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A Cordoned Urn burial with faience from 102 Findhorn, Moray

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ABSTRACT

This paper describes the discovery of a large Cordoned Urn containing the cremated remains of an adult female (aged between 18 and 25 years) and an infant either in the third trimester of pregnancy or newborn. The urn also contained 22 mostly fragmentary segmented beads and one star-shaped bead, all of faience. The urn had been inverted in a pit in a sand ridge and an additional deposit of pyre debris placed over the upper fill of the pit. This deposit contained two faience beads, one star-shaped and incomplete, the other quoit-shaped, and a small chunk of grey flint. The urn is very similar to one found on the adjacent Culbin Sands in the 19th century and the beads can also be paralleled there. A radiocarbon determination of 3410 ± 50 BP *(OxA-7622, which calibrates to 1880–1520 cal* BC*) has been obtained from charcoal from the pyre debris. This is the largest single find of faience in Britain and Ireland, and the only example of segmented, quoit and star-shaped beads being found together.*

INTRODUCTION

The burial described in this paper was revealed as a result of site preparation for the building of an extension at no 102 Findhorn, a house in the small village of that name at the mouth of the River Findhorn in Moray (illus 1). The village occupies the sand ridge that forms the east side of the present estuary of the river. The west side is represented by the extensive sand dune and river gravel system of Culbin.

Although the River Findhorn thus divides this findspot from the Culbin Sands, the essential unity of the coastal system represented by The Culbin, Findhorn Bay and Burghead Bay must be emphasized (Ross 1992, 8, figs 3, 4). The present site of Findhorn is the result of a move in the 17th century from a location c 1.6 km to the north-west, on a bar of sand and shingle to the north of Culbin. The aerial photograph (illus 2: Steers 1973, pl 15), taken in 1947 before the eastern end of the vast Culbin Forest was established, shows the village as well as the river mouth whose form and orientation have altered substantially over the millennia (Ross 1992, 46–57, fig 17). The river's original route to the sea was by way of a channel now partly represented by the Buckie

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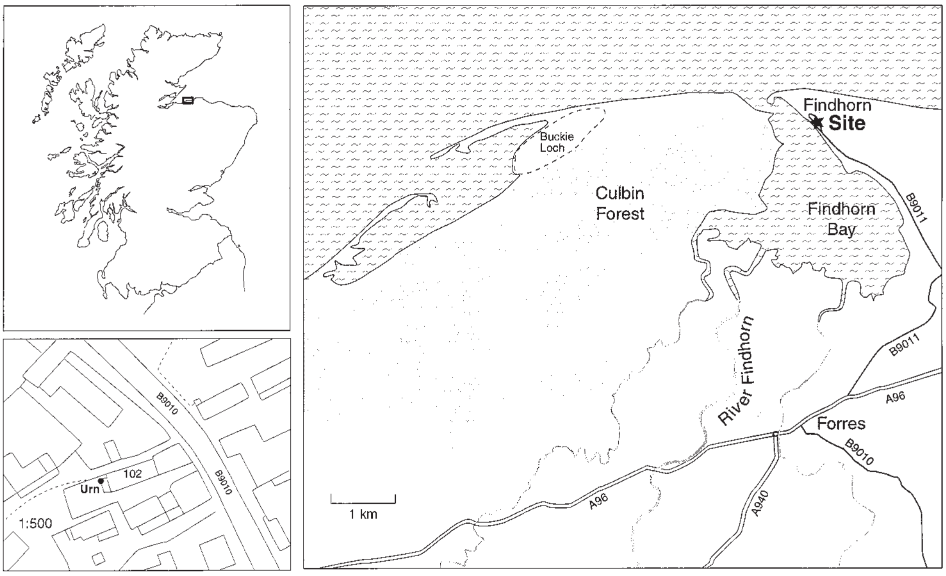


ILLUS 1 Location plan. (*Based on the Ordnance Survey map © Crown copyright*)

Loch (illus 1), a good 3 km west of its current estuary (Ritchie *et al* 1978, 114, fig 4.26.1a). The Culbin is of course famous for producing copious quantities of artefacts of all periods (Linton 1876; Black 1891).

The significance of the find was not immediately understood. Initially, the building works at 102 Findhorn in late 1986 were believed to have exposed an old chimney-pot embedded in the west face of the cut into the sand of the coastal ridge. It was only when, 18 months on, in April 1988, bits of bone began to drop out of a fresh break in the pot that its antiquity was surmised. The householder, Mrs Doreen McLennan, then reported the find to Forres Museum who contacted the Grampian Regional Archaeologist (IAGS). The site was excavated by the writers on the following day (16 April 1988).

The findspot lies at NGR NJ 0397 6443 and forms record number NJ 06 SW 36 in the Moray Council Sites and Monuments Record. The assemblage was claimed as Treasure Trove and, at the time of writing, is to be seen in the Museum of Scotland (catalogue numbers NMS X.EQ 975–1003).

EXCAVATION

The urn was found inverted in a pit in the Findhorn sand ridge. The pit for the urn measured in section a maximum of 0.64 m wide by c 0.50 m deep from the base of an apparently leached old land surface. This old ground surface had subsequently been buried by a minimum of two phases of sand accumulation, the lower of which showed many laminae relating to individual sand blows. The modern surface of light, sandy topsoil had established itself over these. The restricted space in the garden of no 102 and the proximity of the excavation cut to a supporting wall adjacent to a lane precluded any wider investigation for other burials.

A discrete deposit of gritty, dark sandy material partly overlay the upper fill of the pit (illus 3), its south-east edge lying just above the base of the inverted urn. It was oval in plan and

Illus 2 Aerial view of the village of Findhorn, the Bay and Culbin, taken in 1947 prior to the afforestation of the eastern end of Culbin. (*Photo: Cambridge University Collection of Air Photographs*)

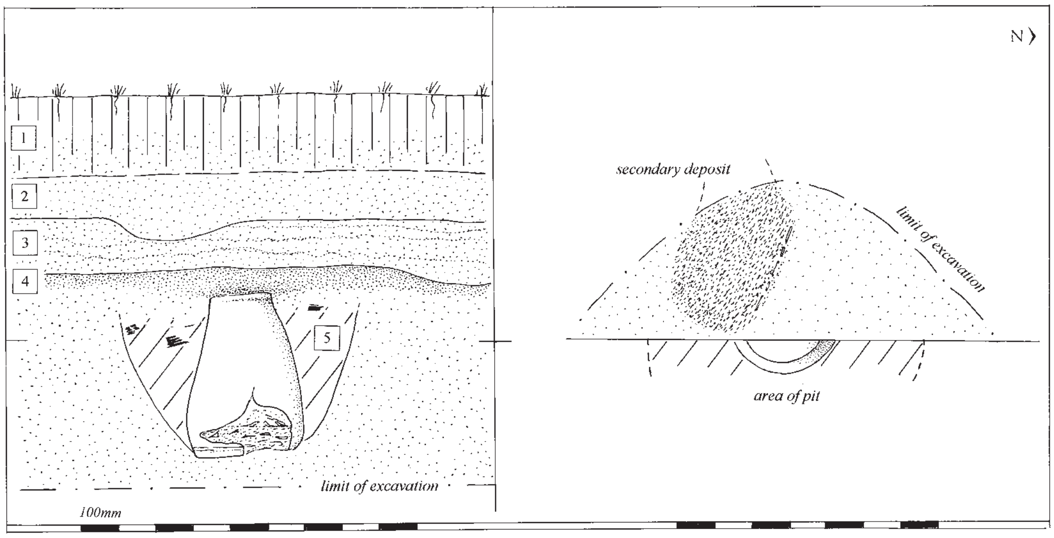
occupied approximately half the surviving area of the upper part of the pit, measuring c 0.40 m by 0.29 m with a depth of between 10 and 25 mm. It appeared to extend beyond the limits of the urn-pit on the west, suggesting that it may have been deposited some time after the urn-pit had been backfilled, but at a time when the location of the burial was still recognisable. On initial exposure it appeared to contain small flecks of cremated bone as well as some small crumbs of charcoal, two larger lumps of which, c 10 mm square, were recovered on site. The deposit was removed and wet-sieved, which led to the virtual disappearance of the bone flecks and the discovery of a small chunk of flint, a complete quoit-shaped bead and approximately two-thirds of a star-shaped bead, both of faience and both, on recovery, a darkish green-brown colour. This colouration led to their being described as 'unburnt' (*Discovery Excav Scot 1989,* 25), but subsequent study has revised that interpretation (Sheridan & McDonald, *infra)*. A thin layer of clean sand was observed to lie between this deposit and the main fill of the pit.

The lower half of the urn-pit contained heavily charcoal-stained sand packed around the urn (illus 4). Pieces of charcoal were visible in section but in general the pit fill was less gritty and

ILLUS 3 The urn *in situ*

more sandy in texture than the secondary deposit in the upper part of the pit. The whole of the surviving pit fill, c 20 litres (barring about 2 litres which were dispersed when the urn was lifted), was removed for sieving. This exercise recovered approximately 250 g of largely oak charcoal — with some fragments (< 5 g) of non-oak species (with thanks to Janet Ambers and colleagues at the British Museum for these identifications) and some small pieces and splinters of cremated bone. These were interpreted as ash and sand scooped from the cremation pyre together with the residue of the cremated remains from its base.

The contents of the urn, which were actively slumping out of the pot, had to be removed on site and bagged before the urn could be lifted intact. A plug of dark brown, organically-stained and consolidated sandy material (initially described as fibrous, but with no structure visible on closer examination) lying in the mouth of the urn was removed and retained for (dry-) sieving. This process recovered small balls of burnt sand and humic material as well as 31 pieces of faience, 30 of which represented mostly fragmentary segmented beads, and the remaining piece a single star-shaped bead. The beads were generally whitish in colour, some with traces of a turquoise-coloured glaze. The initial assumption, that this was a sign that the beads had been exposed to the heat of the funeral pyre, was subsequently confirmed after extensive scientific examination (see p 117, below). The beads and the cremated remains were covered with a fine black/brown powder which may relate to the 'fibrous' plug described above. It is possible that



ILLUS 4 The urn and pit in section and plan

this material represented the remains of an organic cover for the urn to prevent its contents spilling out on being inverted.

THE CREMATION

The cremation deposit within the urn was removed *in toto* during the excavation and found to be particularly clean and free of pyre debris, as if the bone fragments had been carefully picked from the pyre and perhaps dipped in water. They did not occupy the whole of the space available within the urn, but this observation must be qualified by the length of time over which the urn had been exposed since discovery, leading to the settling and slumping of the bones downwards within and, ultimately, partly outwith the urn. The writers are very grateful to Faye Powell for examining and reporting on them. She established that they represented an adult female, aged at death between 18 and 25 years and an infant either in the third trimester of pregnancy or newborn (illus 5).

THE CREMATED BONE

Faye Powell

The cremated remains recovered from the urn were in a rare condition that allowed for a degree of identification not usually possible with cremation burials of this period. The burnt bone was neither markedly fragmented nor crushed after cremation.

The total weight of 1430 g is rather heavier than the average British Bronze Age cremation burial (1000 g). The bone was completely cremated, white in colour throughout, with fissuring ranging in degree from moderate to marked. This suggests an even, regular and relatively intense heat during the cremation process.

The urn contained two individuals. The majority of bone represented a female, aged, at the time of death, probably between 18 and 25 years. She was of a very slight build with slender long

ILLUS 5 Selection of the adult cremated bones. (*Photo: Trustees of the National Museums of Scotland*)

bones and a very slight musculature. Height was not possible to estimate but a small person is indicated, even allowing for shrinkage due to cremation although well within the range of a modern human population. No evidence for osteoarthritis or any other pathology was observed.

The second set of remains was of an infant. The stage of development of ossification suggests the third trimester of pregnancy to newborn. The bone was cremated to the same degree as the adult bones, suggesting cremation together. The remains of the adult and the infant were very closely associated and it would therefore seem reasonable to assume they were of a mother and her child. It is, however, impossible to determine positively whether the two died together during childbirth, shortly before or, less likely, shortly after.

Great care had been taken with the cremation, the gathering of the cremated material of both individuals, and their burial. The bones had been placed methodically within the urn and even the very smallest fragments of the infant's bones were included.

The Adult

Cranium

Twenty-four fragments of the cranial vault were recovered, including large fragments of the occipital, parietal and temporal bones. Blue staining was observed on both the internal and external surfaces. The

TABLE 1
Weights of skeletal elements

Adult	Cranium	248 g
	Vertebrae	75 g
	Innominates	67 g
	Scapulae	43 g
	Ribs	60 g
	Humeri	158 g
	Ulnae	55 g
	Radii	64 g
	Femora	131 g
	Patellae	11 g
	Tibiae	59 g
	Fibulae	19 g
	Hands and feet	53 g
	Misc long bone	123 g
	Misc articular surfaces	21 g
	Misc unidentifiable	235 g
Infant remains		8 g
	TOTAL	1430 g

sagittal and lambdoidal sutures were sharp and clear with no obliteration due to fusion. The nucchal muscle markings of the occiput were very slight. A relatively small left mastoid process was identifiable with faint blue staining on the alar. Seven fragments of the internal cranium, the sphenoid and one petrous portion, were included. The facial bones consisted of the right zygoma, right superior orbital rim, with smooth edge and smooth brow ridge, and the left superior orbital rim with a supra-orbital notch for the blood vessel. The left maxilla fragment showed the sockets for central and lateral incisors, canine, first and second premolars, and first and second molars. A portion of the palatine suture showed a sharp clear edge with closure probable but no fusion. The mandible was represented by a fragment of the right body and ramus with a socket of the first molar and roots *in situ* for the second and third molars. The enamel had been lost during cremation. The mandibular articulations survived for both left and right and showed no osteoarthritis. The roots of a left mandibular molar without crown were also recovered. All fragments were white with deep and long fissuring.

Vertebrae

One articular surface of the atlas was recovered as was the dens and centrum of the axis. Eleven fragments of thoracic vertebrae, consisting mostly of the centra, survived. There was some slight blue staining of one centrum on the anterior surface. The line of fusion of the central plates is just apparent on one thoracic centrum, indicating an age range from puberty to 25 years. Seven fragments of lumbar centra represented the five lumbar vertebrae. The sacrum consisted of five fragments. Eleven fragments, which were unidentifiable as to type, were also recovered. All the bone was white in colour with much pitting due to cremation. No evidence for osteoarthritis was found.

Innominates

Twelve fragments of both innominates were recovered. These included iliac fragments showing marked and deep pre-auricular sulci on both sides and a raised sacro-iliac articulation of right ilium. A left iliac crest fragment showed slight blue staining on the internal surface. A right ischium with part of the acetabulum was very smooth, indicating a slight musculature, and showed a broad sciatic notch. The existence of deep pre-auricular sulci, raised sacro-iliac articulation, slight musculature and broad sciatic notch are all characteristic of a female skeleton. The bone was white in colour with deep and marked fissuring.

Scapulae

There were 11 fragments of the scapulae, which were all white in colour with marked fissuring. The right and left sides were identified from the glenoid fossae and spinous ridges. The articular surface of the right glenoid fossa survived enough to show no osteoarthritis and to give measurements of height and width of 30 mm and l8 mm, respectively. Even allowing for shrinkage due to cremation, these measurements are relatively small. Very slight muscle markings were observed on the right coracoid process. Fragments of the body consisted of the axillary and medial borders.

Sternum

Four sections of the body only were recovered. It was white in colour with no fissuring. Blue staining was observed on the internal surface.

Ribs

The 47 fragments of rib recovered were white in colour with moderate fissuring. Torsion was marked. All fragments were very slender and several showed deep inferior grooves. No osteoarthritis was observed at the articulations.

Humeri

Both humeri were represented, white in colour with deep but moderate fissuring. Torsion of the shafts was marked. The left humerus was more or less complete with the proximal articular surface showing no evidence of osteoarthritis. The maximum diameter of the head was 36 mm. Some blue staining was observed just below the head. The shaft showed slight muscle markings. The distal articulation was damaged. The right humerus was in a poor condition with damaged proximal and distal articulations. The shaft was slender with slight muscle markings.

Ulnae

Ten fragments represented both ulnae. They were white with slight to moderate fissuring and consisted of shaft and articular surfaces. No osteoarthritis was apparent.

Radii

Both radii were represented by 11 fragments. They were white in colour with slight to moderate fissuring. The shafts were slight with a slight radial tuberosity of the right radius observed. There was no evidence for osteoarthritis.

Femora

The four identifiable fragments were all white with moderate to marked fissuring. The proximal third of the left femur was complete. It showed slight to moderate muscle markings of both trochanters and the linea aspera. The head showed no evidence for osteoarthritis and possessed a deep fovea capitis. The maximum diameter of the head was 38 mm. The subtrochanteric anterior-poster diameter was 20 mm. The subtrochanteric medio-lateral diameter was 25 mm. These two measurements give a platymeric index of 40. This is a remarkably low index and may be due to distortion from the cremation process. The right femur is represented by the shaft only and is covered in a faint blue speckled staining. Two fragments of the condyles of a distal articular surface survive.

Patellae

Fragments of both the left and right patellae survive. There was some black charring of the right one; however, both were beige/white in colour in general with slight fissuring. The anterior surfaces were smooth with no muscle markings.

Tibiae

Eight fragments of the tibiae, white in colour with moderate to marked fissuring, were recovered. Included was one each of the proximal and distal articular surfaces. Shaft fragments and a left medial maleolus made up the remainder. There was no evidence for osteoarthritis.

Fibulae

Only three shaft fragments survived. They were white in colour with some black charring. The fissuring was moderate to marked.

Hands and feet

Seven fragments of seven tarsal bones, including one talus, were recovered. Ten fragments of both metacarpals and metatarsals, and 11 fragments of finger and toe phalanges made up the rest. No osteoarthiritic pitting or lipping was observed at the articular surfaces.

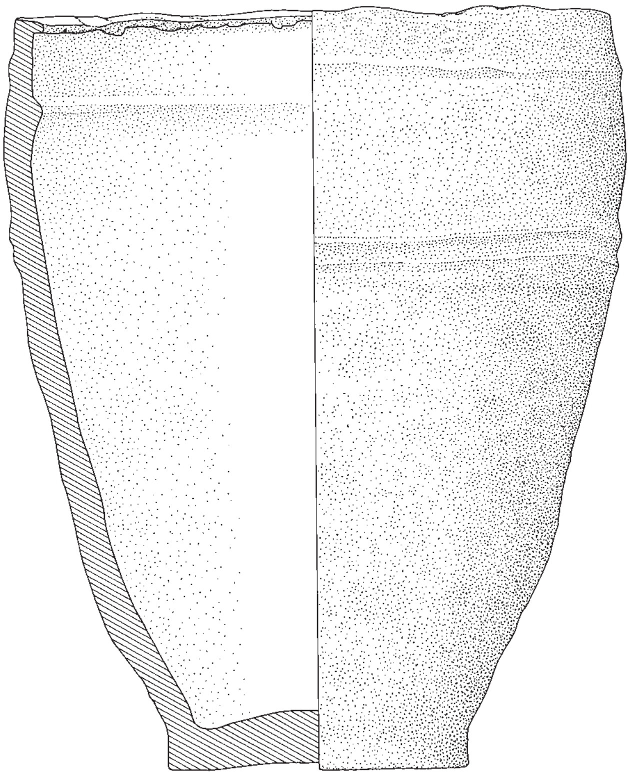
The Infant

The remains of an infant included those of one petrous portion of the skull, two vertebral centra, a distal fragment of a humerus, a proximal fragment of a left ulna, a proximal fragment of the left femur, a proximal fragment of the left tibia, two rib fragments, two metatarsals (fused by concretion in articulation) and two phalanges. The state of ossification indicates a foetus in the third trimester of pregnancy or newborn.

THE URN

The Cordoned Urn was of considerable size, measuring 440 mm tall, 320 mm in rim diameter and 160 mm diameter at the footed base. One low cordon circles the pot just below the rim and a pair of similar cordons run around the upper third of the vessel, just below the point of maximum diameter (NMS X.EQ 975; illus 6). The pale buff-to-tan fabric is well made, with a wall thickness of between 10 mm and 18 mm. Some small dimples in the lower half may relate to handling before firing. The body curves evenly outwards from its level, regular base. The rim is flat with a slight internal overhang where the damp clay has been pinched and smoothed to a fairly level surface. Traces of a low internal cordon can be seen inside the urn, just below the level of the upper external cordon. Below this a band of browner clay, like a smoothed-off building join, appears to correspond to the slight outward swelling of the exterior just above the pair of cordons. A certain amount of sooting, in the form of black patches on one side of the internal wall, is visible in the interior, running down towards the base from about the level of the pair of exterior cordons. This does not, however, amount to real evidence of scorching such as might have come from contact with hot pyre debris.

This urn compares most closely with one found with cremated bone on the adjacent Culbin Sands in the 19th century (Black 1891, 503–4, fig 27) which was described as the tallest in the National Museum of Antiquities of Scotland's collections at the time (NMS X.EA 122). This was 426 mm tall, with a rim diameter of 292 mm and three widely-spaced cordons. It is also closely similar to another Cordoned Urn from Culbin, purchased by the National Museum of Antiquities of Scotland in 1895 but only illustrated in 1966 (Walker 1966, 120–1, fig 7d). These three Culbin/Findhorn Cordoned Urns may also be compared with one with four cordons at the comparatively nearby site of Stoneyfield, Raigmore, Inverness-shire (this



ILLUS 6 The urn. Scale 1:4

was, however, only 210 mm tall: Simpson 1996, fig 18). Looking further afield, the urn from Sky Hill, Glen Aldyn, Isle of Man (Tellet 1901, 86–7; Kermode 1926, 24–5; Kermode & Herdman 1914, 65, fig 26; IOMMM (Isle of Man Archives) 572) with three widely-spaced cordons is intermediate in size (c 330 mm tall) between the Culbin/Findhorn urns and the one from Raigmore. There is also a very similar urn — with two cordons — from Balneil, Wigtownshire, which contained a quoit-shaped faience bead, a tanged bronze chisel and a crutch-headed bone pin (Curle 1916, 302; Callander 1923, 141; Clarke *et al* 1985, 159, fig 4.95).

The Findhorn urn reinforces the tight little knot of Cordoned Urns from the Laich of Moray visible on John Waddell's (1992, 33–4, fig 5) distribution map of this type. This map also shows the type to have a wide Irish/Scottish distribution, with significant concentrations in north-east Ireland, Fife and the Lothians, and in Aberdeenshire/Moray.

FLINT

Small chunk of grey flint, with patch of cortex on one face; of squarish form, c 12 mm max dimension.

FAIENCE

A Sheridan & A McDonald

Accompanying the cremated bones, in the plug of consolidated sand and humic material at the mouth of the urn, were 31 pieces of faience. One was a complete star-shaped bead; the others, after careful examination at the National Museums of Scotland, were found to represent 22 segmented beads, mostly fragmentary. A further two beads — one an incomplete star-shaped bead, the other quoit-shaped — were found in the small deposit in the upper fill of the pit. As illus 7 demonstrates, these latter beads are a darker colour than the ones from the urn.

The Findhorn assemblage is particularly important because these 25 beads constitute the largest single find of faience in Britain and Ireland, and the only instance in which segmented, quoit and star-shaped beads have been found together. The necklace echoes the fashion, seen particularly clearly in Wessex and other parts of southern England, for multi-bead necklaces of precious materials (Beck & Stone 1936; usually more than one material is present in the English examples). It adds to the growing body of evidence showing that southern English fashions were being emulated in Scotland at this time (eg the skeuomorph of a Wessex belt hook from Law Hill and the gold discs from Barnhill, both Angus: Clarke *et al* 1985, figs 5.47, 4.31) — a phenomenon also noted in Ireland (eg in the composite necklace from Tara, Co Meath: Ó Ríordáin 1955) and Wales (eg at Bedd Branwen: discussed in Sheridan & Davis 1998).

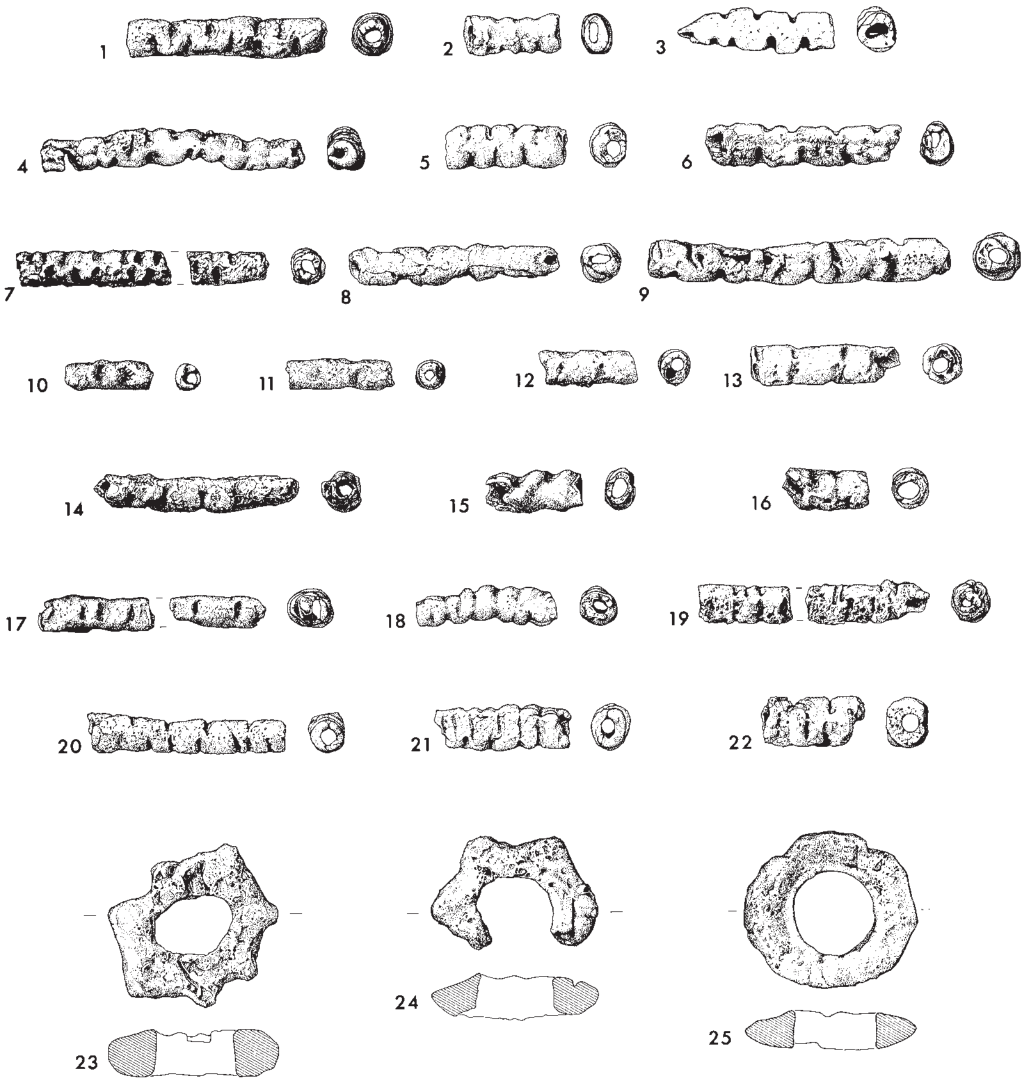
A summary catalogue is presented as follows (see illus 8); for further details, see Sheridan & Warren (forthcoming):

BEADS FROM THE URN

Segmented

1 (NMS X.EQ 979) Fragment including one original end, its tip missing. Length (all dimensions in mm) 25.9; maximum thickness 5.5; maximum thread-hole diameter 1.8.
2 (NMS X.EQ 980) Fragment including one original end. L 12.4; Th 5.3; MTD 2.5.
3 (NMS X.EQ 981) Fragment including one original end. L 19.9; Th 5.5; MTD 2.25.
4 (NMS X.EQ 982) Complete, but one end is now separate from the rest of the bead. L 33.7; Th 4.8; MTD 2.15.
5 (NMS X.EQ 983) Fragment including one original end. L 15.5; Th 5.35; MTD 2.25.
6 (NMS X.EQ 984) Virtually complete, but with damage to one end. L 25.1; Th 5.3; MTD 2.1.
7 (NMS X.EQ 985) Two non-conjoining fragments, each with one original end (although both are damaged). The shorter piece had initially been just over 3 mm longer than shown in illus 8. Original L:

ILLUS 7 The beads, arranged in numerical order as described in the catalogue. (*Photo: Trustees of the National Museums of Scotland*)



ILLUS 8 The beads. Scale 1:1

13.8, 20.3 (therefore the bead's original length must have exceeded 34.1); Th 4.4, 4.6; MTD 2.0, 2.35 respectively.

8 (NMS X.EQ 986) Fragment including one original end. L 27.5; Th 5.3; MTD 2.3.

9 (NMS X.EQ 987) Fragment including one original end. L 39.9; Th 5.8; MTD 2.0.

10 (NMS X.EQ 988.1) Complete, short bead with slight damage to one end. Originally thought to be one of two fragments (with no 11) of a single bead — hence the registration numbering. L 11.3, Th 3.5, MTD 1.7.

11 (NMS X.EQ 988.2) Complete, short bead with slight damage to one end. Originally thought to be one of two fragments (with no 10) of a single bead — hence the registration numbering. L 13.5; Th 3.8; MTD 1.7.

12 (NMS X.EQ 989) Fragment with no original ends. L 12.5; Th 5.0; MTD 1.3.

13 (NMS X.EQ 990) Fragment including one original but damaged end. L 19; Th 5.3; MTD 1.95.

14 (NMS X.EQ 991) Fragment including one original end, slightly damaged, and what may be the other original end, more extensively damaged. L 26.4; Th 4.7; MTD 2.1.

15 (NMS X.EQ 992) Fragment including one original but damaged end; also seven minute fragments. L 12.4; Th 5.35; MTD 3.1.

16 (NMS X.EQ 993) Fragment with no original ends. L 11.2; Th 5.3; MTD 2.9.

17 (NMS X.EQ 994) Two non-conjoining fragments, the larger with one original end, the smaller with one end that may have been close to the original end. The difference in thickness between the fragments suggests that they had probably been separated by several mm. L 12.9, 15.1 (bead must therefore have been longer than 28 mm); Th 4.7, 5.2; MTD 2.2, 2.2 respectively.

18 (NMS X.EQ 995) Fragment with no original ends, but nearly complete (as glaze is present on interior of both ends). L 17.7; Th 4.3; MTD 1.9.

19 (NMS X.EQ 996) Two non-conjoining fragments, the longer with one original end and the shorter with one end that was probably close to the original end. L 12, 16.3 (bead must therefore have been longer than 28.3 mm); Th 4.8, 5; MTD 2.05, 2.0 respectively.

20 (NMS X.EQ 997) Fragment including one original, squarish end. L 26.1; Th 5.25; MTD 2.1.

21 (NMS X.EQ 998) Fragment including one original end. L 17.8; Th 5.5; MTD 2.35.

22 (NMS X.EQ 999) Fragment with no original ends. L 13.4; Th 6.6; MTD 1.9.

Star-shaped

23 (NMS X.EQ 978) Complete, with seven irregularly-shaped stubby rays. Maximum width 23; Th 6.25; MTD 10.6.

BEADS FROM THE SECONDARY DEPOSIT

Star-shaped

24 (NMS X.EQ 977) Incomplete, with four surviving stubby rays from an original total of five or six. W 21.5; Th 5.3; MTD 11.0.

Quoit-shaped

25 (NMS X.EQ 976) Complete, with two indentations on circumference making the bead resemble a quoit pendant, but without the perforation. W 22.4, Th 4.5; MTD 11.8.

All the beads are relatively crudely made, being irregular in shape and (in the case of the segmented and star ones) decoration. Indeed, they are arguably the crudest yet found in Britain and Ireland. Furthermore, with 11 beads over 24 mm long, and one of these over 39.9 mm long, they are also the longest segmented faience beads in Britain and Ireland. Only seven were complete (or virtually so) when placed in the urn, to judge from their weathered fracture surfaces. At present, if all the beads (including the star and quoit examples) were to be laid end to end in a single strand to form a necklace, it would be just under 0.49 m long. If one assumes an average original length of 30 mm for beads nos 1–9 and 12–22 (with beads 10 and 11 being significantly shorter), then the overall length of the necklace would be around 0.64 m; if the average length were 35 mm, it would be around 0.74 m. There is no evidence for the original stringing arrangement, and indeed no proof that the two beads from the secondary deposit had originally belonged with this necklace although, as argued below, this seems likely.

Several of the beads' features shed light on their method of manufacture and their subsequent alteration. These were explored through analysis of the beads' composition and microstructure, using energy-dispersive X-ray fluorescence spectrometry (EDXRF), plus energy-dispersive spectrometry and microprobe analysis using conventional and controlled pressure scanning electron microscopes (SEM); a medical endoscope was also used to investigate the interior rilling noted on some of the segmented beads. This work was undertaken at various times between 1991 and 2001, by one of us (AMcD) and also by Drs Stanley Warren, Andrew Shortland (Oxford University), Kathy Eremin (NMS), Paul Wilthew (NMS) and Mr John Murie (Edinburgh Royal Infirmary). Additional examination, using transmitted-light microscopy at magnifications of up to x50, was undertaken by one of us (JAS). Before reviewing the results, it is necessary to explain briefly what faience is and how it might have been made.

THE MANUFACTURE OF FAIENCE

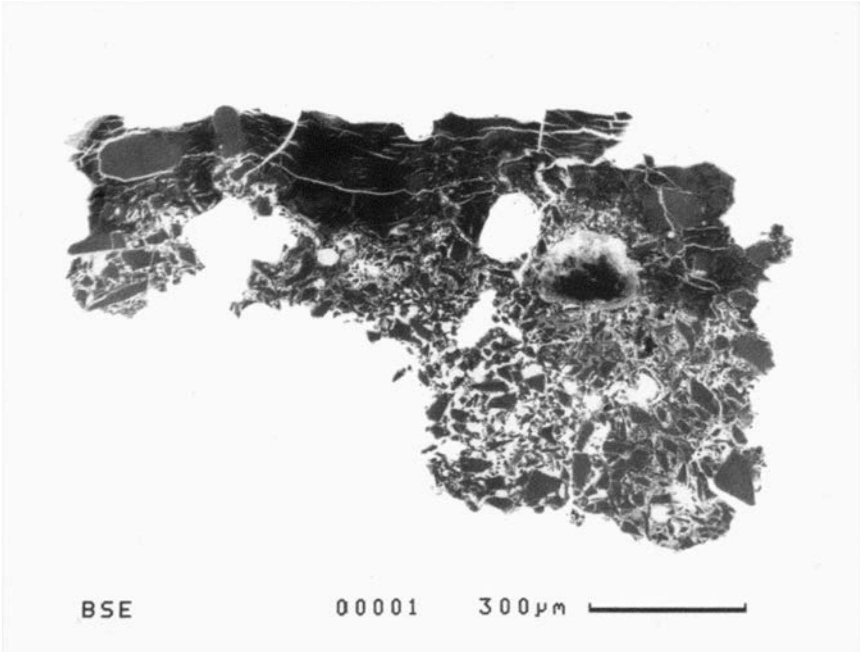
Faience is a non-clay ceramic material — a fired, glazed siliceous paste. Most analytical, experimental and ethnographic work has focused on its production in the Mediterranean and Near East (eg Nicholson & Peltenburg 2000; Shortland 2000; Tite *et al* 1983; Vandiver 1983), but the basic principles are applicable to faience manufacture in Britain and Ireland. The paste consists of a silica-rich material — usually ground sand, quartz pebbles or flint — which is bound with water and with small amounts of an alkaline material (usually plant ash, and often also calcium carbonate, eg from limestone, shells or shell sand). These materials make a pliable yet robust paste, and allow the silica grains to fuse when heated. The calcium carbonate, which need not be a deliberate ingredient (particularly if it is present as a natural impurity in shore sand), strengthens the bead in both the short and the long term (Stanley Warren, pers comm; Nicholson & Peltenburg 2000).

The glaze can be made from various materials and in various ways (see, for example, Tite & Bimson 1986), but its basic constituents are the same materials as used for the paste, with the addition of a colourant. To achieve the blue-green colour seen in the British and Irish beads, a copper-based colourant must have been used. Glazing can be done in three main ways, or a combination of these, namely: i) application to the surface of the object, as a slurry, prior to firing (prefiring of the object is not necessary: Nicholson & Peltenburg 2000, 191); ii) cementation to the surface, by placing the objects in a bed of powdered glaze and firing (this is the traditional Iranian technique, as recorded at Qom in the 1960s: Wulff *et al* 1968); and iii) efflorescence, or 'self-glazing': the mixing of the glaze with the paste, so that the soluble salts in the glaze migrate to the surface of the object prior to firing. To create a durable bead it must be fired at between 800–1000°C; the pale turquoise glaze as seen on the Findhorn specimens would probably have been produced by firing at a temperature of 925–950°C for several hours (Stanley Warren, pers comm). There is no evidence in Britain or Ireland for the kilns or firing vessels as used in the Near East for bulk production, and it is clear from the variability and scarcity of faience here that its production was small-scale.

Work by Vandiver (1983) and Tite (1987; Tite & Bimson 1986; Tite *et al* 1983; 1987) has sought to define criteria for determining which glazing method has been used. Some indications are offered by external features such as the presence of flow or drip marks (indicating application); others, by examination of the microstructure of the item in cross-section (see Nicholson & Peltenburg 2000 and Shortland 2000 for an up-to-date discussion).

The segmented beads

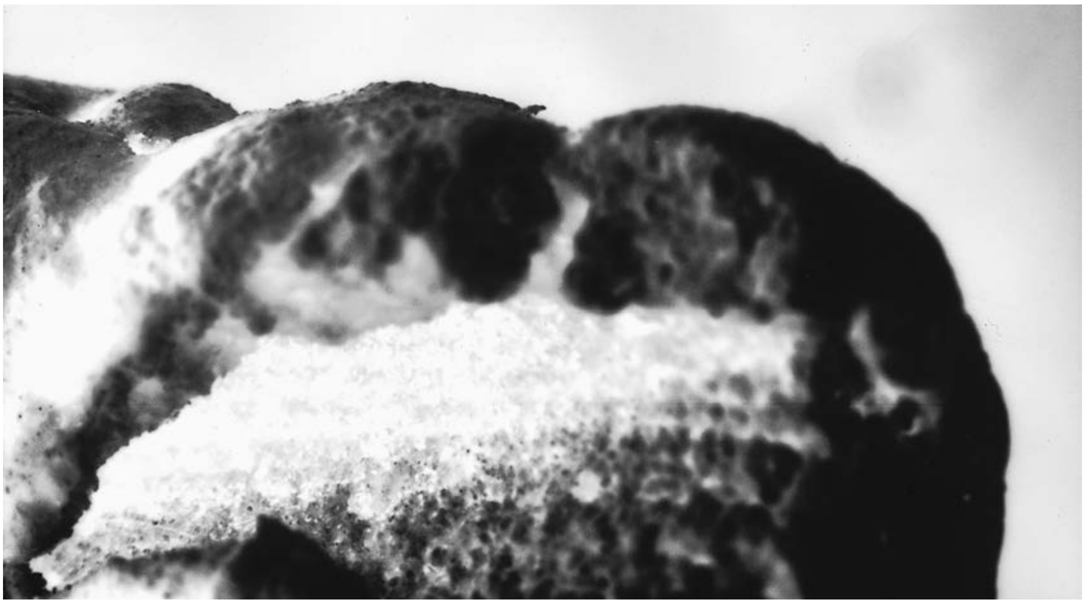
In these, a clear distinction between core and glaze is evident, with the latter present as a surface layer of variable thickness, mostly thin. The beads' predominantly creamy-buff colour is that of



Illus 9 SEM microphotograph showing cross-section of bead 14. The surface glaze layer and the angular ground sand grains are clearly visible. (*Photo: Trustees of the National Museums of Scotland*)

the core, which shows through the colour-depleted glaze and is visible on their interior surface, in the bottom of some indentations, and as an exposed ridge-like feature on several beads (see below). In this respect the Findhorn segmented beads differ from many other Scottish beads, where the glaze colour extends through most or all of the body. The Wessex beads tend to share this surface-core differentiation feature, but in other respects (notably neatness of decoration) they differ from the Findhorn examples. No commonality of production need be assumed, even though Wessex may well have been the source of knowledge for faience production in Scotland.

As for their manufacture, experimental work by Beck and Stone (1936) using sand from Glenluce, Wigtownshire, concluded that grinding was necessary to create the texture of Scottish faience beads. That the Findhorn beads had been made by grinding sand grains is clear from their angular micro-structure, creating a porous body (illus 9; the grain sizes fall within Vandiver's 'fine' to 'medium' categories: 1983, A-61). Beck and Stone had also hypothesized that segmented beads had been made by wrapping a paste around a piece of straw, or similar organic material. The Findhorn beads provide the first unequivocal support for this suggestion in Britain or Ireland, as several had clear traces of rilling along their interior, visible through endoscopic examination and also with the naked eye (illus 10). Straw or reed is the most likely candidate material. Furthermore, the presence of a visible seam line — closed, or as an open linear fissure — on several beads revealed where the edges of the paste had been poorly butt-joined. In common with other British and Irish segmented beads, and in contrast with Mediterranean and Near Eastern examples (Beck & Stone 1936, 220), the thread-holes are large in comparison with the overall bead thickness: in other words, the walls are thin.



ILLUS 10 Microphotograph of one end of bead 5, showing internal rilling caused by straw impression. (*Photo: Trustees of the National Museums of Scotland*)

Most of the beads are not a regular cylinder shape in cross-section, but are squashed or slightly angular. This doubtless resulted from the way they had been decorated: staggered indentations had been individually impressed into the still-soft core, prior to glazing. These jabs vary in width and depth, and had probably been made using more than one tool. This irregular pattern of decoration contrasts with the neater all-round crimping of many of the British and Irish beads, but it is matched on at least one of the Culbin Sands beads (NMS X.BIB 4a: Beck & Stone 1936, pl LXIV, fig 3.11). The indentations do not run across the seam lines.

The glaze is present as a surface layer of variable thickness, usually thin and sometimes patchy; in some cases it has not extended as far as the base of the indentations. In texture it varies from smooth and glossy, to irregular and virtually matt; in most cases it is extensively crazed, and on some beads it has partly flaked off. Its colour varies according to the amount of copper-based colourant that survives. Within an individual bead it may be various shades of pale turquoise in some areas and colourless in others; some beads also show a brownish discolouration, probably relating to heat damage (see below). In most cases, the colourless glaze predominates. Immediately beneath the glaze, and visible in some of the beads, is a whitish 'interaction zone', where some of the quartz grains in the paste have become fused; this is particularly clear on bead 15, exposed in a fresh fracture surface.

Microscopic examination revealed that the glaze had been applied, by dipping the paste-straws into a slurry. This is shown, for example, by the fact that the glaze has lapped over the end(s) of some beads (eg nos 14,19), to extend a little way into the interior, ending in a rounded edge. Given the predominance of colourless glaze, it may be that the slurry had not contained much copper-based colourant in the first place.

Other features give clues as to their firing. The frequent presence of vesicles (bubble-shaped pits) and of tiny holes extending through the thin walls suggests the release of carbon dioxide gas as the calcium carbonate converted to lime when the firing temperature exceeded 880°C. This indicates a deficiency in manufacturing technique, which could have been avoided had more salt and/or plant ash been used in the mix, and/or a higher firing temperature had been used (Warren, pers comm; Vandiver 1983, A-29). Another deficiency is attested by the fact that most of the beads have a ridge of unglazed core material along one surface — usually a flattish surface (eg illus 8, no 3). This core-ridge is almost invariably on the same side as the seam, and it will have resulted from laying the bead-straws flat to fire them (cf Vandiver 1983, A-33).

A further feature noted during the microscopic examination is the frequent presence of blackish particles on the outer and inner surfaces of the beads, including the fracture surfaces. Analysis revealed the presence of carbonaceous material, along with phosphorus and calcium. Much of this probably derives from the 'organic plug' and the cremated bones in the urn, but concentrations of the black specks inside the beads might possibly relate to the burning out of the straw former.

Finally, various characteristics of the segmented beads indicate that they had suffered a degree of heat damage subsequent to their manufacture, and therefore must have been on the body in the pyre. The most unequivocal evidence comes from beads 1, 3 and 20, and was revealed through electron microprobe analysis. In 1 and 20, microscopic laths of calcium phosphate (from the cremated bones) had actually become embedded in the surface of the beads — meaning that the surface must have melted and resolidified — while bead 3 contains carbon (from the pyre charcoal) along with sulphur, chlorine and traces of calcium phosphate, embedded in its surface. The characteristic signs of heavy weathering seen in many of the beads, namely: i) leaching of alkalis from the surface and core; ii) copper depletion; iii) discolouration, cracking and partial loss of glaze and iv) heavy lining of the glassy areas in the body of the bead, could all be other manifestations of this heat damage — although post-depositional chemical leaching could have contributed to the weathering.

The star and quoit beads

The star-shaped bead found in the urn (no 23) differs in colour and texture, as well as in shape, from the segmented beads. It is an irregularly-shaped, seven-pointed star form, made by wrapping paste around a wide former, then indenting the outer edge with a blunt tool to create the stubby rays. This act was probably responsible for the squashing of the body so that the thread-hole is now oval. There are also accidental indentations on either side of the bead, two of which were probably made with this tool. One side of the bead is marginally flatter than the other; the bead had probably been fired resting on this flatter, 'lower' surface. The surfaces are mottled, pitted with numerous tiny vesicles, and matt. Only vestigial traces of the original glazed surface survive, but it appears that the glaze colour penetrated further into the bead than was the case with the segmented beads. This may well indicate the use of a different glazing technique, probably efflorescence (cf a quoit bead/pendant fragment from Varley Halls, Sussex, where both efflorescence and application had been used: Bowman & Stapleton 1997). The bead's dark, mottled appearance suggests the alteration (darkening) of the bead's original blue-green surface colour, and the partial exposure and alteration (greying) of the buff core. One large grey blotch extends over much of the upper surface and hole, and there are several tiny patches of a blood-red colour. This reddening could result from the (re-)heating of the copper-based colourant in a reducing atmosphere. This discolouration, and the loss of much of the original surface, points towards heat damage, and confirmation that the bead had indeed been on the pyre is given by the presence of laths of calcium phosphate, embedded in the surface.

The two beads from the secondary deposit (nos 24 & 25) are darker still, and also show clear signs of heat damage. Both have heavily pitted, matt surfaces and only vestigial traces of the original glaze. The broken star-shaped bead — a squashed circle, whose ray indentations could have been made with a fingertip — has fracture surfaces which are rounded and which curve inwards towards each other. This indicates heat-deformation following fracture (cf the cremated faience beads from Stoneyburn, Lanarkshire, which also show shape deformation: Sheridan 1995). Most of the original surface is missing, and its former blue-green colour has been altered to various shades of dark blue, with one blood-red patch adjacent to a fracture surface. There are hints of a brownish core colour in the middle of the fracture surfaces and in the hole, but the glaze colour extends through much of the bead, as in no 23, and once more the efflorescence technique may have been used. That this bead had been through the pyre is indicated not only by its deep discolouration, surface loss and deformation, but also by the presence of carbon and traces of calcium phosphate embedded in its surface.

The quoit bead (no 25) is uneven in its shape and thickness, and has a weathered scar from an anciently-detached spall on its 'lower' side. It does not lie flat, and at two points around its circumference there are deliberate indentations. The resulting shape bears a passing resemblance to quoit-shaped pendants (such as the ones from Longniddry, East Lothian (Anon 1946, 151–2) and Reffley Wood, Norfolk (Stone & Thomas 1956, pl V, no14)), although here the 'lug' feature is not perforated. One side of the bead is marginally flatter than the other and was probably the underside during firing. In colour and texture the bead resembles the broken star-shaped bead (24). The upper surface is a dark mottled blue, with greyish patches, while the lower surface and inside of the hole are slightly paler. As with beads 23 and 24, the glaze appears to extend into the body. The presence of laths of calcium phosphate embedded in the surface confirms that the bead had been through the pyre; this would also account for the deep discolouration, surface loss and perhaps the weathered spall scar. Indeed, the fact that the two most heavily heat-damaged beads (24 & 25) had come from the secondary deposit at the top of the grave suggests that they may have fallen to the bottom of the pyre during the cremation — when the necklace's organic thread broke — and had been retrieved after the burial. Being precious objects associated with the corpse, it would have been important to include them as grave goods.

One further question remains to be addressed: could the beads have been made locally?

Analysis by EDXRF and SEM microprobe revealed that the Findhorn beads had been made using ground sand, calcium carbonate and a copper-based colourant; the former presence of water and some kind of plant ash (as the soda-rich alkali) can be inferred. (The potash content, albeit depleted, may indicate that seaweed ash had been used: cf Sanderson & Hunter 1981.) It also revealed the presence of tin (as tin oxide) in all the beads, in the relatively high concentration as noted for other British and Irish faience beads: the average copper to tin ratio in the glaze has been estimated at 2.88:1 (see McDonald 1991 for details and cf Aspinall *et al* 1972; Magee 1989; Stone & Thomas 1956; Williams *et al* 1992). In bead no 15, SEM microprobe analysis revealed that the tin was present throughout the body whereas copper was present only in the surface glaze, and there in a depleted amount (illus 9). Impurities in the raw materials (eg baryte inclusions in the sand), and accretions as a result of the cremation process, account for the presence of a range of other elements in minor amounts (namely iron, magnesium, zinc, sulphur, barium, chlorine and phosphorus — the last occurring in calcium phosphate from the cremated bone).

The sand, water, seaweed ash and calcium carbonate could all have been obtained in the Findhorn area. As noted above, shore sand incorporating some shell could easily have provided the calcium carbonate. As for the copper and tin, to a certain extent this could have derived from the use of a pre-existing tin bronze in some form — as metal filings(?), as corrosion product, as scrap, or perhaps as waste from bronze manufacture. Tin-bronze artefacts would have been readily available in the area, and the local bronzesmiths could have provided scrap and working waste. However, as has repeatedly been pointed out in the past (eg Aspinall *et al* 1972; McKerrell 1972; Williams *et al* 1992), the tin content is higher than could be accounted for from tin bronze alone. The deliberate addition of tin (in some form) to the glaze mix is a likely explanation, but whether the makers of British and Irish faience beads realized that high-tin glazes are glossier and have greater depth of colour (Kaczmarczyk & Hedges 1983, 93) is uncertain. (McKerrell's suggestion (1972, 290), that the beads' Egyptian [*sic*] makers were using tin so that the glaze imitated lapis lazuli, now seems far fetched in the wider context of our current understanding of British and Irish faience beads.)

Supplies of tin, probably imported from south-west England, must have been circulating in the area for use in the bronze 'industry' of the north-east (Cowie 1988). Alternative tin sources exist both within Scotland (Jones, pers comm) and in central Europe (Cowie 1988), but it is not known whether the former were exploited at this time, and importation of placer tin from the latter area is thought to be unlikely (S Needham, pers comm). We know that tin was used in its metallic form (as opposed to its ore and mineral forms, cassiterite and stannite), as its use for decorative purposes has been shown, first, in the 'tinned' flat axeheads of the 'Migdale industry' of north-east Scotland (Cowie 1988; Needham & Kinnes 1981), and, second, in a decorative inlay in a recently-discovered jet V-perforated button from Rameldry Farm, Fife (Sheridan & Davis forthcoming).

As for the copper — used in whatever form — this would have been available locally for the bronze 'industry', as noted above. Ingots could have been imported; alternatively, the nearest significant copper sources were in the Great Glen to the south-west, and Glen Esk in Angus to the south-east (Cowie 1988,11); copper also occurs as mineral streaks relating to granitic rocks closer to Findhorn, at Lossiemouth, near Burghead, and on the coast near Nairn (Moray District Council Museums Information Sheet 14, 1988: Moray Minerals).

In theory, then, all the raw ingredients could have been available locally. This, plus the crudeness of manufacture of the Findhorn beads, suggests that they may well have been manufactured in the vicinity. The homogeneity of the segmented beads in their style and method of manufacture suggest that they had probably been made as a single batch; and although the star and quoit beads seem to have been glazed in a different manner, it is quite possible that the entire necklace was made locally, 'to order'.

DATING

The National Museums of Scotland commissioned a radiocarbon date (with the kind co-operation of Dr Stuart Needham and colleagues at the British Museum) for non-oak charcoal from a short-lived species of tree recovered from the pyre debris. It was an accelerator determination of 3410 ± 50 BP, on non-oak charcoal from the fill of the urn-pit (OxA-7622; δ C13 -24.8%) which calibrates to 1880–1520 cal BC at 2σ using the Intcal98 calibration curve (Stuiver *et al* 1998) in the Oxcal v 3.5 program. (This program has been used with all the dates cited in this paper.) Within the 2σ range, there is a 90.9% probability that the date falls within the 1880–1600 cal BC bracket.

This date is closely similar to one of 3450 ± 50 BP (GU-3260, 1890–1620 cal BC at 2σ) obtained from birch charcoal accompanying the cremation of a young adult female (aged 25–30) beneath a cairn at Stoneyburn, near Crawford, Lanarkshire (Banks 1995, 297–302). This burial also contained four burnt faience beads, a hammerstone and an accessory vessel. The Findhorn date can also be compared with that from birch charcoal of 3360 ± 75 BP (OxA-3550, 1780–1450 cal BC at 2σ, with an 87.1% probability that the date lies between 1780 and 1490) at the cremation cemetery of Eagleston Flat, Curbar, Derbyshire (Barnatt 1994, 309, 346). The burial, number 5, was of a woman aged between 30 and 40 at death; she was accompanied by a Cordoned Urn and two small faience beads. General similarities can also be seen with the date from (?)oak charcoal for the fragments of five segmented faience beads from beneath ring cairn 2 on Shaugh Moor, Devon of 3430 ± 90 BP (HAR-2220, 1960–1510 cal BC at 2σ: Wainwright *et al* 1979, 16, 26–7). And finally, three new dates relating to faience have just been obtained from the National Museums of Scotland's *Dating Cremated Bone* project. They are: i) 3305 ± 40 BP (GrA-18016, 1690–1490 cal BC at 2σ) for a quoit bead and quoit pendant associated with a Cordoned Urn from Longniddry, East Lothian; ii) 3325 ± 40 BP (GrA-18019, 1740–1510 cal BC at 2σ) for a star pendant associated with a 'bipartite' urn at Fordhouse, Angus; and iii) 3390 ± 50 BP (GrA-18017, 1880–1520 cal BC at 2σ) for a segmented bead associated with an encrusted Food Vessel Urn at Mill of Marcus, Angus. These, too, are not dissimilar to the Findhorn date.

Taken together, these dates give a reasonable indication of the period represented by the Findhorn find and place it within the span of Periods 3 and 4 of Needham's (1996, 130–2) integrated chronology for the British Bronze Age. Period 3 is characterized as the time of 'a burgeoning practice of depositing ornaments and fittings in graves', while Period 4 shows vigorous use of the rite of cremation (Needham 1996, 132).

DISCUSSION

At a stroke the Findhorn find increases the quantity of faience recorded from Britain and Ireland by approximately 8% (Clarke *et al* 1985, 217) and from Scotland by nearly 40% (Alison Sheridan, pers comm). Grave goods in urn burials in any event remain relatively scarce and several facets of the burial therefore require further consideration. They are: (1) the process by which the beads arrived in their contexts and in their varying conditions; (2) the implications of the pale blue staining noted throughout the cremated remains; (3) other evidence recovered from the burial and; (4) the overall significance of the discovery.

THE BURIAL PROCESS

Much information on the burial ritual that may be relevant to the objects can be derived from Faye Powell's report on the cremated remains. The careful picking of bones from the pyre has already been surmised: a process of cooling in water might perhaps also be inferred, given their particularly clean condition. Furthermore, McKinley has observed that the sizes of bone fragments in cremations (1994a, 339) should be regarded as '*post-excavation* fragment sizes', the result of attrition during the processes of cremation, collection, burial, excavation and study. In this light, the existence at Findhorn of such sizeable fragments as the proximal third of the left femur might suggest that extraordinary care had been taken by the mourners in the collection and interment of the remains.

However, it is worth examining whether one can go further and deduce from the differential heat damage to key parts of the body how the body was laid relative to the pyre. This might also assist with an explanation of some of the differences in the condition of the beads.

Interesting contrasts do exist in the report. For example, the bones of the back of the body such as the vertebrae showed 'much pitting' from the funeral pyre, as did the bones of the pelvis and the scapulae (which had 'marked fissuring'). In contrast, those on the front of the body, such as the sternum and the ribs demonstrated no fissuring. This might be taken to suggest that the body had been laid on top of the pyre and that most fire-damage occurred on the back. The converse possibility to account for these observations, that the corpse had been laid prone beneath the pyre, is inherently far less likely. McKinley (1997, 132) in her review of archaeological and ethnographic evidence for cremation, indicates that the body was usually placed supine on top of the pyre in the position of greatest heat and best oxygen supply. Placing a corpse beneath a pyre (McKinley 1997, 134) would not achieve cremation as the oxygen supply would be rapidly cut-off by the build-up of fuel ash around the corpse.

To go further, there are also contrasts in the effects of fire on the bones of the left and right sides of the body which may provide a potentially clearer picture. The left humerus is complete, as is the proximal third of the left femur, whereas only the shaft of the right femur survives and the condition of the right humerus is 'poor'. These indications of greater fire-damage to the right side could be taken to suggest that the body had been laid on top of the pyre, on its right side and possibly crouched in the manner established for female burials in Beaker inhumation graves from the north-east of Scotland and Yorkshire (Shepherd, A N 1989). (The alternative possibility, that the corpse may have been lying on its left side beneath the pyre, should be discounted in view of McKinley's remarks quoted above.)

There are implications for the faience beads in these possibilities. If the segmented beads were strung as a necklace and placed around the neck of the corpse (by no means the sole possible way of associating the beads with the body), those lying on the body rather than looped around the neck and shoulders might have been less exposed to heat. The condition of the beads does indeed indicate differing degrees of heat damage, with the complete star bead and a couple of the segmented beads appearing to be more heavily heat-altered than the other beads found in the urn. Further, as suggested above (p 118), it is possible that two beads (24 & 25) dropped off the body and into the heart of the pyre, to emerge with their distinctive pattern of considerable heat damage, while others may have been shielded from the effects of burning, secreted in the folds of the grave clothes.

THE BLUE STAINING ON THE BONES

Traces of pale blue staining were quite widespread on the bones, being visible on fragments of the skull, some vertebrae, on parts of the pelvis, the sternum and on the right femur. Analysis of one stained bone by Paul Wilthew of the National Museums of Scotland's Analytical Research Section, using X-ray fluorescence spectrometry, revealed (Appendix) that the staining consisted of copper compounds. Such stains are usually interpreted as deriving from the total decay of a small bronze artefact which had been amongst the grave goods. McKinley (1994b, 339) has suggested that in the cases where the staining is localized to certain parts of the body the object may not have been deposited at all but removed from the pyre debris after it had served its 'purpose' during the rite. However, in the Findhorn case, the range of bones involved is such as to suggest contact within the urn, which conclusion is reinforced by the observation that both the inner and the outer surfaces of the skull bones were so marked. Furthermore, the faience beads can be ruled out as the likely source of the copper compounds — even if the material at the mouth of the urn had acted as a wick for moisture, the pattern of staining was inconsistent with such upward leaching, and the intensity of staining rather too great.

Given the absence of any trace of the artefact in question, it may be surmised that it was not of any great mass; a small bronze blade or awl is perhaps the most likely object (Annable &

Simpson 1964, 113; Clarke *et al* 1985, 296). Indeed, 30 years ago, Walker (1972, 83) drew attention to the precocious occurrence of evidence for razors from Culbin, including a possible mould. A simple bronze blade such as the one that accompanied a cremation in a Cordoned Urn also containing a quoit-shaped faience bead and a bone pin from Harristown, Co Waterford, in Ireland (Hawkes 1941, 140), could well be a likely source of the staining.

We should, however, be alive to other possibilities in view of the insight offered by the rare inhumation graves which do contain faience, such as the Mound of the Hostages, Tara, Ireland (Ó Ríordáin 1955). Here, the skeleton of an adolescent male, 14–15 years of age, was accompanied by a small bronze knife, a bronze awl, and a necklace comprising four segmented faience beads, a jet bead, four amber beads and eight portions of tubular bronze beads. As well as demonstrating that important organic ornaments may have been lost during the cremation process at burials such as Findhorn, the occurrence of the bronze beads provides an intriguing third possibility to account for the blue staining.

While there is no evidence whatsoever to claim such beads at Findhorn, their presence has been noted on rare occasions in association with urn and other burials elsewhere in Britain. A copper-alloy tube, c 60 mm long, with two possible faience beads 'threaded on to it', accompanied a cremation burial, a copper awl and four other spherical beads of (?)faience in a cordoned urn at Stancliffe Hall, in the Derwent Valley, Derbyshire (Barnatt 1994, 335). There is also a case of a tubular bronze bead — significantly, in this context, of segmented form — in association with a Wessex Biconical Urn burial at Roke Down, Dorset (Abercromby 1912, 39, fig 375). This was described by John Brailsford of the British Museum in a footnote to the Tara report as 0.95 in [24 mm] long (BM register 92, 9-1, 226: Ó Ríordáin 1955, 169 n7). Abercromby (1912, 39, fig 374) also refers to 'a very small cylinder of thin bronze leaf' accompanying a similar urn from Bere Regis, Dorset. Finally, there is the inhumation burial from Devil's Dyke, Beggar's Haven, Sussex, which contained, in addition to a Wessex/Middle Rhine-Step 3 Beaker, 14 tiny disc beads of 'lignite' and three sheet-bronze tubular beads, these beads apparently found 'around the neck of the skeleton' (Curwen 1937, 159, pl XI; Clarke 1970, no 991F, fig 167).

Such tubular bronze beads are best compared to those in the well-known Migdale find, from Sutherland, the smallest of which are very similar to the Tara examples (Anderson 1901; *Inventaria Archaeologia,* GB 26; Clarke *et al* 1985, 302–3, illus 4.35). The Migdale, and probably also the Devil's Dyke, examples are certainly earlier in date than Findhorn, spanning Needham's periods 2 and 3 (1996, Tables 3 & 4) while Migdale itself has a date, from a wooden bead core, of 3655 ± 75 BP (OxA-4659 2300–1750 cal BC: Sheridan *et al* 1995). That urn finds such as Findhorn or the others quoted above have a Needham period 3–4 placing, need not be a problem if account is taken of the evidence of curation of rare objects seen in some Early Bronze Age graves (eg Sheridan 1999, 56). Finally, the well-known necklace with segmented beads of faience and tin, and others of amber, from a peat bog at Exloo, Odoorn, Drenthe, Netherlands provides another context (Beck & Stone 1936, 221, 243; Clarke *et al* 1985, 148, illus 4.82).

ENVIRONMENTAL FACTORS

The geomorphological context of the burial has already been dealt with in the introduction. One remaining issue, raised by the predominance of oak charcoal in the remains of the pyre deposited in the urn-pit, is the question of the source of such timber. Bronze Age Culbin/Findhorn would appear to have been a conspicuously sandy location, which was unlikely to have supported oak. It is more likely on first sight to have been found on heavier soils on the southern fringe of the Laich of Moray, such as west of Elgin (now the Oak Wood) — as much as c 15 km to the east of

Culbin — or further up the River Findhorn. However, the finding in the 19th century of (formally undated) oak stumps buried in a moss at Hatton, c 4 km east of Findhorn (Ross 1992, 40–2) raises the possibility of a more local source.

In any case, this is not to argue that the Culbin need be seen primarily as an industrial area or, indeed, one for interments. Its role in the manufacture of the faience beads has already been adduced above, while there is evidence for near-contemporary settlement in the form of a midden with a radiocarbon date of 3209 ± 75 BP (Q-990, 1690–1310 cal BC: Coles & Taylor 1970, 90) from the heart of Culbin. In any event, the sandy content of the pyre pit would suggest that possibly the death, and certainly the cremation, occurred in the locality of the burial.

OVERALL SIGNIFICANCE

Alison Sheridan and Tony McDonald have provided, *inter alia,* an excellent essay on the likely local provenance of the Findhorn faience beads, which points out that their best parallels lie amongst those found on the Culbin Sands. Culbin has produced in the past at least 12 segmented and three star-shaped beads (Black 1891, 509; Beck & Stone 1936, fig 3; Clarke *et al* 1985, 217) and it is argued here that this Findhorn discovery must be seen as merely the most recently discovered manifestation of this activity.

Certainly, it might also be argued that the sheer quantity of beads at Findhorn is itself an indication that they were readily available in the vicinity — because that was where they were made. This conclusion would reinforce the role that Culbin appears to perform as in some strange way the industrial heart of the north of Scotland — at whatever period (eg Linton 1876; Guido 1978, 34–5; *pace* MacGregor 1976, 103–5). There is, of most relevance to this question, direct evidence of early metal-working from Culbin in the form of two flat-axe moulds (Coles 1969, 91) and the (?)razor mould referred to earlier (Walker 1972, 83). Furthermore, it has been observed that a lump of undated, but almost certainly post-Bronze Age, glassy material amongst the Culbin finds in the National Museums of Scotland has a similar chemical composition to Culbin faience beads (Newton & Renfrew 1970, 203).

One of the conclusions of Sheridan and McDonald's work, that we should be thinking of the production of faience at several centres, focuses attention on the other finds of faience in Scotland. Several star-shaped beads have been recorded in eastern Scotland. Two have been found in Aberdeenshire: one accompanying an urn at Camalynes, Auchterless (Callander 1906, 37) and a stray find from Darnabo, Fyvie (Callander 1906, 36). One star-shaped bead — perforated as a pendant, uniquely — was found recently accompanying a 'bipartite urn' in the Fordhouse Barrow, House of Dun, Angus (*Discovery Excav Scot 1999*, 111). The other form of bead found at Findhorn, the quoit-shaped, can be paralleled by similarly-sized examples found on Stevenston Sands, Ayrshire and Glenluce Sands, Wigtownshire, along with star-shaped ones (Beck & Stone 1936; Mann 1906), and it is these two other sand-dune areas, rather than the other sites quoted above, that may have been local production centres.

Further afield, a fragment of a star-shaped bead was recovered from the flat inhumation and cremation cemetery of Camps Reservoir, Crawford, Lanarkshire (*Discovery Excav Scot 1994*, 73; *ibid* 1996, 140–1), but the recent discovery of the Stoneyburn cairns in Lanarkshire with their one quoit-shaped and four segmented faience beads is one of the best sources of comparison with Findhorn (Sheridan 1995, 321–4, illus 7). The Cordoned Urn context, however, remains significant, as represented by the example with the segmented bead from Mill of Marcus near Brechin, in Angus (Hutcheson 1890) and the Balneil, Wigtownshire find (Curle 1916).

Finally, as noted above (p 111), the unique conjunction of all three types of faience bead — segmented, star-shaped and quoit-shaped — in the single episode at Findhorn is unique (see map in Beck & Stone 1936, fig 3). Intriguingly, such an association underlines the possibility that this was potentially an even richer burial than the surviving objects indicate. The bronze bead or blade or awl, inferred from the pale blue staining of the bones, and the very high number of faience beads at Findhorn begin to approach in level of display some of the richest Wessex cremation burials such as Upton Lovell G1 (Annable & Simpson 1964, 54, nos 340–2) — it is lacking only the gold of Upton Lovell G2e (*ibid*, 48, nos 225–33). Findhorn's Scottish context of Wessex-inspired displays of wealth is set out above. Unquestionably, Findhorn does attract superlatives: the greatest number of faience beads, the first conjunction of all three types of bead, and the tallest of the Cordoned Urns. Can these be explained any further, perhaps by widening our perspectives?

We should, in conclusion, consider this burial context at Findhorn as but the final act or residue of a complex ritual of mourning, cremation and disposal (Huntington & Metcalf 1979, 130–2), possibly extending over several days or weeks, and some distance, and involving numerous participants (eg Downes 1999; Sheridan 2000).

Certainly, if we return to the initial event whose manifestation has been the subject of this paper, we can surely accept the most human of interpretations for this burial — that of the tragic death of a mother and her baby in childbirth. Can we also see in the condition and the richness of the grave goods selected to accompany them some reflection of the grief of those they left behind? There are indeed ethnographic examples of violent grief (Huntington & Metcalf 1979, 32), but within the archaeological record, it is less easy to be sure of such interpretations. There is no evidence here of the placing of parts of the mourners' bodies (eg teeth or eyebrows: Shepherd 1982, 131) in the grave, nor yet the breaking and insertion of objects such as the two jet pendants found at Barns Farm, Dalgety, Fife (*ibid*, 131). However, the assembling and deposition of such lavish grave goods as have been recovered at Findhorn may be themselves manifestations of similarly intense reactions, representing attempts by the living to engage with the processes of fragmentation, disruption and, possibly, rebirth, that were begun by death.

By providing reassurance for those remaining and reverence of those gone, we may see at Findhorn an expression of the mourners' need to re-establish a firm foothold in a world destabilized by death.

APPENDIX: Analysis of the blue staining on bone

Paul Wilthew

INTRODUCTION

Patches on some, at least, of the cremated bone fragments from 102 Findhorn had been stained blue, presumably during burial. As part of a larger study of the finds from the site by the Department of Archaeology in the National Museums of Scotland and Bradford University, one stained fragment was sent for analysis to try to determine the nature of the staining.

RESULTS AND DISCUSSION

Qualitative energy dispersive X-ray fluorescence of stained and apparent1y unstained areas of the surface of the bone showed that copper was present at a higher level in the stained areas. Manganese was also present at variable levels in different areas, but higher levels did not seem to be consistently associated with the blue staining. Although the copper levels, even in the most heavily stained areas, were quite close to the detection limit of the method (a counting time of 5000 seconds was used to improve the detection limit), the blue staining is almost certainly due to copper compounds.

XRF analysis cannot help to identify the source of the copper, but corrosion of a copper alloy object in the vicinity of the bone seems the most likely cause of the staining. No comment can be made about the composition of the object. The zinc detected was probably from the bone itself.

An alternative source of copper might have been the faience beads found at the site, depending on their physical location relative to the bone. They were coloured by copper, some of which had, almost certainly, leached out. However, the amount of copper involved would have been relatively small and it seems a less probable source than a copper alloy object.

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REFERENCES

Abercromby, J 1912 *A Study of the Bronze Age Pottery of Great Britain and Ireland and its Associated Grave-goods,* vol 2. Oxford.

Anderson, J 1901 ‘Notice of a hoard of bronze implements, and ornaments, and buttons of jet found at Migdale, on the estate of Skibo, Sutherland, exhibited to the Society by Mr Andrew Carnegie of Skibo, LLD, FSA Scot’, *Proc Soc Antiq Scot*, 35 (1900–1), 266–75.

Annable, F K & Simpson, D D A 1964 *Guide Catalogue of the Neolithic and Bronze Age Collections in Devizes Museum.* Devizes.

Anon 1946 ‘Donations to and purchases for the museum 1945–6’, *Proc Soc Antiq Scot*, 80 (1945–6), 151–6.

Aspinall, A, Warren, S E, Crummett, J G & Newton, R G 1972 ‘Neutron activation analysis of faience beads’, *Archaeometry*, 14 (1972), 27–40.

Banks, I 1995 ‘The excavation of three cairns at Stoneyburn Farm, Crawford, Lanarkshire, 1991’, *Proc Soc Antiq Scot*, 125 (1995), 289–343.

Barnatt, J 1994 ‘Excavation of a Bronze Age unenclosed cemetery, cairns and field boundaries at Eagleston Flat, Curbar, Derbyshire, 1984, 1989–1990’, *Proc Prehist Soc*, 60 (1994), 287–370.

Beck, H C & Stone, J F S 1936 'Faience beads of the British Bronze Age', *Archaeologia*, 85 (1936), 203–52.

Black, G F 1891 'Report on the archaeological examination of the Culbin Sands, Elginshire, obtained under the Victoria Jubilee Gift of His Excellency Dr R H Gunning, FSA Scot', *Proc Soc Antiq Scot,* 25 (1890–91), 484–511.

Bowman, S & Stapleton, C P 1997 'The faience ornament fragment: its technology and provenance', *in* Greig, I 'Excavation of a Bronze Age settlement at Varley Halls, Coldean Lane, Brighton, East Sussex', *Sussex Archaeol Coll*, 135 (1997), 44–7.

Callander, J G 1906 'Two star-shaped beads of green porcellaneous paste from Aberdeenshire', *Proc Soc Antiq Scot*, 40 (1905–6), 36–9.

Callander, J G 1923 'Scottish Bronze Age hoards', *Proc Soc Antiq Scot*, 57 (1922–3), 123–66.

Clarke, D L 1970 *Beaker Pottery of Great Britain and Ireland*. Cambridge.

Clarke, D V, Cowie, T G & Foxon, A 1985 *Symbols of Power at the Time of Stonehenge.* Edinburgh.

Coles, J M 1969 'Scottish Early Bronze Age Metalwork', *Proc Soc Antiq Scot*, 101 (1968–9), 1–110.

Coles, J M & Taylor, J J 1970 'The excavation of a midden in the Culbin Sands, Morayshire', *Proc Soc Antiq Scot*, 102 (1969–70), 87–100.

Cowie, T G 1988 *Magic Metal: Early Metalworkers in the North-East*. Aberdeen.

Curle, A O 1916 'Notes (1) on the discovery of a grave at Balneil, New Luce, Wigtownshire, containing a partially burnt interment, a cinerary urn, a bronze chisel, a bone pin and a bead of vitreous paste. . .', *Proc Soc Antiq Scot*, 50 (1915–16), 302–6.

Curwen, E C 1937 *The Archaeology of Sussex*. London.

Downes, J 1999 'Cremation: a spectacle and a journey', *in* Downes, J & Pollard, T (eds) *The Loved Body's Corruption: archaeological contributions to the study of human mortality*, 19–29, Glasgow.

Guido, M 1978 *The Glass Beads of the Prehistoric and Roman Periods in Britain and Ireland*. London (= Rep Res Com Soc Antiq London, 35.)

Hawkes, J 1941 'Excavation of a megalithic tomb at Harristown, Co Waterford', *J Roy Soc Antiq Ireland*, 71 (1941), 130–47.

Huntington, R & Metcalf, P 1979 *Celebrations of Death. The Anthropology of Mortuary Ritual.* Cambridge.

Hutcheson, A 1890 'Notice of the discovery of urns at Mill of Marcus, near Brechin, Forfarshire', *Proc Soc Antiq Scot*, 24 (1889–90), 470–2.

Kaczmarczyk, A & Hedges, R E M 1983 *Ancient Egyptian Faience*. Warminster.

Kermode, P M C 1926 'Excursion to Skyhill and Glen Aldyn', *Proc Isle of Man Natur Hist Antiq Soc*, 2.4 (1923–6), 22–8.

Kermode, P M C & Herdman, W A 1914 *Manks Antiquities*. Liverpool.

Linton, H 1876 'Notice of a collection of flint arrowheads and bronze and iron relics from the site of an ancient settlement recently discovered in the Culbin Sands, near Findhorn, Morayshire', *Proc Soc Antiq Scot*, 11 (1875–6), 543–6.

McDonald, A 1991 *An investigation into the provenancing and manufacture of an assemblage of faience beads from Findhorn, Moray, using X-ray fluorescence and scanning electron microscopy.* Unpubl MSc dissertation, Univ Bradford.

MacGregor, M 1976 *Early Celtic Art in North Britain.* Leicester.

McKerrell, H 1972 'On the origins of British faience beads and some aspects of the Wessex–Mycenae relationship', *Proc Prehist Soc*, 38 (1972), 286–301.

McKinley, J I 1994a 'Bone fragment size in British cremation burials and its implications for pyre technology and ritual', *J Archaeol Sci*, 21 (1994), 339–42.

McKinley, J I 1994b 'Cremation burials' *in* Barnatt 1994, 335–40.

McKinley, J I 1997 'Bronze Age "Barrows" and Funerary Rites and Rituals of Cremation', *Proc Prehist Soc*, 63 (1997), 129–45.

Magee, R W 1989 *Irish Faience Beads: Their Analysis and Archaeological Context*. Unpubl MA dissertation, Univ Bradford.

Mann, L M 1906 'Prehistoric beads of coarse vitreous paste', *Proc Soc Antiq Scot*, 40 (1905–6), 396–402.

Needham, S 1996 'Chronology and periodisation in the British Bronze Age', *in* Randsborg, K (ed) *Absolute Chronology: Archaeological Europe 2500–500* BC, 121–40. Copenhagen (=*Acta Archaeol*, 67 (1996); *Acta Archaeol Supplementa*, I).

Needham, S & Kinnes, I 1981 'Tinned axes again', *Antiquity*, 55 (1981), 133–4.

Newton, R G & Renfrew, C 1970 'British faience beads reconsidered', *Antiquity*, 44 (1970), 199–206.

Nicholson, P T & Peltenburg, E 2000 'Egyptian faience', *in* Nicholson, P T & Shaw, I (eds) *Ancient Egyptian Materials and Technology*, 177–94, Cambridge.

Ó Ríordáin, S P 1955 'A burial with faience beads at Tara', *Proc Prehist Soc*, 21 (1955), 163–73.

Ritchie, W, Rose, N & Smith, J S 1978 *Beaches of North-East Scotland*. Aberdeen.

Ross, S 1992 *The Culbin Sands — Fact and Fiction.* Aberdeen.

Sanderson, D C W & Hunter, J R 1981 'Composition variability in vegetable ash', *Science and Archaeology*, 23, 27–30.

Shepherd, A N 1989 'A note on the orientation of beaker burials in north-east Scotland', *in* Greig, M K, Greig, C, Shepherd, A N & Shepherd, I A G 'A beaker cist from Chapelden, Tore of Troup, Aberdour, Banff and Buchan District, with a note on the orientation of beaker burials in north-east Scotland', *Proc Soc Antiq Scot*, 119 (1989), 79–80.

Shepherd, I A G 1982 'Comparative background: the assemblage', *in* Watkins, T 'The excavation of an Early Bronze Age cemetery at Barns Farm, Dalgety, Fife', *Proc Soc Antiq Scot*, 112 (1982), 129–32.

Sheridan, J A 1995 'The faience beads', *in* Banks 1995, 321–4.

Sheridan, J A 1999 'Drinking, driving, death and display: Scottish Bronze Age artefact studies since Coles', *in* Harding, A F (ed), *Experiment and Design: Archaeological Studies in Honour of John Coles*, 49–59. Oxford.

Sheridan, J A 2000 'Cremation in Scotland across four millennia', *in* Sheridan, J A (ed) *Heaven and Hell — and Other Worlds of the Dead*, 18–19, Edinburgh.

Sheridan, J A & Davis, M 1998 'The Welsh "Jet Set" in prehistory: a case of keeping up with the Joneses?', *in* Gibson, A & Simpson, D D A *Prehistoric Ritual and Religion*, 148–62. Stroud.

Sheridan, J A & Davis, M forthcoming 'The V-perforated buttons', *in* Baker, L, Cowie, T G & Sheridan, J A 'An Early Bronze Age "dagger grave" at Rameldry Farm, Fife'.

Sheridan, J A, Hunter, F J & Saville, A 1995 'Organic artefacts from the collections of the National Museums of Scotland', *in* Hedges, R E M, Hasley, R A, Bronk Ramsey, C & van Klinken, G J 'Radiocarbon dates from the Oxford AMS system: *Archaeometry* datelist 20', *Archaeometry*, 37(2) (1995), 423–5.

Sheridan, J A & Warren, S E forthcoming *Faience in Bronze Age Britain and Ireland*. Edinburgh.

Shortland, A 2000 *Vitreous Materials at Amarna*. Oxford (= Brit Archaeol Rep Int Ser, 827).

Simpson, D D A 1996 'Excavation of a kerbed funerary monument at Stoneyfield, Raigmore, Inverness, Highland, 1972–3', *Proc Soc Antiq Scot*, 126 (1996), 53–86.

Steers, J A 1973 *The Coastline of Scotland*. Cambridge.

Stone, J F S & Thomas, L C 1956 'The use and distribution of faience in the ancient East and prehistoric Europe', *Proc Prehist Soc*, 22 (1956), 37–84.

Stuiver M, Reimer, P, Bard, E, Beck, J W, Burr, G S, Hughen, K A, Kromer, B, McCormac, G, van der Plicht, J & Spurk, M 1998 'INTCAL98 Radiocarbon Age Calibration, 24000–0 cal BP' *Radiocarbon*, 40.3 (1998), 1041–83.

Tellet, F 1901 'Excursion to Glen Aldyn, Thursday, October 5, 1893', *Yn Líoar Manninagh*, 2 (1901), 86–8.

Tite, M S 1987 'Characterisation of early vitreous materials', *Archaeometry*, 29 (1) (1987), 21–34.

Tite, M S & Bimson, M 1986 'Faience: an investigation of the microstructures associated with the different methods of glazing', *Archaeometry*, 28(1) (1986), 69–78.

Tite, M S, Freestone, I C & Bimson, M 1983 'Egyptian faience: an investigation of the methods of production', *Archaeometry*, 25(1) (1983), 17–27.

Tite, M S, Freestone, I C & Bimson, M 1987 'The scientific examination of pre-Hellenistic faience from Rhodes', *in* Bimson, M & Freestone, I C (eds) *Early Vitreous Material*, 127–32, London. (= Brit Mus Occas Pap, 5.)

Vandiver, P 1983 'Appendix A: the manufacture of faience', *in* Kaczmarczyk, A & Hedges, R E M *Ancient Egyptian Faience*, A-1–144, figs 23–46, Warminster.
Waddell, J 1992 'The Irish Sea in Prehistory', *J Irish Archaeol*, 6 (1991–92), 29–40.
Wainwright, G J, Fleming, A & Smith, K 1979 'The Shaugh Moor Project: first report', *Proc Prehist Soc*, 45 (1979), 1–33.
Walker, I C 1966 'The Counties of Nairnshire, Morayshire and Banffshire in the Bronze Age', *Proc Soc Antiq Scot*, 98 (1964–6), 76–125.
Walker, I C 1972 'The counties of Nairnshire, Moray and Banffshire in the Bronze Age, Part II', *Proc Soc Antiq Scot*, 104 (1971–2), 71–120
Williams, B B, Wilkinson, J L & Magee, R W 1992 'Bronze Age burials at Kilcroagh, County Antrim, and faience beads in Ireland', *Ulster J Archaeol*, 54–5 (1991–92), 48–60.
Wulff, H E, Wulff, H S & Koch, L 1968 'Egyptian faience: a possible survival in Iran', *Archaeology*, 21 (1968), 98–107.

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