Report on Human Remains From Longstone Edge, Derbyshire (Excavated 1996)

Introduction

Human skeletal remains from the following contexts were examined:

Barrow 1

Phase 1: Four contexts (1053, 1056, 1057 and 1082) thought by the excavator to represent material from a Neolithic excarnation platform.

Phase 2: Three contexts (75501-75503) from a Beaker-period rock-cut grave thought on-site to represent three inhumation burials.

Phase 4: A deposit of burnt bone (context 75504) associated with a Food Vessel, and a possible discrete burial deposit (context 3042) within the mound.

Undated: Context 75505 thought in the field to represent the disturbed remains of a secondary burial inserted into the mound.

Barrow 2

Context 2058. This was thought to represent the remains of a child burial from outside the cist in this barrow. Contexts 2063 and 2065-2067 from within the cist were also examined to determine whether they contained additional elements from child 2058.

Preliminary examination revealed that burials 75501-75503 from Barrow 1 actually represented the co-mingled remains of only two individuals. For the purposes of the present report these are given the numbers assigned to the crania on site - 75501 and 75502. Although both individuals were adult, differences in size and robusticity allowed most skeletal elements to be assigned to one or other individual with reasonable confidence. Material which could not be confidently allocated to an individual (some of the smaller bones and bone fragments) was not recorded. Consistent with their rather disturbed nature, these contexts also contained a small amount of fragmentary bone not belonging to either individual; this too was not recorded.

Contexts 75505 and 3042 each proved to contain a small amount of fragmentary bone representing several individuals. It seems likely that they represent redeposited material rather than discrete burials. This material was not therefore recorded.

The skeletal material from context 2058 Barrow 2, although sparse, appeared to be from one individual, so this was treated as a discrete burial deposit. Contexts 2063 and 2065-2067 contain a few fragments (mainly cranial bones) of a child. This is probably the same individual as 2058, but as no fragments adjoin it is impossible to determine this with absolute certainty.

Analytical Study of the Skeletal Material

Methods

Methods used for age and sex determination are detailed alongside the results for particular contexts. In addition, for inhumations 75501 and 75502, cranial and post-cranial measurements were recorded, using the definitions of Brothwell (1981), and non-metric traits were recorded following the definitions of Berry & Berry (1967) and Finnegan (1978). These results are held in archive.

For the material from the putative excarnation platform from Barrow 1, and for the cremated bone from other contexts, bone fragments were, where possible, identified to skeletal element, and for each context bone was weighed and a fragment count obtained. Minimum numbers of individuals represented by the deposits were estimated. For the contexts relating to the possible excarnation platform, attempts were made to evaluate the likelihood of this interpretation using observations on the composition and condition of the material.

Results and discussion

Barrow 1

The material from the putative excarnation platform

The human remains from these contexts comprised 856 fragments weighing a total of 405.8g. Approximately 152 fragments (about 18% of the total) showed evidence for burning. Most burnt fragments were white in colour, but some blue, grey and, occasionally, black pieces were also present.

All the bone was intensely comminuted, even the small bones of the hands and feet rarely survived intact. Mean fragment size was about 12mm. Because of this, only 170 fragments (a total which includes 19 teeth) could be identified to skeletal element (20% of the total). All these were unburnt. Of these, 63 were from immature skeletons, 107 from adult individuals. A full list of identifications is given in Appendix 1.

Among the adult material there was no duplication of skeletal elements. However, differences in size and robusticity of skeletal parts suggested the presence of two individuals, a probable male and a probable female.

The juvenile material contained fragments of perinatal infant-sized remains as well as those of older children. Duplication of the body of the sphenoid indicates the presence of a minimum of two perinatal infants. Comparison of the state of growth and development of the sphenoid bodies with those for a large series of infants (from Mediaeval Wharram Percy) for which age could be accurately assessed from long-bone lengths, suggested that the sphenoid bones from Longstone Edge came from infants aged about 34 and 36 weeks in-utero. Full term gestation is about 38-41 weeks (Tanner, 1989), so both infants were somewhat pre-term. Among the remains

of the older juveniles, dental elements suggest the presence of at least three individuals. Their approximate ages at death, estimated using the dental development standards of Gustafson & Koch (1974), were 1-1.5 years, 4 years and 6-7 years. The minimum number of individuals for the unburnt bone is thus seven, two of which are adult. Little should be inferred from the observation that juveniles outnumber adults in the MNI estimates. In the absence of duplications of skeletal parts it is easier to identify the presence of different individuals in co-mingled juvenile remains due to differing degrees of growth and development of skeletal elements, whereas unless there are marked differences in size and robusticity, different adult individuals are difficult to distinguish. Consistent with this, despite the fact that in terms of MNI the adult: juvenile ratio is 2:5, adult fragments outnumber those from juveniles by about 2:1. If it is assumed that the cremated material comes from at least one other individual, then the overall MNI is eight. The cremated material was from an adult of unknown sex.

The ash weight of a human skeleton ranges from about 50-60g for a neonatal infant to 2kg or more for an adult (Trotter & Hixon, 1974). The total amount of bone (406g) is very small considering that there are bones from at least eight individuals. Despite the sparseness of the remains, most skeletal elements appear to be represented, at least for the adults (Appendix 1). The most frequently occurring parts are from crania, comprising 27% of total identified fragments. The small bones of the hands and feet are also well represented, at 23% of the total. The high proportion of these bones amongst the identified fragments likely reflects their ease of recognition: cranial fragments are highly distinctive, even when small, and even with the intense comminution which characterises the current remains, small bones of the hands and feet are generally sufficiently intact to permit identification. By contrast even quite large fragments of major long and flat bones are generally insufficiently distinctive to be identifiable to skeletal element.

In an attempt to evaluate the likelihood that these remains truly represent residues from the excarnation of corpses, as suggested by the excavator, a number of observations were made concerning the condition and composition of the assemblage.

Although the degree of post-depositional erosion of surfaces varies, in general the unburnt bone is well-preserved and erosion minimal. A few fragments showed root-etching. There was no sign of mosaic and longitudinal surface cracking and flaking of the type which has been described in animal bone exposed to sub-aerial weathering (Lyman, 1994), and which has been reported for Neolithic human remains (from Parc le Breos Cwm long cairn) where there was also other evidence interpreted as indicating excarnation (Whittle et al., 1998). The Longstone Edge assemblage contains fragments of very delicate elements, such as neonatal bones, there are many pieces of cancellous bone, and the teeth recovered have invariably survived intact. Thin, delicate perinatal bones and spongy bone tissue would rapidly be destroyed if left unburied, and teeth would tend to shatter due to the differential expansion of dentine and enamel (Lyman, 1994).

Corpses exposed on the surface to decay would be expected to have attracted carnivore attention. In the Parc-le-Breos Cwm assemblage, referred to above, carnivore gnawing was observed in about half the fragments recovered from most parts of the tomb (Whittle et al., 1998). By contrast, no Longstone Edge fragment

showed any evidence for carnivore gnawing, despite the generally good bone preservation which would be expected to have allowed the survival of such evidence had it existed. Only one fragment, from a femur of a perinatal infant, showed any gnawing, and this was clearly due to a small rodent (Fig. 1). Similar changes were also occasionally noted on some bone from redeposited contexts examined as part of the assessment procedure. The loosely packed nature of the barrow structure would likely have permitted small rodents access to buried bone, so the presence of rodent gnawing does nothing to support the idea that remains were exposed on the surface.

Although there are some fresh breaks, the post-mortem fractures in the material from the putative excarnation platform generally have patinated edges, indicating that they occurred in antiquity. Fractures in tubular bones are generally transverse and in general fracture edges are ragged. These observations, together with the degree of comminution, are consistent with breakage when the bones were 'dry' (i.e. when the organic component had decayed rendering them fragile) rather than soon after death when the bone was fresh (Villa & Mahieu, 1991). The in-situ Beaker period burials 75501 and 75502 show large numbers of post-depositional breaks, but here many are fresh breaks and bones are characteristically broken into several pieces rather than being comminuted into small fragments. In the degree of comminution, and the very high proportion of breaks which show patinated edges, the material from the excarnation platform resembles that from disturbed, redeposited contexts which were examined as part of the assessment phase.

The presence of the cremated material among the remains for the putative excarnation platform indicates that, in the absence of evidence for in-situ burning on the platform itself, this material must have redeposited from elsewhere, either deliberately by human action or by natural or inadvertant human disturbance long after deposition. Disturbed contexts at Longstone Edge likewise often contain a mixture of cremated and unburnt bone, and the presence of the Food Vessel cremation indicates that the barrow was used for the deposition of cremated remains long after the Neolithic period. Were the material from the 'excarnation platform' in fact to represent redeposited material then late prehistoric cremation burials would be plausible candidates for origin of the burnt bone.

Given the above it is of value to try and determine whether any of the unburnt bone from the 'excarnation platform' in fact represents redeposited material from disturbed inhumation burials. An obvious stategy would be to determine whether any fragments belonged to 75501 or 75502. Given the degree of comminution of the remains, it would be time-consuming, and probably unrewarding, to attempt to re-fit bone fragments. However, it was found that three of the teeth from 'excarnation platform' context 1057 fitted sockets in the jaws of burial 75502. This indicates that not all the unburnt material from the putative Neolithic excarnation platform is Neolithic in date and that some at least has been redeposited.

Whether the bulk of the material from contexts 1053, 1056, 1057 and 1082 represents residues from a Neolithic exposure platform cannot be resolved conclusively from the bones. However the most parsimonius explanation for the above observations is that it simply represents mixed, redeposited bone.

The burials from the rock-cut grave

Context 75501

Material: Skeleton about 50% complete, bone moderately preserved.

Sex: Female (pelvic and cranial indicators – Brothwell, 1981)

Age: Approx. 35-45 (dental wear - Brothwell, 1981).

Dental formula:

X	.	.	.	.	.	.	X	X	X	.	.	.	.	.	.
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
X	X	.	X	X	X	X	X	X	X	X	X	X	.	X	X
LEFT								RIGHT							

Key: . = tooth present in socket; X=tooth lost post-mortem from socket

Context 75502

Material: Skeleton 80% complete, bone well preserved

Sex: Male (pelvic and cranial indicators - Brothwell, 1981)

Age: Approx. 35-45 (dental wear – Brothwell, 1981)

Dental formula:

0	.	.	.	.	.	X	X	.	.	.	.	.	.	.	-
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
8	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
.	.	-	-	-	-	-	-	-	-	.	.	.	X	-	-
LEFT								RIGHT							

Key: . = tooth present in socket; X=tooth lost post-mortem from socket; 0 = tooth absent congenitally; - tooth and socket missing post-mortem
Includes three teeth from context 1057 (see above)

Stature: 175cm (Trotter & Gleser, 1952, 1958).

Notes: The arm bones are markedly asymmetrical, with the right side more robust. For example, the humerus epicondylar width is 66.1mm on the left side, 68.3mm on the right. In view of the rather commingled nature of the remains, it might be suggested that the left right differences might mean that the two sets of arm bones belong to different individuals. However, the degree of asymmetry observed does not

truly support this. In the human skeleton, the left and right arm bones generally show slight asymmetries with the right generally being the more robust, reflecting the predominance of right handers at the population level. In a large skeletal series (Wharram Percy) the mean unsigned side difference (i.e. abs(R-L)) in humerus epicondylar width is about 0.9mm, but about 6% of males show asymmetries which match or exceed that observed in the present case. Therefore the degree of asymmetry is not of itself sufficient to indicate that the left and right arm bones derive from two different individuals. On the contrary, it seems probable that they all derive from this individual: they certainly do not come from 75501, and there is no indication, in the form of duplication of skeletal elements, of the presence of a third individual in the rock-cut grave.

The mandibular canine shows dental enamel hypoplasia. This is a transverse line of depressed enamel indicating disturbance to crown development, normally due to disease or poor nutrition. The linear defect is located about 3.2mm from the cemento-enamel junction. This indicates that the episode causing formation of the hypoplasia occurred when this individual was about 5 years of age (Goodman & Song, 1999).

Two thoracic vertebrae show Schmorl's nodes. These are depressions in the vertebral bodies caused by herniation of material from within the intervertebral disc. They are generally due to minor injury to the spine during adolescence and early adulthood through excessive compression, such as may occur in heavy lifting (Schmorl & Junghanns, 1971: 158-168).

The cranium is notably asymmetrical, its length being greater on the right than the left side (Fig. 2). This is most marked for the frontal bone. Thus, for example, a chord measured between the the supra-orbital notch and a point on the coronal suture midway between the bregma and the pterion is 92mm on the right side but only 86mm on the left. Although the skull was fragmented, the pieces of the calvarium fit together well and give no indication of post-depositional distortion of the cranium. If it is accepted that this is an in-vivo condition, then it is probably due to deficiency of growth at the left side of the coronal suture due to premature synostosis here. Cranial distortion due to this cause is termed plagiocephaly (Aufderheide & Rodriguez-Martin, 1998: 53). In 75502, both sides of the coronal suture had closed by time of death, so it cannot be confirmed directly from examination of the suture whether the left side closed prematurely.

The cranial index of this individual was measured at 75.9. That there was a change in cranial form at the Neolithic - Bronze Age transition has been known since the 19th century, Bronze Age skulls having higher cranial index values than their Neolithic counterparts. Cranial index for Neolithic material averages about 71, for Bronze Age skulls it is about 78 (Mays, 1998: Table 4.2). Both Neolithic and Bronze Age crania are known with cranial index values resembling that for 75502. However, a male skull with an index value of 76 would be unusual for the Neolithic but fairly typical for the Bronze Age (Brodie, 1994: 59). For Derbyshire sites, Brodie's (1994) figures give a mean of 80.3 and a range of 74.1-87.9 for male Bronze Age crania (N=9) and he cites two male values for Neolithic Derbyshire material (67.7 and 74.7). The value for 75502 seems to fall nicely within the range reported for Derbyshire Bronze Age burials, however, in view of the asymmetry of the skull, possibly due to anomalous suture closure, its cranial index should be interpreted with caution.

The cremated bone associated with the Food Vessel

Context: 3030, burial 75504.

Material:

	Weight (g)	Mean Fragment size	Max. fragment size	Approx. fragment count
Skull	486.6	20	65	500
Post-cranial and unidentified	1980.6	12	60	3200
Total	2467.2			3700

Colours: generally white / light grey. Some endosteal surfaces are black, as are the interior parts of some skull and longbone fragments revealed at post-depositional breaks.

Minimum number of individuals: Duplication of left petrous temporal bone, nuchal crest area of occipital bone and right supra-orbital region indicates the presence of two individuals. All remains are adult.

Sex: Robusticity of skeletal elements indicates one clear male. The other individual is also probably male.

Age: Cranial suture closure (Perizonius, 1984) and the degree of wear evident on molar dentine fragments (Brothwell, 1981) suggests one individual over about 40 years and one younger than about 40 years. The older individual is the one more clearly identified as male.

Remarks: Colour of bone fragments may be used as an approximate guide to firing temperature. The predominance of white and light grey indicate exposure to temperatures in excess of about 650˚C (Mays, 1998: Table 11.1). Black colouration indicates lower temperatures, less than about 400-550˚C (ibid.). The observation that most external bone surfaces were white whereas some internal and endosteal parts were black, suggests either that the blaze was of insufficient duration for the full heat effectively to penetrate thoroughly the bone in some instances or, alternatively, that after shattering on the pyre early in the cremation process some fragments fell to cooler areas.

Cremation of an adult male corpse might be expected to yield 2-3kg of bone (Trotter & Hixon, 1974), so at 2.5kg for two individuals, the remains are only about half the total expected if all bone had been collected for burial and the deposit had suffered no post-depositional losses.

Barrow 2

Context 2058

Material: Skeleton <20% complete, fragments of skull and leg bones only. Bone moderately well preserved.

Sex: Unknown.

Age: 3 years (dental development (Gustafson & Koch, 1974)).

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Appendix 1: Counts of fragments of unburnt bone identified to skeletal element from the material from the putative excarnation platform, Barrow 1.

Adults	
Skeletal element	No. of fragments
Cranium	15
Mandible	3
Teeth	9 (R man PM2, R max C, R max I1 (all belong to burial 75502), R max I1, R man C, L man I2, R man I2, R man C, R man I2)
Cervical vertebrae	1
Thoracic vertebrae	7
Lumbar vertebrae	4
Sacrum	1
Sternum	-
Ribs	3L, 2R, 14U
Clavicle	1U
Scapula	1L, 1U
Humerus	1L, 2U
Radius	1L
Ulna	1R
Carpals	1L , 2R
Metacarpals	3R, 3U
Hand phalanges	1R, 10U

Innominate	1U
Femur	-
Patella	1L
Tibia	1L, 1U
Fibula	1U
Calcaneus	1R
Talus	-
Tarsals	1L, 1R
Metatarsals	1L, 4R, 1U
Foot phalanges	6U

Juveniles	
Skeletal element	No. of fragments
Cranium	31
Mandible	2
Teeth	10 (dec R mand M2, dec L mand M1, L mand M1, L mand M2 (all from one individual, 6-7 yr old), dec R I1 (1.5 yr old), dec R mand M2 (1.5 yr old), dec R mand I1, R max I2 (4 yr old), L mand M2 (6 yr old), dec R mand M2 (1 yr old))
Cervical vertebrae	2
Thoracic vertebrae	6
Lumbar vertebrae	-
Sacrum	1
Sternum	-
Ribs	1R, 3U
Clavicle	-
Scapula	-
Humerus	-
Radius	-
Ulna	-
Carpals	1U
Metacarpals	-
Hand phalanges	3
Innominate	1L
Femur	1U
Patella	
Tibia	
Fibula	1U
Calcaneus	
Talus	
Tarsals	
Metatarsals	
Foot phalanges	

Notes: L=left, R=right, U=unsided; for teeth, max=maxillary, mand=mandibular, I=incisor, C=canine, PM=premolar, M=molar