'A cup fit for the king': literary and forensic analysis of crogan pottery

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Abstract

A class of ceramic relatively well represented in museum collections, certainly in Scotland but also elsewhere, has been labelled as 'craggan' or 'crogan' pottery, generally with a Hebridean provenance. Though intensively collected in the late-nineteenth century, it received little attention beyond the comparisons it offered for prehistoric material in archaeology. A concomitant of this collecting interest was so-called 'Barvas Ware', a type of imitation ceramic 'discovered' in the crofting township of Barvas on the west side of the island of Lewis. When this Craggan pottery and Barvas Ware were included in an exhibition on Scottish Pottery in the National Museum of Antiquities of Scotland in 1983, the opportunity was taken to fill out a sparse record. With sources hitherto unexplored, questions of production, dating, function and aesthetic were addressed through research ranging from science-based methods to fieldwork.

'Ceramic views', as the title of the conference, prompts the suggestion that 'craggans' should be looked at again. This account addresses three questions from a curatorial point of view since crogan pottery was 're-examined' in the National Museums Scotland following an initiative in 1983:

1. What is crogan pottery?
2. Why did I take an interest in it?
3. What did I learn and is this still useful?

1. What is crogan pottery?

A class of ceramic relatively well represented in museum collections, certainly in Scotland but also elsewhere, has been labelled as 'craggan' or 'crogan' pottery, generally with a Hebridean provenance, typified by copious sherd material, but not much studied. It is well symbolised by this Crogan (Figure 1) given to the Wellcome Institute in 1935 by Finlay Murray, Barvas Lodge, Isle of Lewis. The provenance omitted that it was made about 1930 by Mary Murray (or *Màiri Ruadh*), Park, Barvas, the daughter of Flora MacDonald, Barvas. This level of identification and interpretation emerged from the more recent research work in the National Museums Scotland. Gaelic song, for example, throws light on the status of the pottery: *'S chrèadh dhèanadh cupan gu deoch thoirt don rìgh* ('… a cup fit for a drink to give to the king'), *R'a fhaighinn an taobh Cnoc Chusbaig*, being lines in the song by William Mackenzie (1857-1907) of Siadar, Point, Isle of Lewis. This confirms an indigenous tradition of pottery-making and emphasizes a number of points, such as this being a localised tradition, a characteristic profile of the crogan, asymmetric shape, marks of scraping on the outside walls in the final stages of making the pots, slight scar left by fastening at the neck etc.

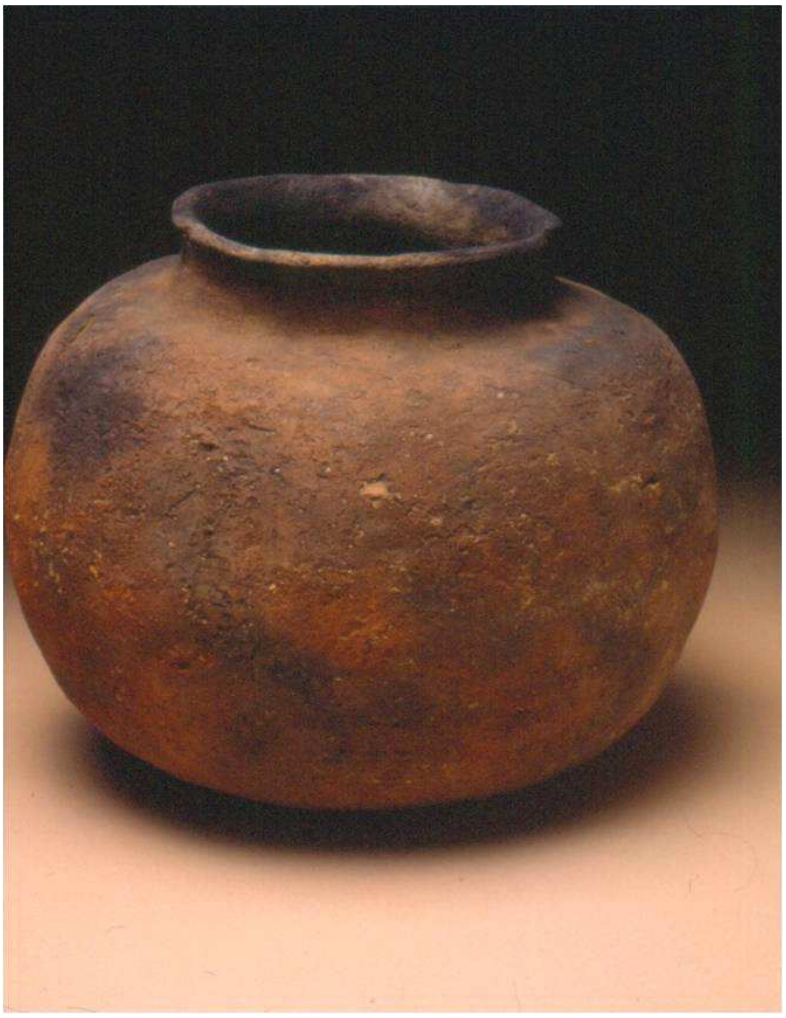

Figure 1: Crogan made about 1930 by Mary Murray of Barvas

Themes suggested for exploration in the Ceramics Conference such as method, practice and theory, or date, function and contact, have not been applied in detail to crogan pottery, and yet simple methodologies such as interpretation of evidence and artefact study - the focus of museum work - have added considerably to our understanding of it; this ceramic, in essence, offers a good example of the study of 'material culture'. It is, at least, challenging, for example, to 'period specialisation' where pottery is defined by time periods, or to 'type series' where sherd material appears to conform to fabric types or to well-stratified sequences in assemblages.

Crogan pottery has been difficult to categorise, and the sherd material is nebulous or formless. Generalisations can be offered, that it is a low-fired ceramic, domestically fired, a thick-walled pottery, with a consistent shape as globular jar, and that it seems to share characteristics with 'common' and undiagnostic sherd material of the Bronze Age and Iron Age. It has most in common with especially Late Iron Age or medieval pottery, and the material described in archaeological reports as 'recent craggan material', material which has not attracted too much attention or scholarly study. I noted that archaeological reports customarily offer a generic descriptor of 'crogan ware'.

This type of ceramic in its ‘whole’ state was identified in the late 19th century and collected enthusiastically by scholars and tourists. At much the same time, visitors to the islands of the Hebrides made the discovery of so-called ‘Barvas Ware’ (e.g. Figure 2).

Figure 2: 'Barvas Ware', probably early 20th century, in the form of the 'tea-set' which seemed to be readily marketed to tourists

In spite of the mild sensation of ‘discovery’ in the field, crogan pottery fell outside the conventional ceramic groupings or typologies of scholarship and has been clearly a poor relation in ceramic studies, appearing perhaps unsophisticated.

2. Why did I take an interest in crogan pottery?

My ‘engagement’ with crogan pottery coincided with moving to a new curatorial post in the National Museum of Antiquities of Scotland [NMAS] in 1982 when an exhibition on Scottish Pottery was being prepared by my colleagues. Having some knowledge of Scottish Gaelic, I was left to handle the Museum’s crogan collection for the exhibition.

Figure 3: 'Vase' made by Mrs Catherine MacIvor, Brue, Barvas, for the Wellcome Institute about 1935

The exhibition – and curatorial responsibilities - followed pre-ordained groupings (a) medieval to 18th century and (b) 18th – 20th centuries, the curatorial division based on conventional period specialisms and departmental divisions. The crogan pottery offered something of a paradox, appearing ancient or medieval but in most examples belonging to the 19th and 20th centuries, but not sharing this material's self-evident features of production, aesthetic or finish (e.g. Figure 3). Crogan ware was well represented in the national collections with about 120 items, and also represented in museum collections with strong national and international reach.

Collections with crogan material were visited and a research database established. The main collections examined were in the National Museums of Scotland, Glasgow Museums and Art Galleries, Birmingham City Museums, the Victoria and Albert and the Wellcome Institute, being mainly collected in the late 19th century, but with some interesting examples from the 20th century, for example, crogan pottery commissioned and collected by A D Lacaille for the Wellcome Institute in the 1930s (Figure 4). He purchased crogan pottery from Mrs Catherine MacIvor, recent research identifying her as *Catriona Mhurchaidh Dhòmhnaill Iain 'ic Iomhair*, of Brue, Barvas.

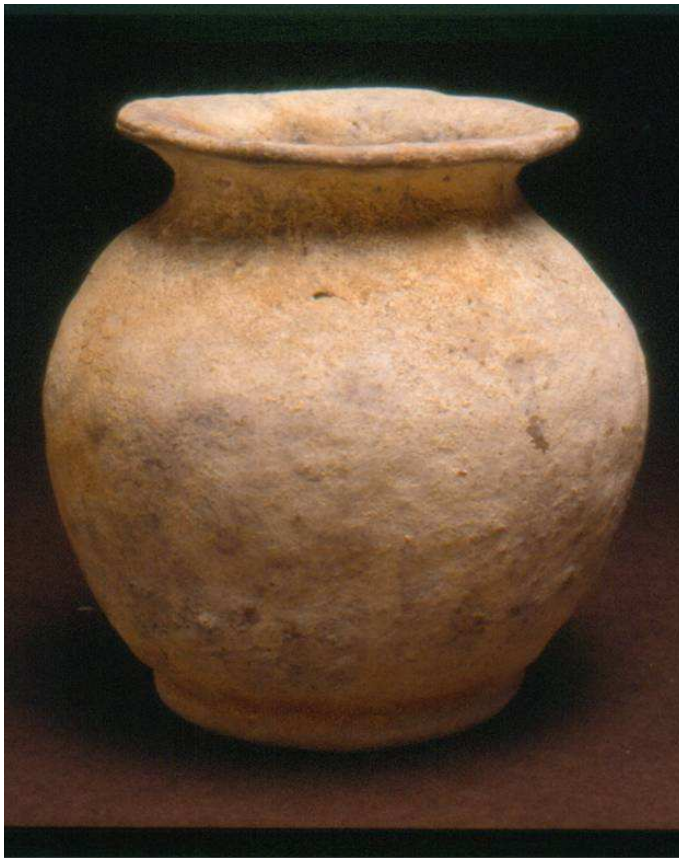

Figure 4: 'Crogan' commissioned from Mrs Catherine MacIvor, Brue, Barvas, and collected by A D Lacaille for the Wellcome Institute in the 1930s

The wider interest of late 19th century collecting is well expressed in Llewellyn Jewitt, *The Ceramic Art of Great Britain* (London 1877), page 625, in which coincidentally the contact is made with a Lewis community through the notorious, if not tyrannical, factor of Sir James Matheson, Donald Munro:

> "The Hebrides.
> Hand-made pottery is still made and used in all its primitive simplicity. The following letter, which I am permitted to print, is so full of interesting matter concerning this curious phase of fictile art that I give it entire. It was addressed by W[alter] Morrison Esq MP to my friend W H Goss, and dated from the House of Commons."
>
> "The circumstances under which I came upon the hand-made pottery were as follows. In conversation with a Scotch friend on archaeological matters, he happened to mention that hand-made pottery is still used in the Hebrides. .... My friend gave me an introduction to Mr D Munro, the chamberlain of Sir James Matheson Bart, at Stornoway in the Lewes, and Mr Munro promptly sent me a complete tea-service consisting of teapot, milk-jug, sugar-basin, slop-basin, egg-cups (or probably dram-cups), cups and saucers, and marmalade pot! which he had purchased for the magnificent sum of 10s from an old woman at Stornoway who was actually using them in the year of grace 1868 at her tea-table. The

> pottery is evidently hand-made, and is of a very rough quality and form, baked, but not turned on the wheel. .... The remarkable thing is that the pottery is distinctly copied, rudely enough, from modern pottery. The forms are ordinary Tottenham Court Road forms, and their continued use in an island with a regular steamboat service from Glasgow strikes me as very curious."

The first documented 'collector' of crogan pottery was Dr Arthur Mitchell. In his Rhind Lectures in 1876, published as *The Past in the Present* in 1880, he described the 'discovery'. The first examples of crogan pottery were given to the NMAS in 1863 by Arthur Mitchell, as examples of what he described as 'neo-archaic' objects in that they appeared to be archaic or ancient but were recently made and information about their manufacture could be derived from the maker. It is significant to note how a crogan was represented as exotic in the text of *The Past in the Present* (Figure 5). Methods of making could be investigated for the light it might throw on early pottery-making techniques. This line of inquiry belonged to this late 19th century period under the influence of Darwinian theories of evolution and progress.

Fig. 21.—Barvas Craggan ;
8 inches high.

Figure 5: Barvas Craggan (Mitchell 1880, Fig. 21)

NMAS' 1892 *Catalogue*, marking the move from Edinburgh's Royal Institution at the Mound to the purpose-built Museum and Portrait Gallery in Queen Street, woefully misrepresented the collection of crogan pottery by grouping it all together and describing it as from the Island of Harris. A change of scholarly interest and emphasis can be sensed here. Hebridean pottery was

then marginalised and essentially misrepresented and its provenance confused. This confusion was carried forward in the museum records until the early 1980s when an effort to re-catalogue the Crogan pottery as from Harris compounded the error. A lack of interest may be symbolised by an example in the Banff Museum drawn by Dr Joseph Anderson and noted by him as 'Urn' (e.g. Figure 6).

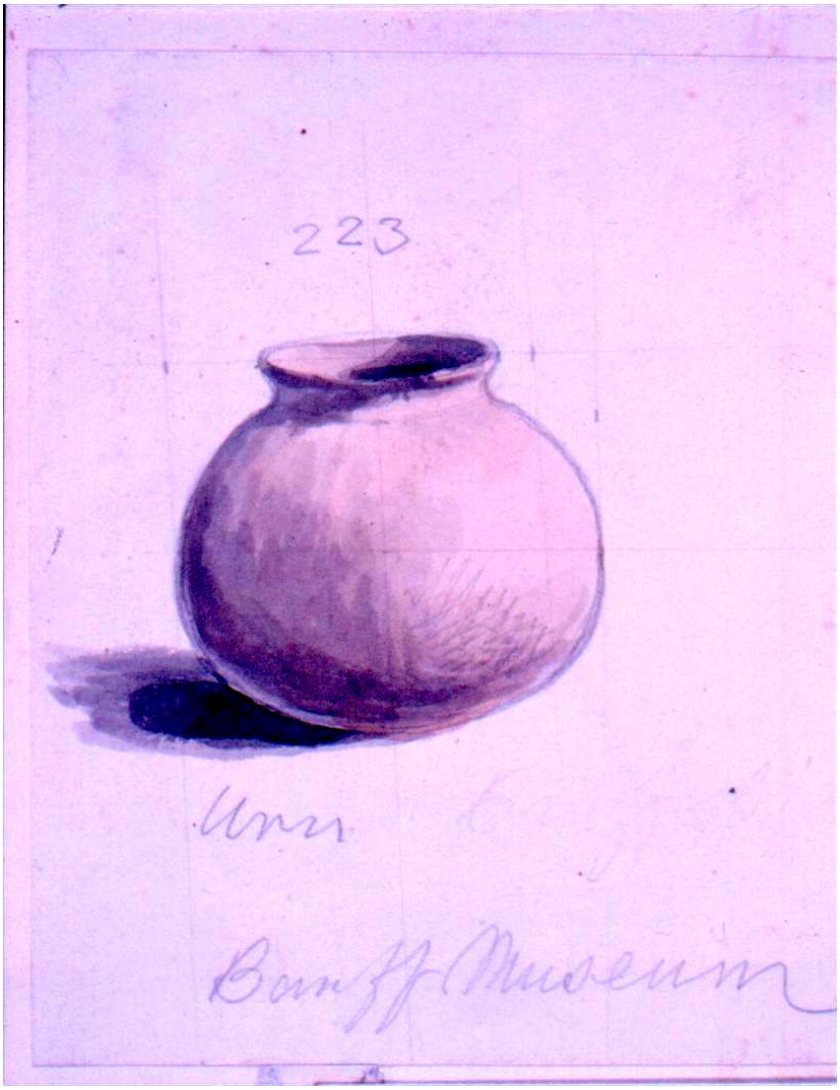

Figure 6: Dr Joseph Anderson's drawing of an 'urn' in Banff Museum

3. What did I learn about crogan pottery and is this still useful?

A process of research was started in 1983, beginning with museum records which were brief to non-existent on individual items. One or two historical sources mentioned crogan pottery, notably Martin Martin, Rev Dr John Walker and Rev J L Buchanan. An account of NMAS' first acquisition by Arthur Mitchell on a visit to the Island of Lewis in 1863 was published in his Rhind Lectures of 1876, *The Past in the Present*. Mitchell describes the

circumstantial details of the first acquisition but it was not exploited, as he explains, because of a language barrier:

> "When I visited the Island of Lewis in 1863, I had the advantage of the company of Captain F W L Thomas. …. In driving from Uig to the village of Barvas on the west coast, we passed a stone-breaker sitting at the roadside eating his dinner out of a vessel which struck us as remarkable. We found it, on closer examination, to be even a stranger thing than it seemed to us, as we first caught sight of it. We waited until the stone-breaker had eaten its contents, and then we carried it off, but we had acquired little information regarding its history, because the stone-breaker and we had no language in common."

Mitchell described how further items were collected later that same day, for example, Barvas Ware and a little clay figure of a cow, but probably a 'toy' rather than a votive offering.

I looked at items in other museum collections and gathered rather sparse catalogue entries. At least most museum catalogues gave a provenance, for example in the collections of the Highland Folk Museum, Tain Museum (where there was a Barvas tea-set from Fendoch! Manifestly misleading!). I wrote an article in the *Stornoway Gazette* (22 January 1983) on the advice of the Librarian of Stornoway Public Library, to try to establish if anyone still knew where, when and by whom crogans were made, since the first item of crogan ware in the NMAS collections had come from the west side of the island of Lewis. I was warned that I shouldn't expect a flood of correspondence in response but that this would prompt memories and might be followed by 'phone calls to a number of people in the island and expatriate islanders in Glasgow and Edinburgh. This was indeed the case and I was given some key 'leads' into who made the pottery, where and when.

I learnt about the functions of crogan pottery, from first-hand experience and information by word of mouth. Its use within living memory, for example, was recalled in the particular function of bringing milk back from the shielings to the townships, where the crogan was cradled in moss and placed in a creel which was carried on the individual's back. There was a consistently strong association with milk and dairy products, with functions of storage and transport, and references to the storage of fish oil (*ola bioraich* i.e. 'dogfish oil' and *ola ròin* i.e. 'seal oil'), and the oil used for lighting in cruisies and for medicinal purposes. A fieldwork trip was made in May 1988, with a return to Barvas to locate clay deposits and to be given information from a man, Mr Malcolm MacIver of 3 Park, Barvas, whose grandmother had made pottery. A typescript was assembled from this conversation and then confirmed by Mr MacIver.

Terminology offered more information, for example, the word *imideal*, a term used for the skin covering of a crogan pot and widely recalled at least in Lewis. It is remembered in proverbial form, *cho glan ri imideal* ('as clean as an imideal'). Another example of proverbial usage is familiar to all Gaelic speakers: *blas a' chrogain*, 'the taste of the crogan', with a range of inferences

and potential ironies deriving from a preference for food tainted by storage in the crogan. In this context, Gaelic dictionaries are an important source, as is literature, especially poetry and song. Crogan pottery had a more than significant currency – lost surely in its archaeological treatment. For example, as it was enshrined in the practical and symbolic representation of crogan pottery as 'fit for the king' (the line of song adopted in the title of the paper) – possibly implied irony, but it was noted by Captain Thomas that crogan pots were customarily passed around and admired. This point is made in his fieldwork notes preserved in the Society of Antiquaries of Scotland Manuscripts

What can we say about dating? Available information for example in the provenance of museum objects makes it clear that crogans were then recently made, whether in the 1860s (as Arthur Mitchell discovered), or with examples made for collectors and museums in the late 19th century and in the 1920s. We have the good example of A D Lacaille's contacts in 1935 and the fieldwork of Mr George Holleyman in Tiree in World War 2. For early dating, a 'benchmark' pot was found in Lewis containing the 'Stornoway Coin Hoard' and Breacacha Castle, Island of Coll, excavation material suggested 15th or 16th century dates. Comparing this with sherd material of similar type from Iron Age deposits, could the gap be closed so this might speculatively be proposed as a continuous unbroken tradition?

Science-based analysis was carried out by Ann MacSween in her MA Dissertation for Bradford University, with analysis of material from the body of pots to give a profile indicating how pots could be identified with particular sites, such as in Lewis, in Kilmuir in Trotternish, Skye, and in Tiree. Differences in composition revealed in Neutron Activation analysis of provenanced historical/sub-recent and recent examples could be used to suggest areas of manufacture of unprovenanced sherd material and patterns of inter-island trade and contact.

What were the outcomes of my research in the years 1983-1993? An holistic process of research between the sciences and humanities confirmed, *inter alia*, locations, dating, processes of production, function, and a gender focus – for example, all the potters were women - as well as the opportunity to feed back to the 'crogan heartland' information from museum research that confirmed oral tradition and community memory. Perhaps the most intriguing detail to emerge closed the circle of my own museum research- the man on the Barvas road in Lewis in 1863 from whom Mitchell acquired the first crogan pot. Who was he? I was invited to speak on 'Barvas Pottery' in Barvas in 1995, a task for which I felt unfitted. My first slide was Mitchell's crogan acquisition of 1863 and I quoted Mitchell's own account of this event and the anonymity of the source. In the discussion following the talk, when I learnt much about the potters of the West Side of Lewis – *Taobh Siar Eilean Leòdhais* – I was told that the source of the National Museums' first crogan was William Matheson of Brue, also known as *Uilleam Òg MacMhathain*, an individual commemorated in a hillock beside the Arnol-to-Brue road, *Tòrr Uilleim*, and a man who died in about 1910 in his 80s. He was not himself a maker of pottery but, at the same event, I learnt of the family dynasties of

potters and individuals such as *Fionnghal Bheag Nic Dhòmhnaill*, *Màiri Ruadh* Murray (*Bean Thormoid Uilleim*), Mary MacIver, and Catherine MacLean (*Catriona Mhurchaidh Dhomhnaill Iain 'ic Iomhair*). This was an impressive addition to a relatively silent and inert archaeological record, and did some honour to the makers of crogan pottery through the generations.

References

As stated above, this research was carried out between 1983 and 1993 and the results documented in the National Museums Scotland collections information system where the individual records were corrected, updated and audited. The results of the research were published at the time in a number of articles and an exhibition in Stonoway. In terms of a bibliography for the above text and proper *apparatus criticus*, the reader is referred to:-

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Scottish brick, tile and fireclay industries

Miles Oglethorpe, Historic Scotland

Scotland is considered by many to be a stone country, but there are huge quantities of brick and heavy clay products embedded within its built environment. Much of this ceramic material is not immediately visible to the untrained eye, but without it, Scotland would not have developed into the global industrial force that it had become by the time of the outbreak of the Great War in 1914.

The significance of Scotland's heavy ceramics stretches back to the great agricultural improvements of the 17th and 18th centuries, when surface clays were extensively used to produce field drain tiles, and also pan tiles for the roofs of buildings (Taylor 1839). The same 'plastic' clays were also employed to produce bricks, and until the mid-19th century, these products were generally hand-moulded. Thereafter, however, their production was revolutionised by 'stiff-plastic' mechanised moulding technology (Bradley and Craven 1948).

The new machines permitted a far wider range of less-plastic raw materials to be used in heavy ceramics manufacture. In Scotland, this included groups of shales and fireclays in the carboniferous geology of the coalfields to be used for a range of new products which transformed industry and domestic living conditions.

The shales, often in the form of colliery waste, found themselves a use in the form of raw materials for brickworks. They had the advantage of naturally containing combustible material which gave them a partial self-firing quality, saving substantially on fuel in the kilns. As a consequence, large numbers of coal-fired kilns grew up adjacent to collieries, and during the late-19th and 20th centuries, provided vast numbers of bricks for waves of house-building programmes in particular.

Most of these bricks were not of sufficient quality to be weather-proof or load-bearing, and were rarely used as facing bricks or in major pieces of civil engineering, such as bridges and viaducts. They tended therefore to be invisible, hidden either within buildings as interior walls, or if on the exterior, covered with some sort of render. However, there were some places in Scotland, such as at Braidwood near Carluke, where the clays and shales were of sufficient quality to produce high-quality facing bricks (Douglas and Oglethorpe 1993, 13).

The other significant raw material of the Scottish coalfields was fireclay, which had an unusually high alumina content, making it suitable for the production of high-quality refractories. At the time, Scotland was home to a range of heat-intensive heavy industries which needed a constant supply of furnace linings, firebricks and linings for corrosive chemical processes, such as sulphuric acid manufacture. Scottish fireclays proved to the perfect raw material, feeding the

iron and steel industries in particular, and developing a substantial export industry (Sanderson 1990).

The fireclays were also used extensively for the production of firebricks and firebacks for fireplaces, but became most widely known domestically for the manufacture of sanitary ware. In the first half of the 20th century, Scottish companies such as Shanks of Barrhead and J & M Craig of Kilmarnock became world leaders, exporting products across the globe (J & M Craig Ltd 1909).

This was, however, the more glamorous end of the heavy ceramics industry. Many brick and tile works used local fireclays to produce a variety of rougher ceramic products that are still functioning in some form all around us today. Often augmented with a brown salt-glaze by adding common salt during the firing process, these products included huge quantities of underground drainage pipes, sewers, grease-boxes, traps, cesspools and bends, forming a hidden infrastructure which continues to drain buildings, yards, streets, roads and land across the country (Glenboig Union Fireclay Co Ltd, nd).

Although generally hidden, there are a few examples of these rougher products that were designed for more visible use. The fireclay companies often produced ornamental pavoirs and tiles for floors and pavements, and also salt-glazed copes to sit on boundary walls. Perhaps most prominent were the ridge tiles for roofs, and most majestic of all, the yellow and brown chimney cans that sit on the chimney heads and stacks of so many of Scotland's older buildings.

Very little of the heavy ceramics works themselves now survive in Scotland as the kilns and clay processing buildings had little aesthetic appeal and have also tended to raise contamination issues. However, the products of these industries are all around us, and continue to contribute to our quality of life.

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7

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Beer Jugs, Wine Bottles and Coffee Pots – a functional approach to changing ceramic use in post-medieval Edinburgh

Julie Franklin, Headland Archaeology

Developer-funded excavations by Headland Archaeology in the heart of Edinburgh's old town revealed a series of well dated and well preserved cellar backfill deposits, giving an insight into the city's material culture at three discrete points in the post-medieval period, from the 1630's to the 1740's.

Rather than study the pottery purely by fabric and origin it was decided to focus on it group by group, analysing the function of the ceramic vessels from each cellar with close comparison to the contemporary glasswares and other finds. This approach, combined with innovative illustration techniques, revealed and quantified the changing uses of pottery in the century running up to the Industrial Revolution. Beyond the ceramics it also illustrated the wider changing fashions in drinking, dining and cookery.

Scotland's post medieval and industrial ceramic industry: past, present and future

George R Haggarty, Research Associate, National Museums Scotland

Scotland was an important player in the manufacture and worldwide distribution of industrial, refined and coarse ceramics, but it is only relatively recently that archaeological techniques has been employed in a bid to identify the range and scale of the industry. What has become known as the National Museums of Scotland Sherd project, with support from Historic Scotland, will by the end of 2011 have produced fourteen ceramic resource discs, containing details of fabrics, form, decoration rarity etc. of extant sherd material from 17th, 18th and 19th century Scottish kiln sites. The most important of these CD ROMs have been distributed over the last few years with the *Journal of the Northern Ceramic Society* (Haggarty 2005, 2006, 2007, 2008, 2009 & 2010). Figures 1-3 illustrate ceramics from Newbigging, Prestonpans and West Pans.

Another major programme of work, and funded by Historic Scotland, has been on Scotland's major excavated post-medieval and industrial redware kiln sites (Haggarty, Hall & Chenery 2011). This has included chemical (ICP-MS) analysis of 612 redware sherds. Collectively, these studies will give those studying Scotland's medieval and later ceramic heritage a world-class platform on which to move the subject forward. That said, creating tight and cost-effective research strategies for the future is crucial, especially at a time when funding is likely to get more difficult.

Recent work has highlighted a number of problems, of which the most important in the eyes of the author are (1) as a nation we are in the main ignorant of Scotland's huge and internationally important refined ceramic industry. (2) We still do not have in place mechanisms to deal appropriately with large assemblages of ceramic material from kiln sites and only one person writing Scottish archaeological briefs, seems to be getting it anything like correct. (3) Most museums do not store medieval and later ceramic heritage in a way that makes research either easy or cost effective. We need to identify end users, what they want from the material and how best to make it available. (4) Current archaeological practices as carried out by archaeological units when dealing with Scotland's industrial ceramic heritage, have in a number of recent cases failed to deal with the material in anything resembling a proficient or professional manner.

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Figure 1: Ceramic plaque identified from shards recovered at the Newbigging pottery Musselburgh (Scottish private collector)

Figure 2 : Plaster of Paris moulds fragments recovered at Cuttle Prestonpans photographed alongside identified Pratt decorated tea canisters (Historic Scotland)

Figure 3: Painted 18th century pearlware sherds excavated at West Pans (Historic Scotland)

"A trail of tiny breadcrumbs"
The Northumbria Medieval Pottery Project

Andrew Sage

Over the last twenty years the increase in small scale development work in Northumberland has highlighted the shortcomings in our understanding of the medieval ceramic record of the county despite an in-depth of understanding of material in the regional centre of Newcastle upon Tyne that has developed over thirty years.

This paper will examine the issues that have faced ceramic researchers and archaeologists as a result of dealing with small assemblages in areas with no established type-series and the impact this has had on the wider management of the archaeological resource.

The focus of the paper will be a discussion of the project the author is currently developing in conjunction with the local government archaeological officers in the North East, local museums and English Heritage to develop a chronological fabric type series for the whole region which will be based around a searchable online catalogue. A detailed assessment phase completed earlier this year demonstrated the possibilities of combining information from very small sites to develop a chronological type-series for the region. The drawbacks of using such small datasets are discussed but the benefits of focussing on small groups of material can be shown to outweigh these, particularly when developing a type-series. The project has been developed in light of the austere funding environment in which the sector now finds itself and has adopted strategies to maximise its potential at minimum cost. Amongst others this includes agreeing a policy with the Local Government Archaeological Officers to adopt a policy to ensure the long-term maintenance of the online resource.

The paper will also outline some of the issues which need to be addressed in the field to improve the ability for ceramic specialists to contribute meaningfully to the archaeological process in areas where our understanding of the ceramic record is poor and the mere recovery of ceramic assemblages should be considered a key excavation aim in itself.

A handful of sherds: methodologies for dealing with small assemblages

Ewan Campbell, University of Glasgow

Quantification issues are usually associated with large ceramic assemblages, but small assemblages raise a different set of issues. Extracting the maximum amount of information from small assemblages is often critical for site interpretation, particularly in areas of low ceramic usage. This paper will outline some simple techniques developed for analysing small assemblages of imported pottery in 5th- to 7th-century contexts in western Britain (see especially Campbell 2007, chapters 6 and 7). These include establishing taphonomic 'signatures' from different depositional environments, and using pot-to sherd ratios in residuality studies. Hopefully these techniques will be useful to those working in other contexts.

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Still in a Renaissance or are we treading water? Scottish Medieval Pottery Studies

Derek Hall

Introduction

The study of Scottish medieval ceramics was given an enormous impetus by the urban regeneration boom of the later decades of the 20th century (Hall, Haggarty and Murray 2000). The large assemblages of pottery recovered from Rescue excavations in several Scottish medieval burghs finally allowed specialists to create a baseline from which further research could grow. At the time of an economic recession (2010) and a subsequent downturn in archaeological excavation now would seem an ideal opportunity to review where the subject stands and how it can move forward.

History of the Study

The study of medieval pottery, and indeed medieval archaeology as a whole, is still a fairly young discipline in Scotland. The first real attempt to try and understand medieval pottery was made by Stewart Cruden in the 1950's when he was an Inspector of Ancient Monuments in The Ministry of Works for Scotland. Cruden examined the large groups of material from Ministry of Works clearances of the likes of Melrose Abbey in the Scottish Borders and Bothwell Castle in South Lanarkshire (Cruden 1954; Cruden 1955). None of this material was stratified so all he was able to do was to examine differences in vessel form, decoration and note the presence of apparently imported fabrics. Lloyd Laing moved the subject on in the 1970's with important papers on Scottish medieval cooking vessels and general considerations of new finds from the likes of Stenhousemuir (Laing 1973; Laing and Robertson 1971). The first real attempt to widen horizons was made by Eoin Cox and George Haggarty in the mid 1980's with their seminal paper on the important group of pottery from Kelso Abbey (Cox 1984; Haggarty 1984). This paper was the first to really try and bring scientific analysis of ceramics to the fore. We are now at a point where we feel that we have a good basic idea of Scotland's native industries in the medieval period.

Scotland's Medieval Pottery Industries

The earliest of these appears to be the Scottish White Gritty Ware industry which on current evidence seems to begin production in the 12th century. The Historic Scotland funded White Gritty Sourcing project considered this industry across the whole country and developed a draft vessel typology that was backed up with ICPS analysis (Jones *et al* 2003). There is a firm belief that this industry was monastic inspired but this has yet to be conclusively proved. The only production site so far excavated is at Colstoun in East Lothian where an archaeomagnetic date of 1340 AD was returned for the last firing of the multi-flued kiln from the site (Hall 2007). Other potential production sites have been identified at Ceres (see Harris, Jones and Hall, this conference) and Coaltown of Wemyss in Fife but await further work.

The second identified industry is the Redware one which does not appear to start until the late 12th or early 13th centuries using clays from the major river valleys. Production sites for this industry are known so far at Rattray (Aberdeenshire), Stenhousemuir and Throsk (Falkirk Council). All burghs in close proximity to major Rivers appear to have their own Redware industry. Recent excavations at Stenhousemuir produced a C14 date of 1400-1490 from one of the dismantled kilns on the site suggesting that there was pottery production at a slightly earlier date than previously thought (Hall and Hunter 2001; Hall 2009). The excavations at the deserted burgh of Rattray are of interest as pottery manufacture was taking place within the burgh limits and may have only been supplying the burgh (Murray 1993, 147-169). Throsk has good documentary evidence for named potters in the 17th century (Harrison 2002) and probably represents the onset of mass production, how long this industry continues before it is supplanted by industrial pottery manufacture is the subject of continuing debate (G Haggarty, pers. comm.).

Documentary research and Scientific Analysis

In the 1990's Historic Scotland provided funding for this author to carry out the first real pilot study of what could be gained from the various available documentary resources about the Scottish pottery industry (Hall 1998). This was quite a frustrating exercise due to the lack of obvious early references to pottery manufacture. A study of surname evidence in the documents only noted Simon Potter of Dumbarton in 1357 as one of those negotiating for the release of David II King of Scots and it is not obvious that that was necessarily his trade. It would appear that a more useful term to search for is 'laym' (the Scots word for earthenware), it appears in early 16th century documents recording orders for pottery vessels 'AD 1501-02 Item, the secund day of Februar, to the pottair for laym (earthenware) pottis vs ' and may also feature in placenames such as 'Limepottis' in Perth and Kinross (Paul and Dickson Vol IV, 135). The biggest breakthrough in pottery studies in the last 15 years must be chemical sourcing, the use of ICP-MS (Inductively Coupled Plasma Mass Spectroscopy) to try and isolate separate pottery production centres has been ground breaking and the results, particularly on Redwares, have been quite remarkable (Haggarty, Hall and Chenery 2010). It has given us the ability to separate samples from sites that may only be less than a mile apart, we believe very strongly that this technique must be built in to any reporting and analysis of pottery assemblages and would suggest the following list of minimum standards for this technique:

- Ensure that you have taken enough samples, a minimum of ten should be the standard.
- Ensure that the samples are big enough to give some idea of the original vessel form.
- You must provide list of questions for the statistics to answer.
- Insist that samples must be kept and archived together so that analysis is repeatable.
- Try and ensure that any glaze is removed from surface of sample to avoid effects of lead on results.

Archaeomagnetism and geophysical survey should also be employed to aid the dating and prospection of new production centres. If we examine the small number of identified Scottish production centres we can see that they all share common elements, a nearby clay source, a water source and a fuel source, should this not aid any future search for the many other sites that should be out there presumably in a rural location?

The study of imported wares and the use of C14 dating

Excavations in the likes of the burgh of Perth have indicated the wealth of evidence that can be gained from the considered study of medieval ceramics, this includes the proper analysis of what the considerable range of imported wares can tell us. George Haggarty's recent survey and gazetteer of French medieval pottery imported into Scotland is a good example of what can be achieved when we try and move beyond simply recording how many pieces of each fabric are present (Haggarty 2006). The recent improvements in the accuracy of AMS C14 dating have finally allowed us to use this technique on material of a medieval date. The most striking example of this being the recent series of C14 dates on carbonised cooking wares from Perth, London and Bergen which suggest that this pottery type was in use in the mid 11th century some 100 years earlier than the published chronology (Hall, Cook and Hamilton 2010). It now seems likely that C14 could be used to aid the dating of both the Scottish White Gritty Ware industry and the Organic tempered/Craggan Ware industries of the Scottish West Coast and Islands.

Early groups of pottery from Perth also include quite a high proportion of greyware fabrics. These have been identified as being of Low Countries (Belgium, Holland) origin but their apparent date is something that we have never been happy with. In recent years we chemically sourced a group of this material in comparison with samples from kiln sites in Jutland and East Anglia, and at least one of the Perth samples is closely comparable with a sample from a production centre on Mors Island in Jutland (Hall and Chenery 2005). Other samples had good comparisons with a couple of the East Anglian kilns and a small group remains unidentified. There is good documentary evidence for the presence of merchants of East Anglian origin in Perth and this may be reflected in the ceramics. Recent excavations in St Nicholas Church, Aberdeen have also revealed a similar unprovenanced group of greywares. Widespread pottery production in Scotland seems to have started very late so when foreign 'settlers' were brought to Scotland's burghs they may have brought pottery with them that they were used to using; word had obviously spread that the Scots produced no ceramics! Is it possible that before the major burghs take off in a commercial sense it may be possible to identify the origin of the early inhabitants of our 'proto-burghs' based on the pottery that is present?

The Future

Creating a workable chronology for our local pottery industries in the medieval period must take a high priority; the obvious difficulty is identifying who will

pay for such pure research? The other questions that need addressing can be summarised as follows:

Training

- Who will carry on?
- It should form part of any sensible research framework
- Who pays?

Minimum Standards

- Processing
- Storage
- Availability for study
- Retention
- Naming of fabrics

Co-operation

No matter what the period, whether it be Prehistoric, Roman, Medieval or Post-Medieval, ceramic specialists are all suffering from similar problems. With the obvious success of the likes of ICPS and C-14 dating we should be talking to each other about mutually beneficial ways of analysing our ceramics and how to move the study on.

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Looking for the missing link - Viking pottery on Shetland

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The excavation of a site at Norwick, on the northerly island of Unst, yielded evidence for Iron Age and early Viking occupation. It lies close to an area known as Clibberswick (klebber (ON) = soapstone or steatite). The early Viking pottery from Norwick has mainly steatite temper and the vessels were relatively poorly made (Fig. 1). However, its discovery provided an opportunity to research the occurrence and techniques of manufacture of ceramic assemblages with similar characteristics, from sites thought to be early historic in date across the Shetland archipelago.

Shetland abounds in settlement sites of Viking/Norse and medieval date, but the investigation of their ceramic tradition has been almost non-existent until recently. One of the main type sites for Viking studies, that of Jarlshof in south Shetland, has not produced a single sherd of pottery identifiable as Viking, but later Norse ceramics were found there. Indeed, Viking Age sites have largely been considered as aceramic but this is not necessarily the case. Research by Bradford University at the multi-period site of Old Scatness at the southern tip of Shetland revealed buildings with Pictish and Viking levels and contemporary pottery. More recent investigations, again by Bradford University, on early medieval and medieval sites on the island of Unst have produced some ceramic material and this comparative collection has allowed the pottery assemblage from Norwick to be evaluated.

As well as these sites, it has also been pertinent to revisit the important assemblage of coarse pottery from the medieval royal site of the Biggings on the island of Papa Stour, dug between the 1970s into the 1990s (Fig. 2). This reappraisal has implications for the story of traditional hand made ceramics in Shetland and their (limited) continuation.

Through this paper I examine the manufacture of pottery of Viking date, the problems of identifying it and the use of steatite in its production. I will consider how the development of this material from Middle and Later Iron Age traditions took place, and what finally happened to it.

Figure 1: Some of the largest surviving steatite-tempered sherds from Norwick, Unst

Figure 2: Part of a vessel from the Biggins, Papa Stour

Don't panic – confronting ceramics of one period in contexts of another

Colin Wallace, University of Liverpool

In some cases, it is simply a change of interpretative viewpoint that is required to make some progress understanding ceramics of one period in contexts of another period (case study: the 'Roman' tile from a 10th century AD context on the Isle of May). In others, good project work requires some vital, 'soft' skills of team working and patience in the face of provocation, alongside thoughtful application of method and theory (I will show you my scars).

What does 'residuality' mean anyway? It can be faced up to, but over-confidence (by ceramicists) is just as bad as an absolute fear of it (by non-ceramicists). The rest of my paper will move on from softer issues, of memory practice and of how some Roman pottery remained available and/or in circulation for quite some time, to harder issues about the archaeology of the Late Roman to Anglo-Saxon transition in Britain (why did Romanists lose thee continuity wars?)

Luminescence dating applied to ceramic building materials

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The *Groupe de Recherche Européen* (GdRE), named "*Terres cuites architecturales et Datation*" and created in 2005 by archaeologist Ch. Sapin and physicist P. Guibert, became involved in the archaeological study of historical buildings, in order to investigate their chronology and to consider the question of the origin of their building materials. The aim was to bring together a series of different experts to form a multidisciplinary team. The building archaeological team comprised English, French and Italian archaeologists, historians of art and chronologists such as specialist in C14 dating applied on charcoal from mortars, dendrochronology on wood beams, archaeomagnetism and luminescence dating applied to bricks. This led to the first studies in Europe that entirely combine and correlate archaeological and archaeometric data on medieval buildings. The aim was to combine all methods to obtain very accurate dates for buildings.

The work focused on eleven early medieval religious sites in north-western France and south-eastern England that have seen a continuity of durable settlement from the early medieval period to the present day: five Anglo-Saxon and early Norman churches in Kent and Essex and six Carolingian, pre-Romanesque churches in Normandy and Pays de Loire.

The purpose was to determine whether medieval builders reused Roman salvaged bricks or if the ceramic material used were contemporary to the building under construction. Furthermore, because of the important place of these buildings in architectural history, it was imperative that they were positioned as accurately as possible in the chronology of the history of art. Indeed they are often referred to in order to provide a chronological estimation of lesser-known buildings which display similar architectural features. In view of the importance of some of these buildings, it was necessary to attempt to define their dating. Thus luminescence dating (Aitken 1985; 1998) was applied to bricks sampled in these buildings.

The luminescence dates show that the two types of practices were in use in both countries: either Roman reused material especially in the cases of the parish churches (Blain *et al.* 2010), or early medieval bricks. In this case, the more samples were dated, the more accurate the mean date was, on condition the bricks are contemporaneous. Assuming the bricks are furthermore contemporaneous with the building itself, dating can provide very interesting information on the origin or the phasing of the building. Some of the cases of early medieval bricks are:

- Notre-Dame-sous-Terre in the Mont-Saint-Michel: the two phases defined archaeologically could be dated, and it was therefore shown that only a couple of decades separates these two phases since the surrounding wall is dated to 950+/-50 AD and the east sanctuaries and the median wall to 990+/-50 AD (Blain *et al.* 2007).

- St Martin's church, Angers: three dating methods were applied there: C14, thermoluminescence and archaeomagnetism. Each method provided results which were in agreement with each other. The combined dates for all structures of the bell-tower are in the range 850+/-50 AD (Blain *et al.* in preparation)

- Chipping Ongar's church, Essex. The mean date by OSL on four bricks sampled in the building indicates a production in the 11th century. These new data cast some doubt on the pioneering role of Cistercians in the technological reintroduction of brickmaking in England (Ryan 1996; Rodwell 1998; Andrews 2008).

This study is a good example of the relevance of absolute dating methods in building archaeology and more specifically of luminescence dating applied to ceramic building materials.

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Theorising Ceramics: The social lives of pot

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Using Roman pottery recovered from non-Roman contexts as a case study, this paper develops a biographical approach to tease the social dimensions out of ceramics (Campbell 2011). The study is set within the framework of modern theoretical constructs alongside ethnographic studies which have demonstrated the social significance attached to certain ceramic objects. The study rejects functional analyses of ancient pottery on the basis that these approaches do not adequately elucidate the role which foreign objects adopted within recipient communities. Neither do they address the complex issues at play in determining which objects were deemed acceptable for appropriation into existing conditions, nor whether cultural restrictions were in place on the objects. Detailed analysis of material spreads also renders traditionally accepted proposals for elite control of wider access to incoming exotica debateable, strengthening the case for innovative modern methods of understanding how Roman material culture functioning in Iron Age communities.

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Yes, Mortaria were made in Roman Scotland! (with the corollary that other coarsewares were also made)

Kay Hartley

A survey of the evidence as it stood in 1976 (Hartley 1976) and that which has come to light since, notably the workshops which can be confidently attributed to Bearsden and Elginhaugh. In the former, the important Antonine potter Sarrius was involved in addition to his other two subsidiary workshops (Buckland, Hartley, and Rigby 2001), while continuing his major production in Warwickshire outside *Manduessedum* (*ibid*); the latter at Elginhaugh, an undoubted multi-potter workshop including potters from the north of France (eg Fronto), Germany and England (Hartley 2007, 326-378). The distribution area included Camelon while 'carries' from Elginhaugh include stamped mortaria at Carlisle (Howard-Davis 2009, fig 298, no. 3 and p586), Castleford and Ribchester which indicate military movements of some kind.

What are the implications arising from all of these productions and from the Elginhaugh mortaria found in England? Who were the potters and how was the army involved in the productions? How is the influx of mortaria and other coarsewares from sources in midland, south-eastern and northern England and the Oise/Somme area of northern France to be explained? Reflexions on the possible significance of what we know and can conjecture for movements of the military and for the Roman advance through northern England.

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Rehydroxylation (RHX) dating

Moira Wilson and Margaret Carter, University of Manchester

The RHX dating technique is described with particular reference to the requirement of the meticulous experimentation necessary to obtain data of extremely high quality. New results on Samian ware are presented which demonstrate the first successful application of the new dating method to materials other than brick and tile. Methodological approaches to more complex classes of ancient ceramics including the presence of food residues, glaze and contaminants from the burial environment are discussed briefly.

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Dimpled bases: Iron Age decoration or the cook's delight?

Roy Towers (Orkney College) and Orlene McIlfatrick (University of Edinburgh)

Pot base sherds with finger-impressed dimples on the interior surface of the base are not unusual in the Atlantic Iron Age of Scotland. Most commonly, the trait is described as being a form of decoration and, although initially assigned to an early origin, these vessels are now also recognised in the Middle Iron at Dun Mor Vaul, (Mackie 1974: fig 20), and Loch na Beirgh (Harding 2000:24) and À Cheardach Mhor (Young & Richardson 1960, pi 11, 4, 7). Dimpled bases also appear in the assemblages of Orkney such as Skaill (Buteux 1997) and Howe of Howe (Ross in Ballin Smith 1994:250).

Dimpled base pots occasionally have only one central dimple, but more often they have multiple randomly scattered dimples, sometimes covering the entire surface. This research questions the widely accepted view that their purpose was decorative. It notes the effect of finger impressions on a base as both producing thinned 'hot spots' in the base and increasing the overall surface area of the interior. In view of this we developed a hypothesis that dimples would in some way alter the transfer of heat applied to the pot, but in what manner? To test this hypothesis, an experiment was conducted using a series of volumetrically identical dimpled-base pots. Pots were made with one, three and five regularly placed dimples, and also one non-dimpled control pot.

The mathematics

Several complex mathematical principles govern the behaviour of the heating water and the temperature of the pot itself. These include Newton's Law of Cooling and Rayleigh's equation for thermal convection in a fluid. At this juncture we will not discuss these theorems, but rather leave them for the publication (Towers & McIlfatrick forthcoming). The rate of heat absorption into each of the pots is constant because the pots are the same size and shape, the walls are the same thickness and the mass of clay is the same over the base. The dimples do not remove any of the clay mass because they are impressed rather than scooped out. The average thickness of each base therefore is still the same.

However, the dimples do create 'hot spots', places where the base is thinner, and this encourages convection columns to establish quickly above them. The behaviour of convection in a fluid is encompassed by Rayleigh's equation. As the clay pot is heated, it will also begin to radiate heat. Over time the amount of heat being absorbed and the amount of heat being radiated will equalize. When this temperature is reached no more heat will be gained by the contents of the pot – the heat source, the pot, and its contents will have reached a thermal equilibrium as per Newton's Law of Cooling. Put simply, during the heating of a pot and its contents the effects of convection columns and those of Newton's law are in a race against each other.

Results

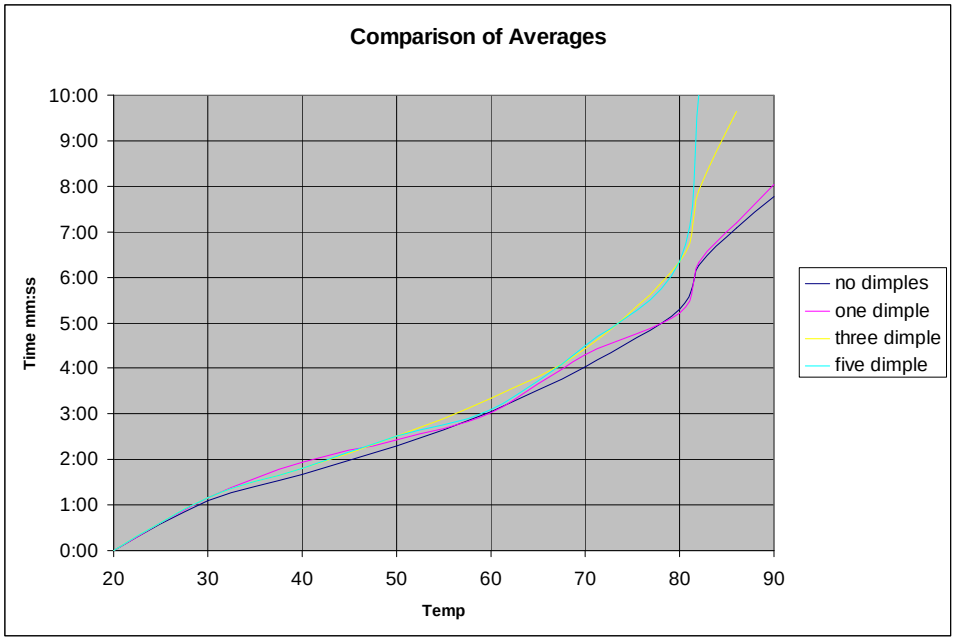

Figure 1: Plot of time (minutes) against temperature (^{o}C) for the pots with different numbers of dimples

The comparison of averages graph (Figure 1) in particular shows the disparity in heating pattern between pots. Ultimately the paths of ascent show a regular pattern, whereby pots with more numerous dimples begin to slow the heating process after the water temperature reaches approximately 70 C. At 80 C the slowing becomes especially noticeable. In both the control pot and single dimple pot, the 90^{o} end-point temperature was attained with no difficulty. The rapidity of convection was such that 90^{o} could be reached before the pots reached thermal equilibrium with their heat source.

Three and five dimpled base pots behave similarly to each other. Once again, above each dimple a convection column became established, however the proximity of other columns produced a state of interference within the liquid. As one plume of hot water rose, the wave of cooler water falling beside it would mingle with it which in turn slowed the rise of hot and the sinking of cold water. The convection currents, while fully established would not be functioning efficiently in their movement; they would remain slow and therefore also slowing the heating of the fluid. Naturally the effect was greater in the five dimpled pot. The slowed rate of convection consistently allowed thermal equilibrium between pot, contents and heat source to be reached before the water could attain the 90^{o} end-point designated for the experiment. The three-dimpled pot would stabilize at 86^{o} and refuse to climb higher, and the five-dimpled pot consistently stabilized at 82^{o}. At these points the pot and its contents were radiating heat at the same rate they were gaining it.

Discussion

From the experimental results it is suggested that dimpled bases may have been an expedient technology applied to the preparation of foodstuffs. A

dimpled base pot would have been particularly useful if heating milk, a liquid which is easily boiled over thus causing loss of a valuable resource. Processing milk for cheese manufacture could be highlighted as a possibility. The many dimples would keep milk from boiling, which is necessary for curd production. Cheeses could have been of the 'cottage-cheese' type, consisting of curds and whey. This type of cheese is made using a process in which the hot milk is artificially acidified artificially to make it curd.

One traditional Scottish cheese called 'crowdie' is believed to have been made since at least Norse times. In involves the heating of soured or 'thickened' milk until the liquid separates from the curdled milk solids. Dairying is focused on the production of milk, and of milk products such as butter and cheese. The most well known evidence for these practices is that of bog butter. Several Scottish Iron Age sites, such as Cladh Hallan in the Western Isles, show evidence of slaughter patterns most often seen in dairy farming (Craig *et al* 2000). High incidence of juvenile bovines, often younger than one month old, combined with the secure identification of casein from bovine milk on a large number of vessels seems to suggest that cattle-based dairying played a significant role in the Atlantic economies from at least the beginning of the 1st millennium BC. As yet no scientific analysis has been carried out on dimpled base sherds, which could ultimately indicate which kinds of food or beverage preparation they were used for. This is in part due to the intensive post excavation cleaning done on the sherds held in Scotland's museums, and in part due to the belief that the dimples were purely decorative.

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Luminescence dating of ceramics

David Sanderson, Scottish Universities Environmental Research Centre

Ceramics form the longest established and arguably best known group of materials to which luminescence dating has been applied. Yet paradoxically the majority of dating applications in recent decades have been related to archaeological and environmental sediments. The SUERC laboratory, established in 1986, has been involved in a diverse programme of developmental and application work, which has included dating ceramics from archaeological and modern settings, using both thermoluminescence and photostimulated (or optical) luminescence approaches.

From archaeological contexts the laboratory archive includes examples of pottery from Neolithic to modern periods, from sites in Scotland and the Northern Isles, as well as from further afield. In the majority of cases the aim has been to use ceramics indirectly to date contexts or sites, rather than to attempt to date the ceramic for its own sake. In some respects such work has been superseded by the recent focus on sediments (which form the context directly as well as supplying indirect environmental information), and on heated lithics where the heating event may have a more direct archaeological association with the site. However the opportunity remains for studies which are more closely focused on the ceramics themselves, and where luminescence dating provides a direct physical means of studying the important relationships between age since firing, form, and fabric.

On occasion information derived from ceramic dating has led to further research in unexpected directions. The observation of residual geological TL signals from poorly fired prehistoric pottery in Orkney prompted PhD study of the use of luminescence signals themselves to assess thermal exposure. These archaeologically inspired methods have been used to estimate the extent of firing of both early and later Neolithic pottery from Orkney. They were also used in guiding the civil engineers responsible for repairing damaged concrete in 1997 following the Channel Tunnel fire.

This presentation will outline the main approaches to luminescence dating and indicate, with examples, some of the potential applications to ceramic studies.

Scottish Atlantic Iron Age pottery c. 800 BC – AD 500: a preliminary overview

Euan MacKie, Research Associate, National Museums of Scotland

Background

Despite numerous well conducted excavations over the last forty or fifty years, in which large quantities of fine pottery have been recovered in clear stratigraphical sequences – the field of Scottish Atlantic Iron Age pottery still lacks an all embracing explanation to replace the one lost during the 1970s when uncritical diffusion from the south ceased to be acceptable. Such an explanation is offered, tentatively, here in the hope that it will galvanise people to look afresh at the evidence in its entirety, not just that from single excavations. It will however be a necessary preliminary to reject the belief that no foreign influences ever affected Iron Age Scotland.

It is suggested also that this explanation is, at least in part, an inductive one which was devised after a prolonged study of the evidence. The argument thus moved *upwards* from the particular – the form and distribution of the pottery styles on the ground – to the general one of seeing these patterns and thinking of a cause for them. It is hoped that this is a more reliable method than the deductive one which is so fashionable in British archaeology today and in which a pre-existing explanatory theory is planted on top of the evidence,

Atlantic Iron Age pottery

Atlantic pottery contrasts sharply with the contemporary wares on the Scottish mainland, which tend to be plain and rough-looking, with large grits incorporated in the clay. On the western and northern islands, and on part of the extreme NE tip of the mainland, the pottery is much finer and smoother, and comes in various distinctive styles – often decorated. The possible origins of these maritime styles, and the reasons for their distinctiveness, are discussed here.

The argument offered here – arrived at inductively from the mass of the available evidence (and which is to be tested against that evidence) – is that there were three basic *kinds* of pottery in the maritime Iron Age, in the sense that they originated in three distinct ways. It is also assumed that these different origins could tell us something about the prehistoric populations which used them. The first kind is *indigenous pottery*, which has plausible local antecedents but no obvious parallels elsewhere. The second is *exotic pottery* which has no obvious local antecedents but good parallels in distant regions, while the third includes the *hybrid pottery styles* – evidently local combinations of the first two.

Indigenous pottery

The genuinely indigenous Late Bronze Age and Iron Age pottery styles are easily identified. All over the Scottish mainland in and north of the Forth/Clyde valley late prehistoric pottery consists of what is known as *Dunagoil ware*, from the type site on Bute. Most of this consists of plain, barrel-shaped vessels – *urns* in the terminology used here – of hard-fired clay containing many grits, some quite large. Good examples were recovered from Traprain Law reasonably well stratified in the Late Bronze Age levels, and similar material occurred alone at Dun Vulan in South Uist in a context dated to early in the 1st millennium BC. It is also prominent in the earliest levels at Dun Mor Vaul on Tiree (MacKie 1974)

This pottery could be descended from the later Bronze Age, undecorated cremation urns of which a good example comes from Girvan in Ayrshire; the plain ware and the gritty inclusions are strikingly similar.This kind of 'bucket urn' dates broadly from about 1600-800 BC (Sheridan 2007), which allows an overlap with the earliest Dunagoil ware. However the barrel-shaped urn is not the only form of Dunagoil ware; there is also the smaller vessel, with slightly out-turned rim with a row of finger-impressions under it which is usefully termed a *vase*. There is a good example from Sheep Hill, West Dunbartonshire, which has recently been reliably dated to between about 780-500 BC (at a 94% level of confidence) from the organic residue on another sherd from the same deposit.

Exotic pottery styles

There is clear evidence from Shetland for the appearance of completely new pottery with no local antecedents at all. *Everted Rim jars* have a footless base and a sharply out-turned rim hich sometimes has parallel fluted lines on its inside surface; the pots can also be black-burnished. The ware seems to appear at Clickhimin before anywhere else, and the excavator thought this was at about 400 BC (Hamilton 1968). Scepticism about this early date (no C14 dates are available for the site) has been the rule, but now it seems that this pottery was intermingled in the earliest middens with the better-dated carinated ware about to be described (MacKie 2002). A date as early as the 7th century BC is therefore possible for Everted Rim ware in Shetland, and the closest parallels so far seem to be in Brittany.

Another clearly exotic tradition includes several forms of the Early Iron Age shouldered or carinated ware – well known in southern England and elsewhere – and its chronological horizon seems to be fairly tight – broadly the 7th and 6th centuries BC judging from C^{14} dates from three Orkney sites. The sharply carinated shoulder and the concave, footless base derive from the sheet bronze prototypes and the examples from Jarlshof show the black burnishing which suggests the same derivation (Hamilton 1956). The peculiar flaring profile of the Clickhimin vessels is well matched by many Hallstatt cremation jars (broadly of the 7th and 6th centuries BC) from Brittany.

A shiny, copper-coloured little carinated pot was found in a late, Middle Iron Age context at Dun Mor Vaul, Tiree, but must surely be an heirloom. The colour recalls the haematite-coated ware of the Wessex area, and the angular shape the early La Tène (later 5th century BC) vessels from the same region. This may be somewhat later than the Shetland carinated ware.

What is the meaning of this clear and apparently fairly short horizon of Early Iron Age exotic pottery in the far north? Perhaps we can suggest, as Denis Harding did with French forms of Iron Age vessels found in southern England, that even in these remote northern regions specialised professional potters may have arrived bringing new skills. But it is a much longer and more hazardous journey to Shetland than it is crossing the Channel to Wessex and it may be that such potters came as part of an organised trading expedition, or in one in which rulers were visiting distant relatives, or arranging diplomatic marriages.

Hybrid pottery styles

If the ideas outlined at the start are valid then it is in the Early Iron Age in Atlantic Scotland, and perhaps not in the Late Bronze Age, that two distinct phenomena should be visible for the first time, and as a direct result of the arrival of small amounts of the fine exotic wares in the maritime zone. First – it is at this point that the various well made, well fired and decorated local Atlantic Iron Age pottery styles should appear, to replace gradually the old, plain gritty styles. Second – the first of these new styles should be recognisable hybrids, combinations of the new fine wares and the plain, gritty indigenous forms. Two areas are briefly examined here to test this idea – the Inner and Outer Hebrides and Caithness and Orkney – but there are several more. In the first stratigraphical sequences help us to reconstruct what happened but in the second typological analyses have to be relied on.

Example 1: the origin of Vaul ware in the Inner Hebrides

The long, well stratified sequence of pottery found at Dun Mor Vaul on Tiree (MacKie 1974) could be the key to more than one aspect of what happened to Iron Age pottery in the west, despite the fact that the radiocarbon dates are crude by modern standards (it is intended to get a new set of much more reliable dates soon). There is abundant material from the early Iron Age levels, where there is only incised-line-decorated Vaul ware (with some Dunagoil ware). Everted Rim ware arrived later with the broch. These two quite distinct pottery styles thereafter remain separate throughout the site's history with very little blending. This is not the case in the Outer Hebrides, where much more blending occurred and where it is therefore more difficult on some sites to unravel the separate ceramic traditions.

The argument deployed here is that the two forms of Vaul ware – the smaller vase and the barrel-shaped urn – are directly descended from the two similar forms of Dunagoil ware, the implication being that new, more skilled potters appeared in the Inner Hebrides in the early Iron Age and reproduced the two Dunagoil vessels in their new, hard-fired, fine, decorated ware. The early

levels at Dun Mor Vaul may actually show this happening. Only in the Phase 1 levels were large fragments of Dunagoil urns found, so they were still in use on Tiree at that time. The same midden produced a highly unusual *plain* version of a Vaul ware urn – a convincing transitional form.

The Early Iron Age Balevullin hut site, also on Tiree and explored in 1912, provides further evidence (MacKie 1965). The mass of small, fine, hard-fired vessels shows no sign of the standardised Vaul ware, and Everted Rim ware is entirely absent as one would expect in such an early site. However three high quality miniature vessels could be reconstructed and two of these are in essence Vaul ware vases – but without the usual, elaborate incised decoration and with a thin waist cordon. They look very like partially transformed Dunagoil vases, even to the extent that one has finger-nail impressions under the rim and the other a row of dots in the same place. Several other sherds from the site look like close copies of Early Iron Age pottery in the south. The most interesting is a small carinated pot – also of thin and hard-fired ware – which is remarkably similar in form and decoration to a much larger pot from All Canning's Cross in Wiltshire.

The unusual pottery evidence from Tiree seems to make much better sense when interpreted by the hybridisation hypothesis. This also allows the wide distribution of Vaul ware in the Inner and Outer Hebrides to be interpreted as marking the presence of a mainly indigenous population which had recently – that is probably in the $7^{th}/6^{th}$ centuries BC – acquired a fine, decorated version of its traditional Dunagoil ware because of the arrival of a few skilled potters from the south (with or without more influential people). It seems possible that the transformation of Dunagoil to Vaul ware took place on Tiree itself.

Example 2: the Orkney/Caithness jar

There is a standardised hard-fired, plain, smooth-surfaced pot – what can be termed the *Orkney/Caithness jar* – which is common in the brochs of the two areas and which is a distinctive local style (see Midhowe in Orkney and Crossskirk in Caithness in MacKie 2002; 2007). It can be argued that it too is the ancient mainland Dunagoil ware transformed by new potting skills as it spread into the maritime zone of the extreme north-east tip of Scotland. The Dunagoil vase is in fact quite common in Caithness where it can be unusually large. There are probably early examples from the Wag of Forse and sherds of it occur at Crosskirk, almost certainly in a Late Bronze Age context. One of the brochs at Keiss produced a large one (see pottery illustrated under relevant site in sentries in MacKie 2007).

The process of the transformation of the Dunagoil vase into a fine ware hybrid jar can be seen clearly in two huge and similar pots – one from Orkney (from Bosquoy, in the Hunterian Museum) and one from the Hill of Works (or 'Barrock') broch in Caithness. They are plain and retain the general shape of the Dunagoil vase as well as the very gritty fabric; however their walls are harder and thinner and they lack the finger-impressions under the slightly turned-out rim. Typologically they look like a half way point in the transition.

Little in the way of clearly exotic, Early Iron Age pottery has so far been found in Orkney or Caithness; one exception is a black-burnished, fine ware bowl from the midden under the Keiss West broch (MacKie 2007) which closely resembles similar Early Iron Age pottery from Clickhimin in Shetland.

Several other examples of probable hybridisation can be identified, notably in Shetland in the Western Isles; in all cases there are interesting implications for the nature and origins of the local Iron Age populations.

Acknowledgement

I thank the staff of the Archaeology Dept. of the National Museums in Edinburgh – in particular David Clarke and Fraser Hunter – for my appointment as an Honorary Research Associate with the task of undertaking a fresh study of Atlantic Iron Age pottery. Most of the ideas described above have resulted from that work – which included looking again at the museum's huge and invaluable collection of unpublished potsherds.

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Northern British pottery: any role for chemical analysis?

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The intention of this paper is to show that chemical analysis, although it has not in the past featured significantly in Northern British ceramic studies, now has the potential to play a more dynamic role. The reason why chemical analysis, traditionally one of the principal methods of characterising pottery fabric, has not found much application in northern Britain is clear: the coarse-textured nature of much or most prehistoric pottery is such that the petrographic approach is the natural first approach to use, being generally more informative in defining fabrics at a given site, establishing the nature of tempering material whether naturally present or deliberately added (see Jones, this conference) and understanding the nature and possible location of the raw clay materials.

Where it has been applied (Table 1), chemical analysis has usually played a supportive role in the investigation of the dynamics of prehistoric pottery making at the intra-site or, at most, intra-regional level. But the situation changes where the production mode moves from the domestic to the workshop level and when questions of identity and origin are asked. Thus Evans' study of Roman pottery by NAA showed that regional production rather than importation from the south accounted for 3rd century AD grey wares found at sites in northern England, and that 4th c Crambeck wares found in NE England had similar origins matching with known kiln sites supporting the view of major production at Crambeck rather than small local productions. Chemical differentiation of production centres on the Antonine Wall was a useful product of Gillings' methodological investigation, surely demonstrating the potential for more combined chemical and petrographic work on Roman pottery in Scotland (see also Hartley, this conference). Moving to the medieval and post-medieval periods, chemical analysis has recently found encouraging application to the Redwares (Haggarty, Hall and Chenery 2011; see Hall and Haggarty, this conference) and the earlier White Gritty ware (Jones *et al* 2003), both employing the technique of choice, that is, ICP-MS and ICP-ES respectively. Both studies were able, albeit to differing extents, to identify chemical groups which had well-defined spatial significance.

The trend seems to be clear enough: the more standardised the pottery is in its production, the finer the fabric's texture and where the questions asked of analysis are bound up with potential long-distance movement of pottery, chemical analysis has a strong role to play. But the default position should always be that both chemical and petrographic are employed in tandem, at least at the start of the investigation.

The scanning electron microscope with associated analytical capability (SEM-EDAX) has wide application in technological enquiry, for example investigating the nature of glazes on medieval and later pottery (see Harris, Jones and Hall, this conference), and the nature of clays selected respectively for metallurgical and domestic ceramics (see Sahlen, this conference). Hand-

held XRF instruments which are of keen current interest owing to their ability to provide rapid non-destructive analysis are already finding application in investigating glazed and painted pottery, and they also have the potential to be valuable in *in situ* clay prospection where 'broad brush' identification of clay types is required. Another hand-held instrument, whose potential in ceramic analysis has recently been explored by the writer and Brendan Derham, is Fourier Transform Infra Red spectrometry (FTIR); it appears well capable of making rapid estimations of firing temperature ranges of pottery.

Table 1 Some chemical studies of northern British pottery

Site(s)	*Pottery*	*Techniques (number of samples)*	*Publication*
Pool, Sanday, Orkney	Neolithic-Iron Age (& clays)	ICP ES (95), XRF (344), PE	MacSween (2007)
Sites in Ireland	Neolithic (& clays)	XRF (60 + 60 clays), PE	Sheridan (1985)
Western Isles, Skye, Tiree and Iona	Iron Age (& clays)	NAA (550), XRD PE and thermal analysis	Topping (1985) Gair (1995)
Yorkshire & N England	Roman	NAA (> 200)	Evans (1989)
Antonine Wall	Roman (& daub -clays)	NAA (200)	Gillings (1991)
Many	Scottish White Gritty ware N England White ware	ICP-ES (566), PE	Jones *et al* (2003) Vince (1998)
Many	Scottish Redware	ICP-MS (613)	Haggarty; Hall and Chenery (2011)

ICP-ES inductively-coupled plasma emission spectrometry, ICP-MS inductively-coupled plasma mass spectrometry, PE petrographic examination, NAA neutron activation analysis.

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Beyond provenance and dating: ceramic technology in late prehistoric Scotland

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Ceramic studies in Scotland have rarely looked at ceramic technology beyond characterisation. Most studies have instead tried to construct chronological sequences or studied the provenance of the material (e.g. Campbell 2002). The study of technology has in recent years changed its focus from economic models to enquiries of human decision making and choices, looking particularly at the sequence of production and its context (cf. Sillar and Tite 2000). This presentation discussed some general issues of ceramic manufacture, examining a series of different ceramic materials from late prehistoric Scotland.

The presentation, based on research carried out as part of a PhD thesis at University of Glasgow (Sahlén 2011), focused on the first step in this sequence: the selection/collection of raw materials. The research presented in the PhD thesis is wider and look at both selection strategies and the preparation of clays for the manufacture of ceramics materials, particularly moulds and crucibles. Studies of clay selection have been rare in Scottish studies of ceramics, mainly because of little evidence from pottery production in the archaeological record. But it was acknowledged in this presentation that there are three main sources which can be employed to get closer to such issues, without evidence of a kiln or pottery wasters:

- Ethnographic analogy, particular crogan pottery from a Scottish context (cf. Cheap this conference)
- Evidence of production, for example deposits of clay and the presence of tools possibly used in the production of ceramics
- Analytical examination of ceramics and sampled clays, including ceramic petrography and chemical analysis

This presentation demonstrated that potters and craftworkers predominantly used local clays for the production of pottery, and metalworking ceramics (ceramic moulds and crucibles used in the casting of non-ferrous metals); with little evidence of the use of refractory clays for the production of crucibles or moulds. But it was demonstrated that there was some selection of particular clay sources in the Middle Iron Age and the Late Iron Age/Early Historic Period. This suggests some specialisation in the use of resources, which should be seen in contrast to the Late Bronze Age where there is clear evidence of the use of the same or similar sources for the manufacture of different ceramic materials. Archaeological evidence of the production activities in the late prehistoric period supports this conclusion, indicating a more specialised production in the Middle Iron Age and Late Age/Early Historic period.

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Organic residue analysis or rather the analysis of organic residues

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The application of 'archaeological science' to the analysis of pottery residues may be divided into different approaches that have evolved over time. This paper gives an overview of the differing approaches that have been taken to the organic residues that have been found in Scotland and discusses how changes in both technique and theory have altered their role within the interpretation of archaeological artefacts. It also reviews the application of organic residue analysis in Scotland and suggests areas for further research.

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Analysis of large assemblages from multi-period sites – a case study of the pottery from Mine Howe, Orkney

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The paper considered issues relating to the analysis of large assemblages from complex, multi-period, prehistoric sites. 'Large' was defined as several thousand sherds, over 12,000 in the assemblage used as the example, that from Mine Howe near Kirkwall in Orkney. At Mine Howe, the recent excavations (see references listed below) uncovered a subterranean structure sunk into a natural mound which was surrounded by a ditch and structures associated with settlement and metalworking. An ongoing process of demolition, flattening, dumping, rebuilding, etc, had created a complicated stratigraphy. The pottery in the assemblage was generally undecorated with limited numbers of rim sherds.

The temptation to project the structural phasing for sites onto the artefact assemblage without detailed analysis is especially problematic for multiphase sites where the possibility of secondary deposition can be overlooked. The paper argued that when dealing with large assemblages like this, it is worth investing the time to record a range of attributes as, while time-consuming, detailed profiling of the pottery from individual contexts can lead to a better understanding of the process of deposition. In turn, this analysis improves the chances of identifying a reliable sequence for the pottery which, because of events such as the use of midden material from earlier activity as backfill, may not be contemporaneous with the structural phasing.

The approach adopted for the Mine Howe assemblage was that the recording should reflect the choices that a potter would have made. Attributes recorded included fabric, surface finish, morphology and decoration. The aim of the recording and analysis was to identify points of change in the assemblage. If surface finish, fabric and morphology, for example, alter simultaneously, this may indicate a significant event such as the use of the site by a new group of people. Consideration of whether change at that point is evident in other assemblages from the site, will feed into the interpretation.

Following detailed recording, the data was analysed by structural phase, as defined by the excavators. Study of material from other sites and the other assemblages from Mine Howe enabled the definition of a broad chronological framework with three main groups of pottery – early/early middle Iron Age, middle Iron Age, and later Iron Age.

Now that a broad chronological framework has been established, the next stage will be to look more closely at individual contexts to answer questions about activity on the site as a whole. One question which the excavators at Mine Howe are keen to explore is the nature of the ditch deposits. Looking at the make-up of individual contexts, suggestions will be made for the type of activity that resulted in the infill of the ditch at various points in the history of the site, and this information will be used as interpretation of the site proceeds.

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Ceramic material associated with metalworking – a survey of the Late Bronze Age evidence from Scotland

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Over the last decade, the number of Late Bronze Age sites that have produced evidence of metalworking has gradually expanded. In Scotland, the classic assemblages such as Jarlshof and Traprain Law have been augmented by significant new groups of material from Galmisdale on Eigg, Cladh Hallan on South Uist and Birnie in Moray. As this brief survey of the evidence will show, fired clay played a fundamental part at many stages of the metalworking process by providing the raw material for everything from crucibles to moulds. Archaeologically, clay becomes the medium which provides insight into what was being manufactured in regions where the surviving inventory of actual metalwork may be misleadingly incomplete.

Tempering nature and society: theory and methodology in the analysis of pottery tempers, with a case study from Neolithic Orkney

Andrew Jones, University of Southampton

The analysis of pottery tempers is traditionally discussed as a functional requirement of pottery manufacture. More recently, studies have begun to emphasise the cultural choices made by potters in the selection of temper. The division between function and cultural choice offer the pottery analyst a stark choice: are we to interpret the presence of temper on a functional basis, or are we to understand tempering a culturally flexible activity; in which case, to what extent do deliberately chosen tempers also act functionally?

This paper will discuss these problems, and – through an exploration of the recent literature in Science and Technology Studies (STS) – I will argue that the division between function and cultural choice is false, and underlies more problematic philosophical divisions between archaeological scientists and archaeologists.

I will discuss this issue using a case study – the analysis of two assemblages from Neolithic settlements in Orkney, Crossiecrown and Wideford.

Radiocarbon Dating of Pottery with Particular Reference to the Scottish Medieval Period

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There are several possible sources of carbon in pottery sherds. These include: (1) carbon derived from naturally occurring organic matter in the clay, (2) carbon derived from temper, e.g. organic matter (straw, chaff, etc.), calcite, ground shell, (3) carbon from kiln fuel, (4) carbon derived from use of the pottery, (smoke/soot and food residues) and (5) carbon derived from the surrounding soil. While the carbon associated with the temper and that associated with use of the pottery are potentially the most useful for direct dating, both have been identified as having potential problems.

We made a series of 34 AMS ^{14}C measurements on carbonized food residues removed from the external surface of rim sherds of cooking pots of London Sandy Shellyware pottery from Perth (15), London (7) and Bergen (12). The 15 residues from Perth produced ^{14}C ages between 890 ± 45 and 1085 ± 40 years BP (Table 1). This, together with supporting ^{14}C measurements (910 ± 35 to 1060 ± 35 years BP) from associated materials such as leather artifacts from the same secure contexts, demonstrates that this type of pottery was in use at Perth at least 100 years earlier than the accepted chronology for this fabric type. Our subsequent dating of similar residues from the same fabric obtained from the Billingsgate excavations in London and the Bryggen excavations in Bergen, Norway gave age ranges of 905 ± 35 to 1115 ± 35 years BP and 915 ± 35 to 1065 ± 35 years BP, respectively, both very similar to the Perth age range.

The chronological model for Shelly Ware in Perth, as previously described in Hall *et al*. (2007), is composed of the ^{14}C measurements on 15 carbonized residues from 11 different archaeological contexts. The measurements are in agreement with the model assumption that they belong to a single phase of activity. This activity dates the introduction of Shelly Ware in Perth to *cal AD 930-1020* (*95% probability*; *start Shellyware: Perth, Scotland*) [*cal AD 960-1000* (*68% probability*)]. Shelly Ware fell out of use in Perth in *cal AD 1020-1120* (*95% probability*; *end Shellyware: Perth, Scotland*) [*cal AD 1030-1070* (*68% probability*)].

The chronological model for Shelly Ware in London is composed of the ^{14}C measurements on the 7 carbonized residues (Table 1). The measurements are in agreement with the model assumption that they belong to a single phase of activity. This activity dates the start of Shelly Ware at Billingsgate Lorry Park, London to *cal AD 820-1020* (*95% probability*; *start Shellyware: Billingsgate Lorry Park, London*) [*cal AD 900-990* (*68% probability*)]. Shelly Ware fell out of use in this area in *cal AD 1020-1220* (*95% probability*; *end*

Shellyware: Billingsgate Lorry Park, London) [*cal AD 1030-1130* (*68% probability*)].

Site	*Sample Code*	*$\delta^{13}C$ (‰)*	*Age (BP) ± 1σ*	*Calibrated range*
Perth	S.1 C.5097	-26.3	960 ± 40	990 (95.4%) 1170 AD
Perth	S.2 C.4715	-26.0	1065 ± 40	890 (95.4%) 1030 AD
Perth	S.3 C.3748/1	-27.1	1050 ± 40	890 (95.4%) 1040 AD
Perth	S.4 C.3748/2	-26.7	1065 ± 55	860 (90.6%) 1050 AD
Perth	S.5 C2386	-26.7	975 ± 45	980 (95.4%) 1170 AD
Perth	S.6 C.4513	-26.8	890 ± 45	1020 (95.4%) 1230 AD
Perth	S.7 C.4534	-26.8	1085 ±40	880 (95.4%) 1030 AD
Perth	S.8 C.3625	-26.9	1050 ± 70	810 (95.4%) 1160 AD
Perth	S.9 C.2394/1	-26.9	1065 ± 60	800 (90.5%) 1050 AD
Perth	S.10 C.2394/2	-26.9	1020 ± 45	890 (95.4%) 1160 AD
Perth	S.11 C.2394/3	-26.8	1065 ± 40	890 (95.4%) 1030 AD
Perth	S.12 C.3748/3	-26.4	1030 ± 35	890 (92.1%) 1050 AD
Perth	S.13 C.3728	-24.2	955 ± 40	990 (95.4%) 1180 AD
Perth	S.14 C.2387	-26.0	910 ± 35	1030 (95.4%) 1210 AD
Perth	S.15 C.3733	-26.0	1010 ± 40	960 (92.8%) 1160 AD
Billingsgate	Ph 5.3, C 5868	-27.2	1115 ± 35	860 (93.6%) 1020 AD
Billingsgate	Ph 7.5, C 6548	-24.5	1105 ± 35	860 (95.4%) 1020 AD
Billingsgate	Ph 7.7, C 6542	-25.0	1035 ± 35	890 (94.0%) 1050 AD
Billingsgate	Ph 7.7, C 6507	-24.8	1000 ± 35	970 (95.4%) 1160 AD
Billingsgate	Ph 7.7, C 5072	-23.2	955 ± 35	1010 (95.4%) 1160 AD
Billingsgate	Ph 7.8, C 6395	-25.0	1000 ± 35	970 (95.4%) 1160 AD
Billingsgate	Ph 8.1, C 3299	-28.4	905 ± 35	1030 (95.4%) 1210 AD
Bergen	4455	-24.8	990 ± 35	980 (95.4%) 1160 AD
Bergen	25761	-25.9	915 ± 35	1020 (95.4%) 1210 AD
Bergen	20145	-25.9	965 ± 35	1010 (95.4%) 1160 AD
Bergen	20938	-24.1	1050 ± 35	890 (95.4%) 1030AD
Bergen	21005	-24.9	960 ± 35	1010 (95.4%) 1160 AD
Bergen	89458	-24.6	1035 ± 35	890 (94.0%) 1050 AD
Bergen	21959	-27.3	1020 ± 35	950 (91.7%) 1160 AD
Bergen	53187	-23.9	1065 ± 35	890 (95.4%) 1030 AD
Bergen	43196	-24.5	995 ± 35	980 (95.4%) 1160 AD
Bergen	42466	-25.0	980 ± 35	990 (95.4%) 1160 AD
Bergen	36430	-26.2	1025 ± 35	890 (95.4%) 1150 AD
Bergen	23001	-24.4	985 ± 35	980 (95.4%) 1160 AD

Table 1 ^{14}C ages of carbonized residues from Perth, Billingsgate and Bergen samples

The chronological model for Shelly Ware in Bryggen is composed of the ^{14}C measurements on the 12 carbonized residues (Table 1). The measurements are in agreement with the model assumption that they belong to a single phase of activity. This activity dates the introduction of Shelly Ware in Bryggen to *cal AD 980-1030* (*95% probability*; *start Shellyware: Bryggen, Bergen*) [*cal AD 1000-1030* (*68% probability*)]. Shelly Ware fell out of use in Bryggen in *cal AD 1010-1070* (*95% probability*; *end Shellyware: Bryggen, Bergen*) [*cal AD 1020-1050* (*68% probability*)].

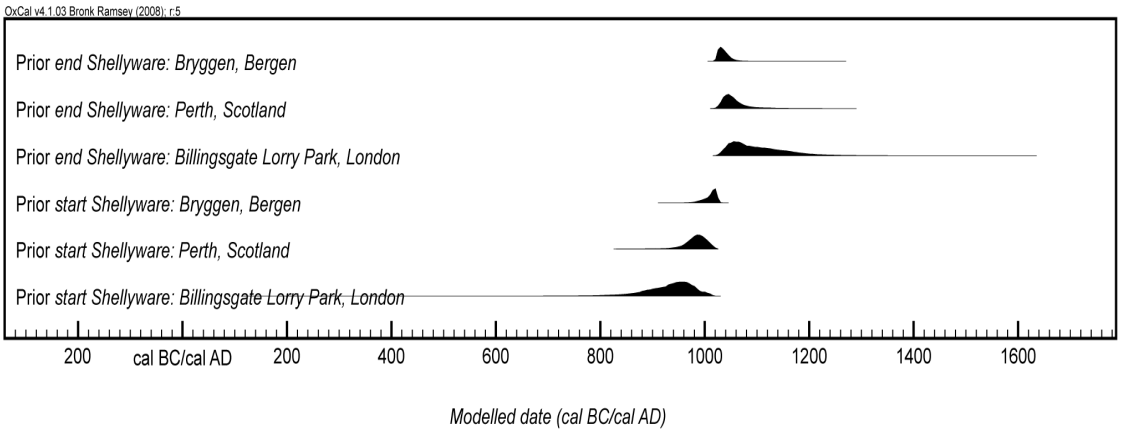

Figure 1: Graphical representation of the start and end probabilities for Shelly Ware pottery in Perth, Billingsgate and Bryggen

Conclusions

The measurements at each site are in agreement with our Bayesian model assumption that they belong to a single phase of activity. The model estimates the introduction of London Sandy Shellyware in London to cal AD 820–1020, in Perth to cal AD 930–1020, and in Bergen to cal AD 980–1030 (95% probability). Further modeling predicts that it fell out of use in the reverse order (Figure 1).

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'Do me a pottery report.' What does that mean?

Alison Sheridan, National Museums of Scotland

This paper explores the issues involved in writing pottery reports, highlighting the need for clarity and information sharing throughout the process. The 'whys' of pottery description will be explored.

Reconstruction of a Parian-ware jug

Bill Brown, Glasgow School of Art

An experimental reconstruction forming part of the post-excavation work undertaken on behalf of GUARD after the 1996 excavation of Bell's Glasgow Pottery (Speller 1996a, b).

Among the many plaster moulds recovered during the excavation were several sections that could be identified with surviving examples of Bell's wares, notably a group of mould sections that appeared to be for a parian-ware jug known from a photograph in Glasgow Museums' archives. Other items found in the same context have been dated to 1857 (Kelly 1999, 36), though the moulds are very worn and may have been discarded well before this date. Although extensively damaged, they still had enough detail to allow a copy to be made and for a series of ceramic pieces to be cast from it, exploring the making techniques which may have been used by Bell's Pottery in the mid 19th century (Figures 1-3).

The design of the original mould would have made the modern technique of slipcasting difficult and yet its construction is unlike the other moulds for hollow-ware articles found at the site, having no adaptations necessary for trimming the excess clay that would be needed when joining press-moulded sections together. The series of experiments demonstrated that a combination of two techniques used in this period, pressing a wheel-thrown blank into the revolving mould, could be used to manufacture this type of jug.

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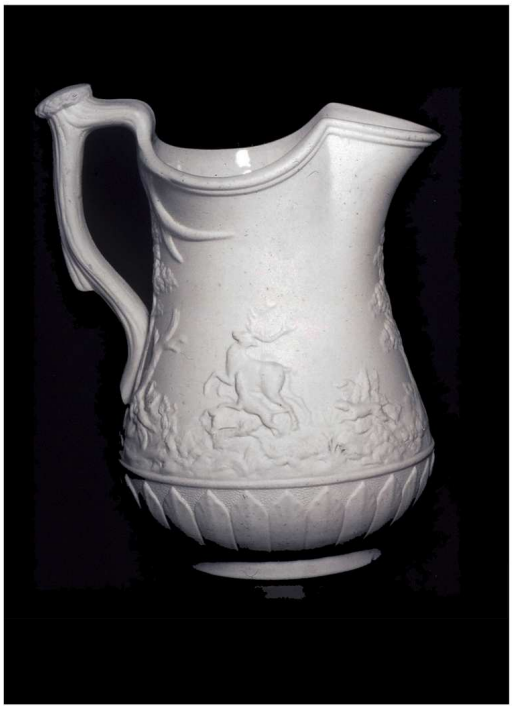

Figure 1: Bell's Pottery Parian-ware jug. Photograph from the archive of Glasgow Museums

Figure 2: Reconstructing the model

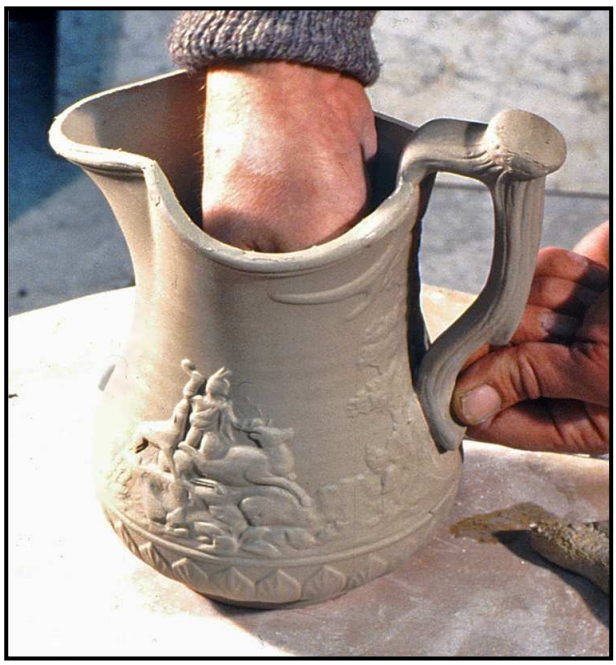

Figure 3: Assembling a jug

Characterising White Gritty ware production at Ceres, Fife

Vivienne Harris, Richard Jones and Allan Hall, University of Glasgow

In fields near Ceres in Fife plentiful sherds of Scottish White Gritty Ware (SWGW) have been found, and geophysical survey by GSB Prospection in 2005 indicated likely kiln remains. Thus Ceres seems to be one of the very few currently known production centres of SWGW (see Hall, this conference).

Of the twelve sherds (kindly supplied by Colin Martin) examined in thin section nine were very similar (Figure 1) with three differing only in texture. Petrographically, Ceres appeared very similar to Colstoun, although encouraging distinctions between Ceres, Colstoun and other findspots in Scotland were found in terms of the respective quartz to quartzite ratios. Furthermore, using ICP-ES, Ceres and Colstoun could be differentiated chemically (Figure 2).

Examined with a Zeiss SIGMA SEM with EDAX, the glazes were all lead rich; the thickness varied from 90 to 300 µm, the colour being yellow, brown orange and light green, all due to an iron content of around 1%. The presence of trapped bubbles within some samples (eg. Figure 3) suggested that the pots were unfired before the glaze was applied.

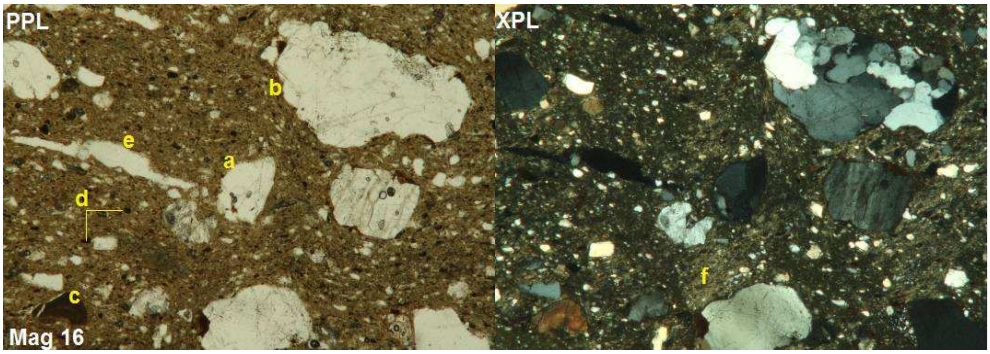

Figure 1: Typical SWGW from Ceres in plain (left) and crossed (right) polarised light. Inclusions include (a) quartz, (b) quartzite, (c) grog, and (d) burnt material. Voids (e) are elongate with the fabric in this section. Image width 2.75 mm

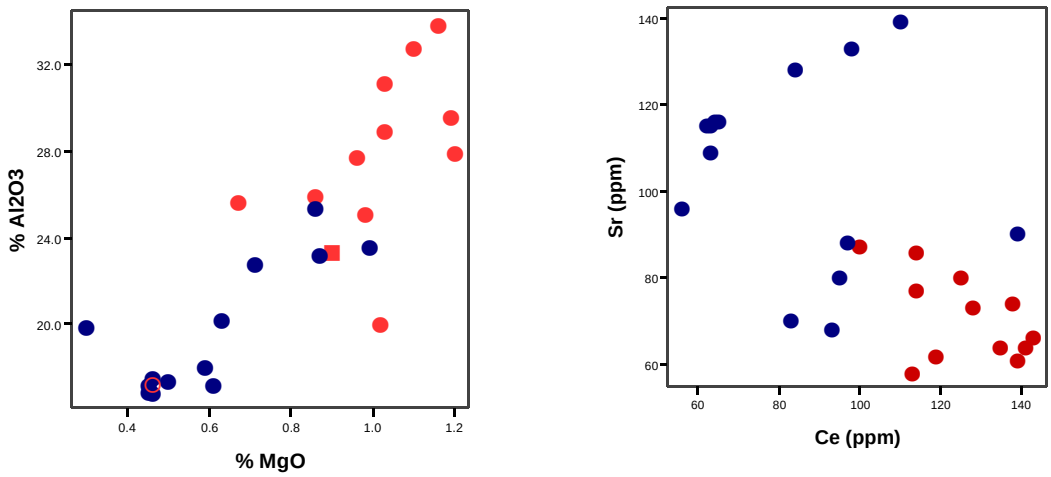

Figure 2: Al-Mg oxide (left) and Sr-Ce (right) plots for Ceres (red) and Colstoun (blue) SWGW

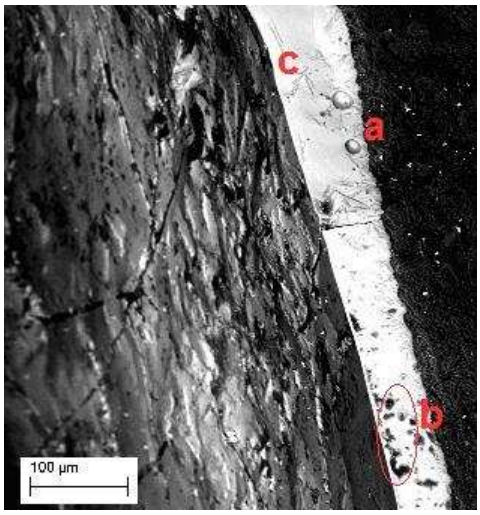

Figure 3: SEM backscatter image of a sherd from Ceres showing the well-defined glaze layer containing some air bubbles (a), clay particles (b) and crystals (c)

Controlling their temper - but still cheesed off? Results from the petrographical and organic residue analyses of Neolithic pottery from Lanton Quarry, Northumberland

Julie Dunne[1], Lucy J E Cramp[2], Richard P Evershed[2] & Mary Benton[3]

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Recent excavations at the multi-period site of Lanton Quarry, Northumberland, yielded a substantial assemblage of Neolithic pottery comprising Carinated Bowl Ware typical of the Early Neolithic in the North and Ireland, together with modified forms including an unusual example of a handled vessel and others with external lugs. Combined with smaller assemblages of Impressed Ware and Beaker Ware, this represents a significant addition to the local and regional corpus of material, in terms of both quantity and temporal spread (Tinsley and Waddington 2009).

Lanton Quarry is located on the sands and gravel terraces of the Milfield Basin, and is flanked by the mainly andesitic lavas and granite outcrops of the Cheviot massif to the south and west and the Fell Sandstone escarpment to the north and east (Carruthers *et al.* 1932). The Milfield Basin has long been recognised for the wealth and diversity of its archaeological remains, in particular, the range of Neolithic sites, including henges, burial monuments and settlement areas, which led Higham (1986, 46) to characterise it as 'the heartland of the Neolithic in the north-east'.

A petrographic analysis of the Neolithic Carinated Bowl and Impressed Wares from Lanton Quarry identified the deliberate selection of inclusions which could be provenanced to five different Devonian andesitic lava flows and Old Red Sandstone age dyke intrusions located within the Cheviot complex, with two of these rock types only occurring at small site-specific locations, located up to 15km from the site. These rock fragments from different locations within the landscape were combined together in varying 'recipes' in the tempering of vessels, perhaps reflecting the complex articulation of social identities within the pots, and drawing together strands of people, place and identity.

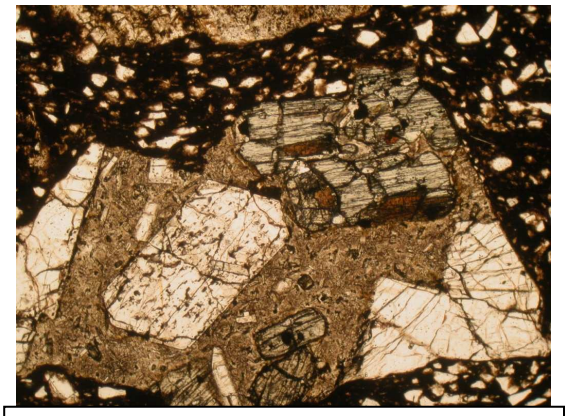

Figure 1. Glassy (pitchstone) andesite inclusion (ppl). Note the angular nature of the inclusion. Field of view 2mm. Photomicrograph: Julie Dunne

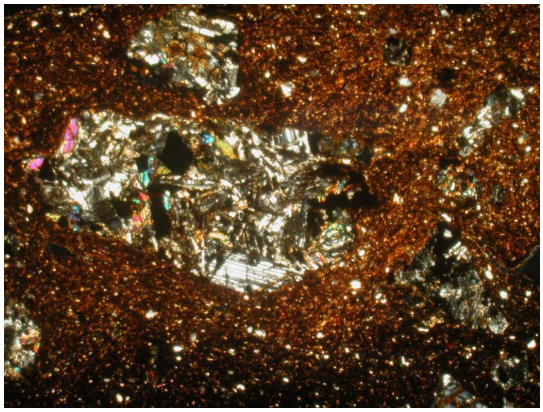

Figure 2. Doleritic textured inclusions (xpl). Field of view 2mm. Photomicrograph: Julie Dunne

In addition, organic residues were extracted from 51 vessels (58 sherds). Lipid residues were exceptionally well preserved, with appreciable concentrations of lipid recovered from 78 % of vessels, and lipid concentrations ranging from 6 – 2027 µg per gram of sherd. The majority of residues could be characterised as partially degraded animal fats (Fig. 3). The presence of a distinctive range of mid-chain ketones, with carbon chain lengths from C_{31}-C_{35} was detected in 10 residues; this pattern of ketones has been identified as a pyrolytic degradation product formed during the heating of fatty acids in the presence of a clay matrix (Evershed *et al.* 1995; Raven *et al*. 1997) and, as such, is widely observed in lipid extracts from prehistoric cooking vessels. Determinations of compound-specific stable carbon isotope values indicate that the majority of residues (87 %) derive predominantly from dairy fat whilst only a minority were derived predominantly from the carcass products of ruminants (Fig. 4). Although faunal remains were poorly preserved at the site, these data therefore indicate that processing dairy products in ceramic vessels was widespread at this settlement - a pattern has been noted from early and later Neolithic sites in southern Britain (Copley *et al*. 2005). These residues therefore lend further support to the hypothesis that the exploitation of dairy products was already well-developed in the early Neolithic in Britain.

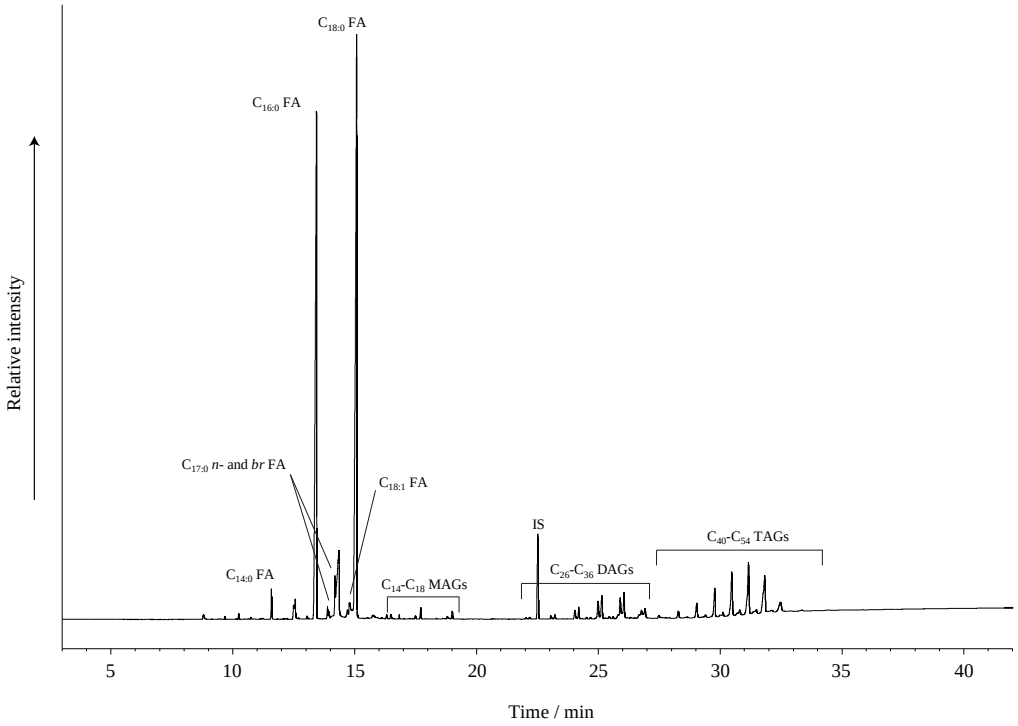

Figure 3. HT-gas chromatogram from a trimethylsilylated total lipid extract, showing a partially degraded animal fat extracted from a Neolithic potsherd from Lanton Quarry. Abbreviations: C*x*:*y* FA – free fatty acid with *x* carbon atoms and *y* degree of unsaturation; *n*- normal, *br* – branched-chain. *x*MAGs – monoacylglycerols, *x*DAGs – diacylglycerols, *x*TAGs – triacylglycerols, with *x* acyl carbons. IS – internal standard (*n*-tetratriacontane).

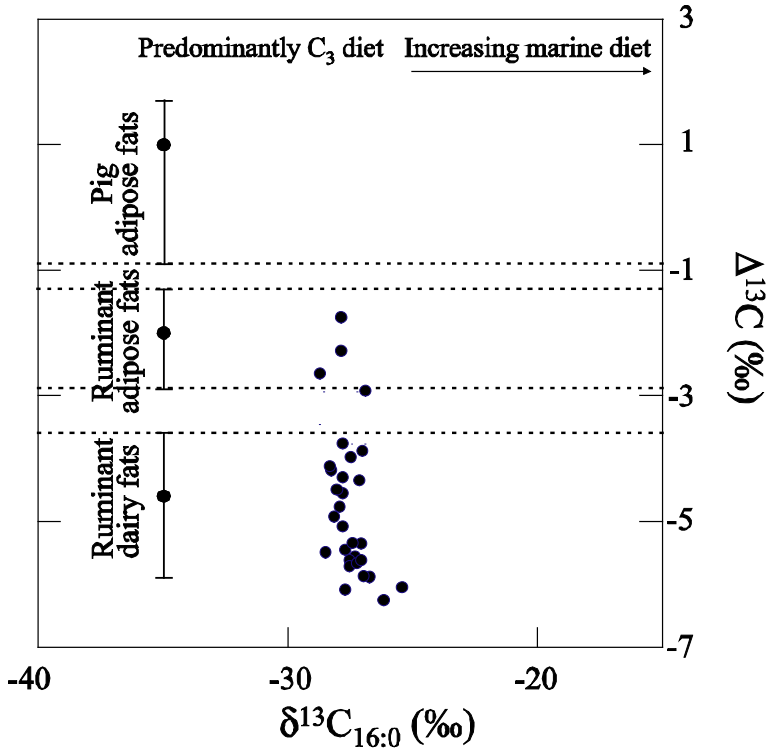

Figure 4. Scatter plot of $\delta^{13}C_{16:0}$ values plotted against $\Delta^{13}C$ ($\delta\ ^{13}C_{18:0} - \delta^{13}C_{16:0}$). The ranges shown to the left are from modern reference data which have been corrected for the Suess effect.

Acknowledgements

JD would like to thank Clive Waddington from ARS Ltd for allowing her to carry out the petrographical analysis. LJEC would like to thank Helen Whelton, Ian Bull, James Williams and Alison Kuhl for technical assistance. The organic residues analyses comprise part of a larger project funded by the NERC.

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Iron Age 'glue pots' from Orkney?

Roy Towers (Orkney College) and Richard Jones (University of Glasgow)

In the course of examining two Iron Age pottery assemblages from the roundhouse at Skaill, Deerness and the ground-galleried broch called the Riggan of Kami both on Mainland Orkney (Towers 2010), two unusual sherds displayed an unusual residue under magnification. The first was a rim sherd from Skaill 6N2 (roundhouse occupation) and the other was a base and wall from Riggan. The residues, which were brownish in colour, had spread over the interior and exterior of the sherds and over the broken sections of the base, perhaps through breakage whilst placed on a heat source. In notes made at the time it was described as being 'like melted toffee'.

The sherds from Riggan and Skaill were examined with a FEI Quanta Environmental SEM with EDAX attachment in the Earth Sciences Department, Glasgow University. The residues were characterised by high calcium and phosphorus contents in comparison with the plain surface. Analysis of the residue on the sherd from Skaill with a Renishaw inVia laser Raman microscope clearly revealed the presence of apatite.

It is suggested that the residues adhering to the pots may be a form of bone glue. Adhesive made from animal parts is attested elsewhere, such as on IA pottery from Uitgeest in North Holland (Oudemans *et al* 2007) and on a 4th century AD cattle bone assemblage at York which suggested commercial processing for cosmetics, soap and glue (Denison 1995). Although not hitherto identified in the Atlantic Scottish Iron Age, bone glue is hinted at in relation to the antler mounts discovered at Bu Sands, Orkney in 1990. Analysis suggested the best parallels were late Roman/Anglo-Saxon examples but the absence of perforations for rivets or pegs indicated fixing by glue (Hunter 1993). Further examples may exist in Atlantic Scottish Iron Age assemblages but they may have been overlooked due to their relative rarity.

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Ceramic Regionality and the Question of Choice

Alison Kyle, University of Glasgow

This poster presents part of my doctoral research which is a broader study of regionality within Ireland and western Britain in the first millennium AD. The poster presents initial considerations of the ceramics within this area, focussing on areas of difference and similarity – namely ceramic versus aceramic regions. This research adopts a new perspective in terms of both methodological and theoretical approach. Both the broad geographical and chronological scope is felt important in order to place the developments within each region, including Scotland, within a wider interregional context.

Within this study area the distribution of areas engaged in ceramic production is strongly regional, and includes the Outer Hebrides, northeast Ireland, and Cornwall. The remaining regions in the study area, including the majority of Ireland, mainland Scotland, Wales and the Isle of Man, appear to have been largely aceramic. The use of ceramics in each region has a unique preceding history, resulting from the nature of the varying influences on each area. This research will consider how the unique stimuli in each area may have affected choice and influenced the role of ceramics in the expression of regional identities.

The differences in cooking vessels between ceramic and aceramic regions must be viewed as more than a simple question of materiality. It is not enough to dismiss aceramic regions as having used ‘organic alternatives’, as is all too often the case. Such vessels could not have been used in the same manner as their ceramic cooking pot equivalent – it is obvious that a leather vessel cannot be placed directly in the fire in the manner of a ceramic vessel. The utilisation of alternative cooking methods would have created a number of regional differences in experience, behaviour, and techniques. Differences in these experiences are likely to have been highly sensory - not only in terms of sight and touch, but also sounds, smells, and flavours. There remains the need to explicitly interrogate the nature of the differences between these regions which was not just a simple question of using alternative materials, but also alternative cooking methods and therefore bodily techniques.

These daily, habitual, bodily actions would have created a socially accepted way of doing things, in this case preparing a meal, with the repetitive nature of these daily actions culminating to create a cultural marker, an active expression of identity. Through experience and replication the techniques of vessel production and use – as socially embedded activities – would have acted as a mechanism of social and cultural reproduction, resulting in the transmission of a regional cultural identity from generation to generation. This raises the question of the role of *habitus* in the formation and transmission of identity.

Ultimately, this research asks the question: does the regionality exhibited in the distribution of domestic ceramic use reflect regional variations in *habitus*,

and therefore the deliberate creation, maintenance, or expression of regional identities through the active manipulation of material culture?

This research is facilitated by a doctoral grant from the Arts and Humanities Research Council.

Ceramic and related finds at the Iron Age and Roman Period site of Baldhowend, Matterdale, Cumbria

Helen Loney and Andrew Hoaen, University of Worcester

This poster will present a description of a selection of ceramic and related finds recovered during excavation of the enclosed settlement at Baldhowend. The description of the pottery sheds light on a time period when little similar finds are commonly recovered in northern and western English settlements. Further, the association of the ceramic fragments with other artefacts and materials interpreted as industrial in nature may further our understanding of the limited role pottery played during the first century BCE and first century AD in this region. Finally, the nature of the finds underscores issues surrounding site taphonomy and archaeological recovery techniques.

Baldhowend is an unenclosed settlement situated in the upland hamlet of Matterdale, off the A66, near Penrith, and north of Lake Ullswater. Baldhowend was excavated in two seasons, in 1998 and 1999, revealing Roman-period and pre-Roman period Iron Age structures and artifacts. C-14 dates from a number of contexts confirmed that the earlier activities from this site date to the Late Iron Age, between the last centuries BC and the early first century AD, with the later activities associated with late first and second century AD dates.

The excavation revealed a small settlement consisting of a number of round structures, including a large round house, an associated paddock area, and a number of smaller, secondary structures, including an adjacent structure that revealed a quantity of material relating to industrial activities.

The finds from this site are dominated by a large quantity of worked stone, mostly discarded ground stone tools, but including a massive saddle quern. One of the characteristic features of the larger of the round features assumed to be a house structure (A) was the incorporation of a large quantity of these discarded stone tools within the walls, as make up.

Other finds from this site included a very small quantity of very abraded pottery, in a number of contexts, but predominately associated with the industrial activities identified in the other large structure excavated (D). These scarce finds are none the less important, because the contexts were well dated, and as such are some of the very few pieces of Iron Age pottery identified in Cumbria.

The pottery collection consists of a number of small, abraded sherds that are almost entirely unidentifiable in terms of vessel element, style and function. As a consequence, the interpretation of these pieces will be approached contextually, in the presence of the other artifacts and materials recovered from each context. The pottery and other associated materials are therefore organized by context, by on site structure, and by relative chronology.

The pottery and associated artifacts combined have aided in the potential identification of the use of the two main structures excavated. Importantly, though Baldhowend does not appear to have been particularly high status, three R-B glass bangles were recovered in and around Trench A. Trench D, in contrast, provided pieces of vitreous materials, a small ground stone tool showing polishing, a large quantity of burnt materials, and the bulk of the pottery recovered. The fragmentary nature of the pottery recovered coincides with pottery that has been broken, stood upon and kicked around. The floor of Trench D appears to have been scraped and replaced, further reducing the amount of pottery available for recovery. The presence of material within a tumbled area also confirm a structure which was used for non-domestic activities.

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