze Age farms have been found in Sør-Trøndelag County, and one of the most important excavations is fromThorgårdsletta, Kvenild farm near Trondheim. Only a minor part of the area with Bronze Age house remains have been excavated, as a gravel pit has changed the landscape dramatically (fig. 5) (Solheim 1999: 9 Grønnesby 1999: 10). The house sites at Kvenild were excavated by Vitenskapsmuseet (Museum of Natural History and Archaeology, Trond-

Fig. 6: Kvenild on Torgårdsletta. Most of the area has been disturbed before the excavation. The postholes have been marked by white plates. Courtesy Grønnesby1999.

heim) during 1998, and probably only a minor amount of the farm remains have survived the digging of the gravel pit, and the "village" must have been much larger. Twenty house sites were confirmed (fig. 6 and 7). The oldest house remains have been dated to 1200-100 BC, but most of the remains are from 1200-100 BC.

Until recently the house remains from Kvenild were the northernmost long houses from the Bronze Age in Norway. A large amount of post holes could not be connected to any known type of house remains, and the project manager, Geir Grønnesby, assumed that the many traces of postholes indicated that many more house remains have originally been present at the site. Grønnesby assumed that at about five household units have existed simultaneously in the area for every 100 year period (Grønnesby 2005: 97).

Stokkset, Møre and Romsdal County

During the late 1970'ies the first two aisled house remains from late Neolithic and Early Bronze Age were excavated in Denmark. But the house type was actually excavated in Norway as early as 1953–55 by Egil Bakka (Løken 1998: 170;

Børsheim 2005: 115, 116 fig. 4). Interesting enough they were excavated even earlier than the house remains at Fragtrup mentioned above, but because of the question of dating the house remains at Stokkset were not published until the late 1970'ies. Today the house remains dating to the Late Neolithic or Early Bronze Age is generally accepted.

Søberg, Sør-Trøndelag County

Two Bronze Age house sites are known from Melhus municipal in Sør-Trøndelag c. 20 km south of Trondheim, Søberg and Skjerdingstad, and both sites are located in the broad valley along the river Gaula, fig. 8. The earliest house remains at Søberg are probably connected to the initial phase of agriculture in the area, and the site represents the only place in Trøndelag where two aisled houses have been found. The soil is very rich and well suited for agriculture, and at the same time both the river Gaula is one of the best fishing places in Norway and the mountains around the valley are rich in game.

The earliest long houses from late Neolithic, c. 2000-1700 BC, and Early Bronze Age Period I, c. 1700-1500 BC, are very

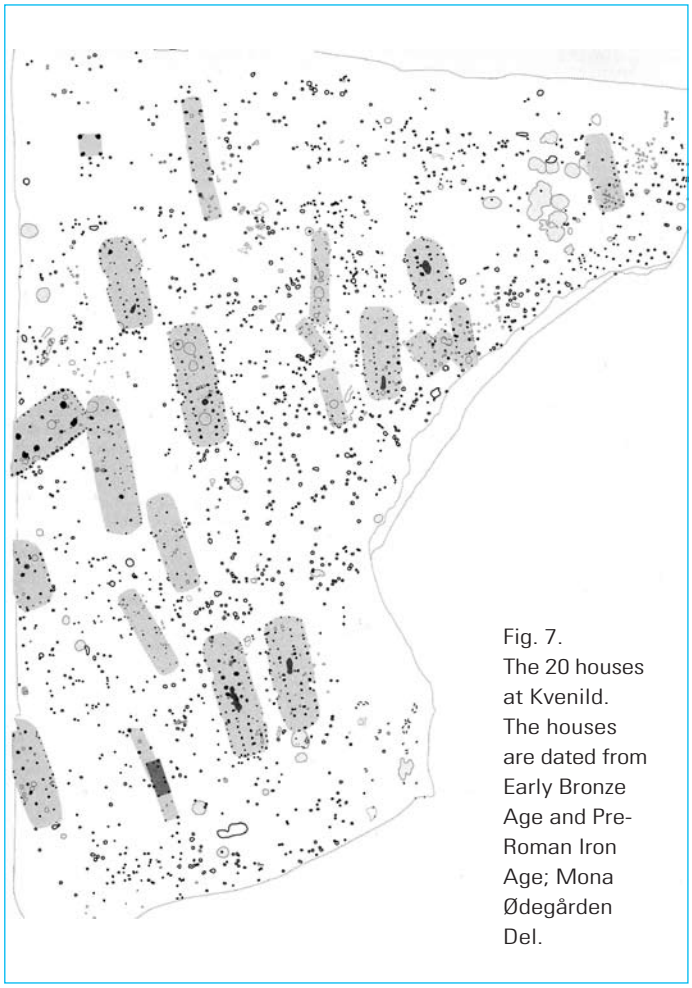

Fig. 7.
The 20 houses at Kvenild. The houses are dated from Early Bronze Age and Pre-Roman Iron Age; Mona Ødegården Del.

Fig. 8: The landscape along the river Gaula, where Bronze Age house remains have been excavated at Søberg and Skjerdingstad. Photo Fjellanger Widerøe AS.

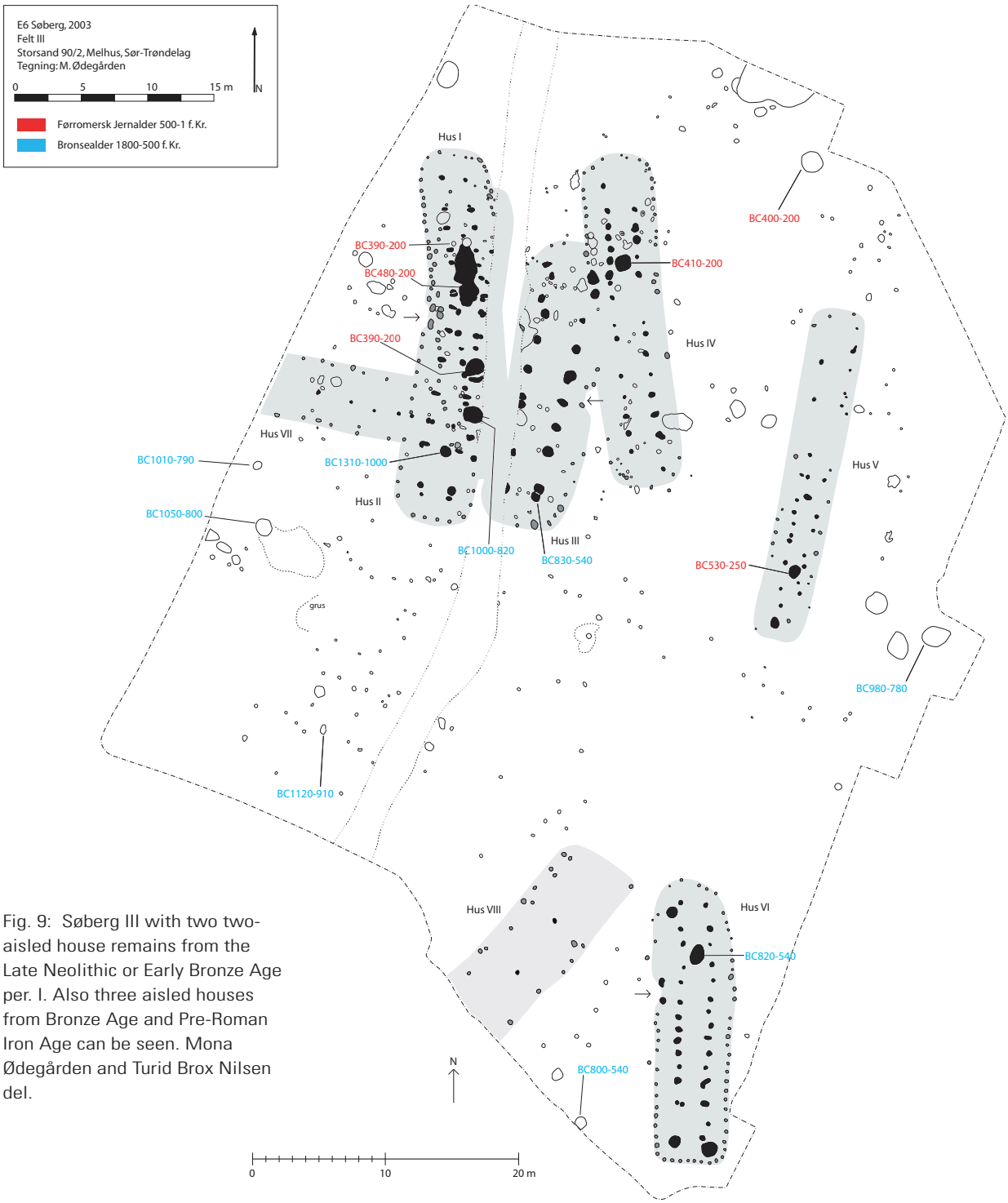

Fig. 9: Søberg III with two two-aisled house remains from the Late Neolithic or Early Bronze Age per. I. Also three aisled houses from Bronze Age and Pre-Roman Iron Age can be seen. Mona Ødegården and Turid Brox Nilsen del.

10. In front the remains of house VI from Søberg III. It is a typical house from the Bronze Age in Melhus, 14 C dated to 820 – 540 BC. The house has stables in the center. In the background houses from Bronze Age and Early Pre Roman Iron Age. The two aisled houses were found later. Photo Vitenskapsmuseet.

scarce in Norway, and they are only known from tree places (fig. 9). They follow partly the same building technique as known from southern Norway and from South Scandinavia with one central row of roof bearing posts. In Rogaland the house type is known from eight archaeological sites, compared to the two house remains of this type known from a site in Østfold (Børsheim 2005: 109-115). The habitation at Søberg III continued after Period I with the usual three aisled buildings (fig.10), and the latest house remain is dated to 420-200 BC. Later the house structures moved closer to the river, and the latest house is from Late Roman Iron Age c. 200-400 AD.

Bronzes and farms

In Central Norway only one bronze artefact is known from the Late Neolithic period. Later during the Early Bronze Age Period I, nine bronze pieces have been found. They show very clearly that both the central European and in particular the South Scandinavian Bronze age culture influenced Central Norway (fig. 11). Today we see the area between Sør-Trøndelag and Nord-Trøndelag as a border zone for the expansion of the ear-

liest Nordic Bronze Age culture, and no bronzes or two aisled house remains have been found north of this area. The composition of artefact types is more or less like in South Scandinavia, where local Nordic types dominate, such as the massive axes of type Fårdrup and local variants of flanged axes.

Conclusion

Central Norway has been a natural part of the European Bronze Age culture, and with a close association to the central Nordic Bronze Age area in South Scandinavia as early as from Period I c. 1800 BC.

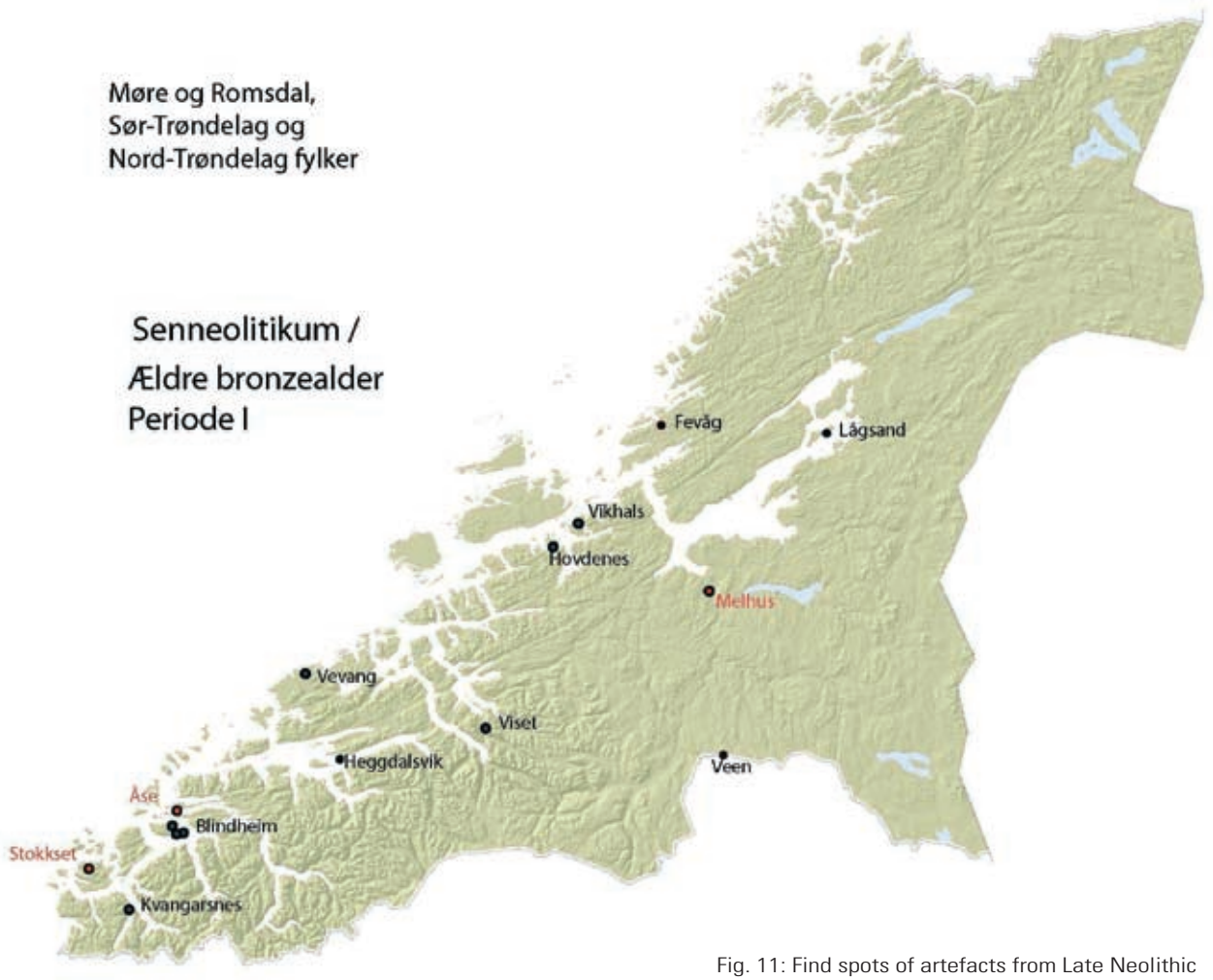

Fig. 11: Find spots of artefacts from Late Neolithic and Early Bronze Age per. I marked with black. The two aisled farm house remains from the same periods are marked with red.

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Neolithic Shetland: Peopling an empty area 4000-3000 BC?

Ditlev L. Mahler

Ditlev L. Mahler photo 2011.

Introduction

As introduced elsewhere in this volume the Shetland research project aims to investigate the Neolithic elements on Shetland and compare them with the South Scandinavian elements (Mahler 2011: 6 f.). Just mentioning some of the elements they are house sites, agricultural implements, ritual behaviour and burial customs and there are many common elements. Of cause there are also very clear differences such as the very early knife tradition with the Shetland Knives going back to may be 3500 BC according to the newest 14C dating (SUERC-37997; Mahler 2011a, fig. 2).

Compared to Southern Scandinavia, the existing conditions on Shetland are rather different, because we do not know for sure that Shetland had a Mesolithic population which could turn Neolithic. Alison Sheridan has written about the early dating at the kitchen midden at West Voe, Sumburgh in this volume and the very early dates of 4200-3600 cal BC (Melton 2009: 184, see also Melton & Nicholson 2007: 99; Melton personal comments), fig. 1. Even though none of the West Voe finds from the bottom layer can tie the area to a Mesolithic environment, other indications show the possibility of at least Mesolithic visits to the Shetland Islands during the period 5000-4000 BC (Edwards et al. 2009: 113; Edwards & Whittington 1998: 5 f.). At the time of the Neolithic expansion c. 4000-3700 BC Shetland hardly contained a large Mesolithic population if any, so the Neolithic population probably expanded into empty islands in respect of a human population. This expansion could very well have arrived on Shetland coming from the South West, and probably not directly from Caithness to Orkney, and from there to Fair Isle, jumping further North to Shetland which would be expected (Sheridan 2009: 92 f.; Rowley-Conwy IP). As we shall see later that kind of expansion into empty land is not uncomplicated and certain conditions must be present for securing a successful expansion.

Fig. 1: West Voe, Sumburgh, Shetland. The kitchen midden is in the center of the picture.

Why choose Shetland?

There are several reasons to choose Shetland as one part of a comparative analysis. First of all, Shetland is considered to be the northernmost area of Europe where farming was practised as a result of the expansion around 4000 BC. After a standstill of about 1000 years on the Continental lowlands just south of the Baltic, the farming economies expanded to the North. In Scandinavia, the expansion ebbed away at Svinesund on the border of present day Sweden and Norway 58,5° North or just around the

present day Oslo Fjord area. The Neolithisation of the British Isles happened as a push from Western and Northern present day France, and this *push* reached its ultimate boundary approximately 60° North on Shetland, and according to past maritime technology further expansion was impossible.

Shetland is moreover a closed unit, although it is scarcely also a closed laboratory. One of the tasks set by this research project will be to clarify possible outward relations after the islands were first colonised by the farming population. It is evident that the Neolithic cultures on Shetland were related to the rest of the Neolithic traditions in North-West Europe, and it is just as evident that the Neolithic communities developed their own cultural traits with regards to tools, building traditions, and grave monuments.

Two cases of pioneer societies

This paper deals with peopling Shetland as there are different challenges to understanding the Neolithisation on the mainland on the British Isles and the continent and on islands especially of the size of Shetland and Orkney. As mentioned in the introduction some of the Neolithic elements if not all are present in Shetland, which indicate that there was a well functioning society on Shetland during the Neolithic Period (Mahler 2011a & b). This brings me to deal with the question of demographic aspects, wondering how island populations survive their initial colonization.

A pioneer society consisting of a 100 persons may well be economical successful, but if 98 of them are men and only 2 women the demographic prospective is not prosperous. Besides population size we talk about three main elements, namely birth rate or fertility, death rate and sex ratio (Moore 2001: 397; Moore & Moseley 2001: 526; Robert-Lamblin 2006: 235 ff.). It is also important to remember that even a fairly large population of let say 100 persons, males and females in the reproductive age will, after some hundreds of years, have great difficulties finding an acceptable marriage partner avoiding the society's definition of incest. These definitions could force the society to an exogamous marriage system (Moore 2001: 406). Beside there is not a "magic number" for a population size that ensures a band's viability in a new environment.

"There is no such number. Initial size is only one factor contributing to the success of a colonizing group. Probably more important is birth rate, and good luck in having a balanced number of male and females born into the band..." (Moore & Moseley 2001: 528).

Generally we speak of six different models of colonization into empty areas, but here I shall only touch upon three of them (Moore 2001: 395-396; Anderson & Gillan 2000: 43 ff.). The first model and much discussed is called *Outpost Model or Leap-frog Model*, which describe a human population colonizing an empty area without contact to the mother population. Such expansions are very vulnerable and constitute a demographic risk to say at least. This model is much more suited to situations where the expansion goes into already populated areas i.e. with an existing mass of genes, which could explain the rapid Neolithic expansion in continental Europe where the population of the Mesolithic or Ertebølle/Ellerbech Cultures constitute possible mating or marriage partners for the expanding Funnel Beaker (TRB) population (Rowley-Conwy ip: 1ff.). The TRB expansion is a large and fast push only coming to a temporary halt just North of Bohuslän in Western Sweden or around the Oslo Fjord area as earlier mentioned, may be because the Mesolithic population density drops drastically further North and thus the local mass of genes also drops.

The String of Pearls is a variation of the Matrix Model (Moore 2001: 395) and describes a colonization along coastlines or river systems securing continuous communication with neighbouring

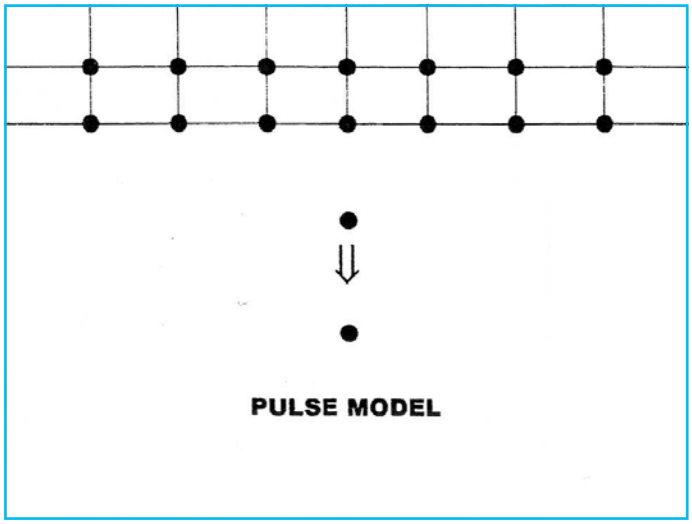

Fig. 2: One of six demographic models. (Moore 2001, fig. 5).

sister settlements eventually securing this communication with exchange of e.g. raw material for making implements, as we shall see later with the Sarqqaq Culture of Western Greenland (Grønnow 2004: 66). The last model to be mentioned is *the Pulse Model or Wave Model,* fig. 2. It is used for describing two beachhead and outpost scenarios, where colonists arrive in successive groups securing a steady gene flow. The successive arrives of new groups could be caused by special attractive elements in the newly colonized land such as arable land with the possibility of a social rise or special luxury raw material such as walrus teeth, if we look at Norse Greenland. In these far out societies it is necessary for some kind of social economic relations, which

the archaeologist could recognise as exotic objects and the anthropologist e.g. ritualized objects. These phenomenons could indicate a gene flow so to speak as the most important function. One of the most famous examples in the anthropological research is the Kula Exchange Ring and Red Feather Money both in Oceania (Malinowski 1922; Neich 2006: 217 ff.; Kirch 1988:103 ff.). The Norse expansion in the North Atlantic during the 9th and 10th Century is an archaeological-historical example. Their dependence on an exchange system solving the demographic dimension for 500 years, could not prevent the demographic failure with total depopulation during the 15th Century for the Norse population in West Greenland (Mahler 2007: 412 ff.). The cause of this depopulation should probably be seen as part of demographic development in Scandinavia and Europe as a whole. After mid 14th Century there were waves of diseases not at least the Black Death, which reduced the European population with between 30 and 60 % (Lynnerup 1998:122; 2011: 328). There were no pressure on the arable land resources any longer, and living on the fringe of the known world far away from family relations, it must have been much more attractive gradually then returning from where they had come some 500 years

Fig. 3:
Dark band of killiaq in the Østerfjeldet, Nuussuaq, Grønland (Sørensen & Pedersen 2005:110).

earlier. In this respect the colonization of Greenland was not a failure but a way of surviving for 500 years.

The first paleo Eskimos expansion into the High Arctic started around 2500 BC. They crossed the straits between Ellesmere Island to the Northernmost Greenland, initiating the Independence 1 Culture – part of the Arctic Small Tool Tradition. The Independence 1 Culture expands to the East through Peary Land to areas with a rich population of Musk Oxen, but North East Greenland is at the same time a cul-de-sac from where it is very difficult to return (Grønnow 2004:78; Grønnow IP.); by 1800 BC the expansion was over and the depopulation a fact (Andreasen 2004: 62 f.). The High Arctic is a severe challenge for any human population, and even small variations in climate and resources may be a threat. The demographic aspects could be an even worse challenge, as the small populations may be very thinly spread over huge distances, so without a steady influx of new genes the bands were doomed to extinction. In fact it is most impressive that the Independence 1 Culture in fact lasted between 200 and max. 700 years.

The Sarqqaq Culture, which is the archaeological name for a contemporary paleo Eskimo culture, did much better with a higher population density in the resource rich and varied Low Arctic area of West Greenland (Grønnow 2004: 66 ff.). The Sarqqaq Culture survived for over 2000 years, and the youngest traces of the culture are dated between 800 and 500 BC. The culture is characterized by bifacial knives, adzes, tanged points, micro blades and burins made of *Killiaq*, a grey metamorphosed slate (Sørensen & Pedersen 2005: 110; Grønnow & Sørensen 2006: 59 ff.), fig. 3. The stone quarries for *killiaq* is situated only in the Disko Bay area, but the *killiaq* raw material and artifacts made of *killiaq* are quite common on all the settlements of the Sarqqaq Culture often a very long way from the quarries. The exchange chains with *killiaq* could very well be a mediator for a gene flow along the West coast of Greenland, and thus creating a demographically successful development for the Sarqqaq Culture – for at least 2000 years (Robert-Lamblin 2006:235f.).

The initial population in Western Oceania arrived some 30.000 year ago where they reached as far as the Solomon Islands but could not expand further because of the lack of maritime technology. It was impossible to expand out in the eastern Oceania bringing enough provisions at the same time by rowing. Only with the invention of the sailing technology did it become possible for further expansion around 2000-

1500 BC (Irwin 2006: 62 f.). The expansion of the Lapita Culture, a farming culture, could be due to a mixture of over population in the already colonized islands and the wish for social mobility. The Lapita expansion is a pulsating expansion with periods of stability changing with renewed pushes and periods of lability. The first push is supposed to have happened shortly after 2000 BC, reaching Hawaii around 700 AD and Easter Island 900 AD – an expansion covering one third surface of our planet (Anderson 2001:17; Kirch 2007:332; Irwin 2006:67). Some of the Islands became depopulated such as Henderson Island, Pitcairn, Necker and some of the small Polynesian islands, while other islands showed a considerable population growth such as Tikopia (Kirch 2007:334; Firth 1959) (fig.). Research into the exchange networks show connections between as many as 20 or 30 island societies through socio economic transactions. Kula and Red Feather Money have been mentioned, and though the systems are fairly recent maybe just two to three hundred years old, they show us the essentials of exchange with prestige objects as mediator for a gene flow. Archaeological excavations have shown much older systems among other places on Vanuatu, Vanikoro and Tikopia. Both Kirch and Friedman recognize the exchange importance of the systems for the social reproduction and the forming of marriages especially in the Eastern Lapita area (Kirch 1988: 114; Friedman 1981: 275 ff.).

Fig. 4: Te puke trading canoe. Santa Cruz Islands, about 1900 (Neich 2006:218).

Conclusion

We still need more research before understanding the Neolithic expansion at the ultimate European border around 4000 BC on Shetland. I have already mentioned the possibility that the expansion was a Westerly phenomenon

coming up the British West coast, or was it rather an expansion which used Orkney and Fair Isle as stepping stones? One thing is certain that the colonizing must have been pulsating that means it presumably consisted of waves of influx securing a demographic success, or the Shetland population had either connections back to the mother population or was part of an exchange system as we have seen above with Sarqqaq and in Oceania. This brings us in search for one or more mediators or special prestige items. One would expect that the beautiful, point butted felsite axes, totally polished and some of them never used or hafted could be items in an exchange chain and thus a mediator (Mahler 2011b: 61), fig. 5. On Shetland these long special axes are often found in wetlands, and seen from an archaeological point of view, they are likely to be ritual deposits though we know precious little about the circumstances. But there are none of these axes outside Shetland – other than in museum collections (Compare Ballin this volume). The same goes for the Shetland Knives, which are found packed together in numbers up to 19 and deposited in wetlands or in special places (Brandly 2000). As far as is known we have no objects with affinity to Shetland found in known Neolithic context on Orkney, Scotland or the Hebrides (Ballin 2011: 32 f.). The Bronze Age on Shetland is very poor on actually bronzes, and finds from Jarlshof and the foot marks from Clickhimin suggest Westerly connections, maybe Irish (Turner 1998: 65). Whether these connections have older roots is not yet known, and the proof of a supposed network during the Neolithic period is still to be found. During the Late Bronze Age renewed contacts are made, and Shetland is again part for much larger cultural area.

Fig. 5:
Long totally polished felsite axe from Shetland, ARC 65541. There is no indication either of wear or of hafting. Courtesy Lerwick Museum.

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The heel shaped cain on the island of Vementry.

The prehistoric house at Punds Water.

Photo Ditlev L. Mahler.

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The Border of Farming and the Cultural Markers

Backcover:
The audience at the day of papers: To the left of the boat from the front: Esther Renwick, Preben Rønne, Ditlev L. Mahler, Gabriel Cooney, Chris Dyer. To the right of the boat from the front: Jenny Murray, Lauren Daughton, Deborah Lamb, Simon Clarke, Ian Tait, Alison Sheridan, Will Megarry, John Hunter. The group to the right from behind the left: Val Turner, Flemming Kaul; and in front from the left Carol Christiansen and Laurie Goodlad.

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