4 Early Prehistoric Activity: The Finds

4.1 Chipped stone *by Bill Finlayson*

An assemblage of 312 pieces of chipped stone was recovered during the excavation. These items were mostly recovered from Iron Age settlement features (see Section 3.1), although it has not been possible to identify the contexts of recovery in all cases. The assemblage was analysed using a modification of a system developed previously (Wickham-Jones 1990), refined in a number of studies by the author. Most of the diagnostic material appears to reflect Mesolithic activity, with some Late Neolithic/Early Bronze Age forms also present. However, the assemblage shows evidence for a wide range of techniques, suggesting that knapping from many periods may be represented. This allows for the possibility that at least some of the material is directly related to the Iron Age settlement (see Young & Humphrey 1999 for a recent review of the use of chipped stone tools in the Iron Age).

The raw materials employed comprise flint (159 pieces), chert (134 pieces), chalcedony (14 pieces), jasper (two pieces), agate (one piece), quartz (one piece) and a single piece of an unidentified material. This range is typical of assemblages from the eastern Borders (cf Mulholland 1970). Few pieces of less than 10mm were recovered. This apparent bias may be the result of recovery methods.

Primary reduction techniques include blade production from prepared blade cores and flake production from a variety of core types, including prepared platform cores, amorphous flake cores and bipolar cores. All stages of primary knapping are present, ranging from a pebble to core rejuvenation products, indicating that this activity occurred in the vicinity. The assemblage composition (Table 1) shows that although the material is dominated by flakes, a fairly high proportion (12.5%) of blades (defined as regular flakes, more than twice as long as wide, made by blade technique) are present. This ratio of blades to flakes is indicative of Mesolithic industries. The chunks (broken blocks, not formed by conchoidal fracture) are mostly chert, and simply reflect the tendency of the Southern Uplands chert to splinter along bedding planes.

An extremely mixed collection of retouched tools is present. As with primary technology, these were produced by a number of techniques. These range from the manufacture of microliths, involving microburin production, to bifacially invasive pressure flaked tools more typical of the Bronze Age. Fifteen of the retouched tools are microlithic. Possible resharpening flakes are also present. A full catalogue of chipped stone pieces, including detailed descriptions of the retouched items, forms part of the site archive.

Table 1 Composition of the chipped stone assemblage

Blades	40
Flakes, inner irregular	102
Flakes, inner regular	58
Flakes, secondary	74
Chunks	19
Cores	15
Bipolar pieces	3
Pebbles	1

It appears clear from the lithic material that the site of Dryburn Bridge occupies an area used as a Mesolithic camp. The microliths form 4.8% of the entire assemblage, which is an unusually high proportion, even for an entirely Mesolithic assemblage. It can be assumed that the large number of blades also mostly derive from this Mesolithic occupation.

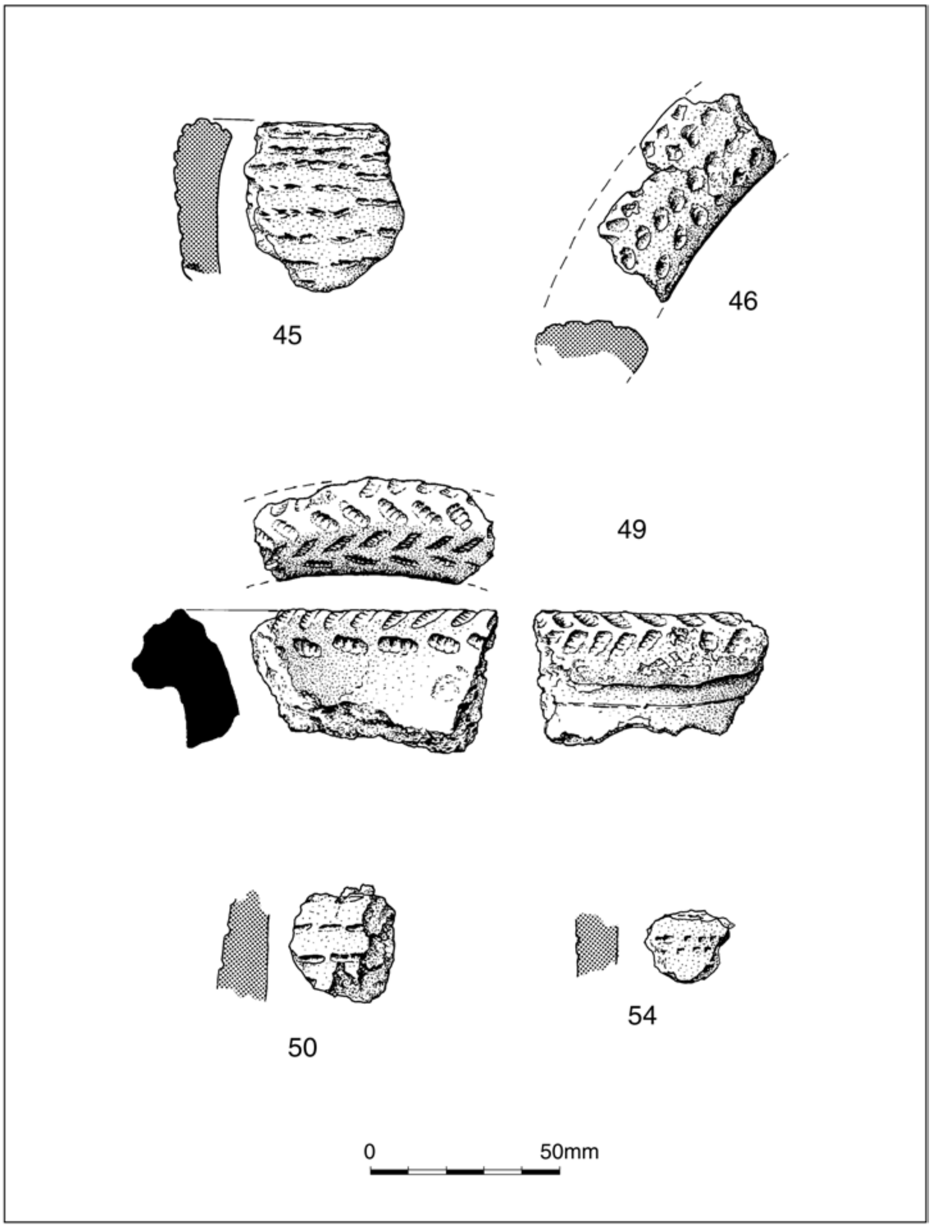
Two well-made retouched flint artefacts were associated with Burial 10 in Cist 2. They are a bilaterally retouched point made on a blade and an end scraper. Both artefacts are made on a similar good quality grey flint and the point, at 66mm long, is the largest retouched artefact in the assemblage.

Most of the other retouched artefacts are not chronologically diagnostic, although one, from the topsoil, with bifacial invasive retouch covering both faces, is probably Late Neolithic or Bronze Age. A small number of other bifacially retouched tools and fragments probably date to this phase. There is no worked material that could be confidently proposed as being of Iron Age origin.

The usage of raw materials suggests a move towards an increased use of flint in the post-Mesolithic phases. All the bifacially retouched tools are of flint, whereas seven of 15 microliths are made of chert. While this may simply reflect the technological requirements of bifacial working, it may also reflect access to more distant sources of different raw material, possibly through exchange.

4.2 Late Neolithic pottery (illus 9) *by Hilary Cool & Trevor Cowie*

Three pits produced sherds of decorated pottery comparable to Late Neolithic Impressed Ware (Cat nos 45, 46, 49, 50 and 54). Plain sherds from the same pits (Cat nos 47, 48, 51, 52, 53 and 55) are presumably from contemporary vessels. These decorated sherds display twisted cord and bird-bone impres-



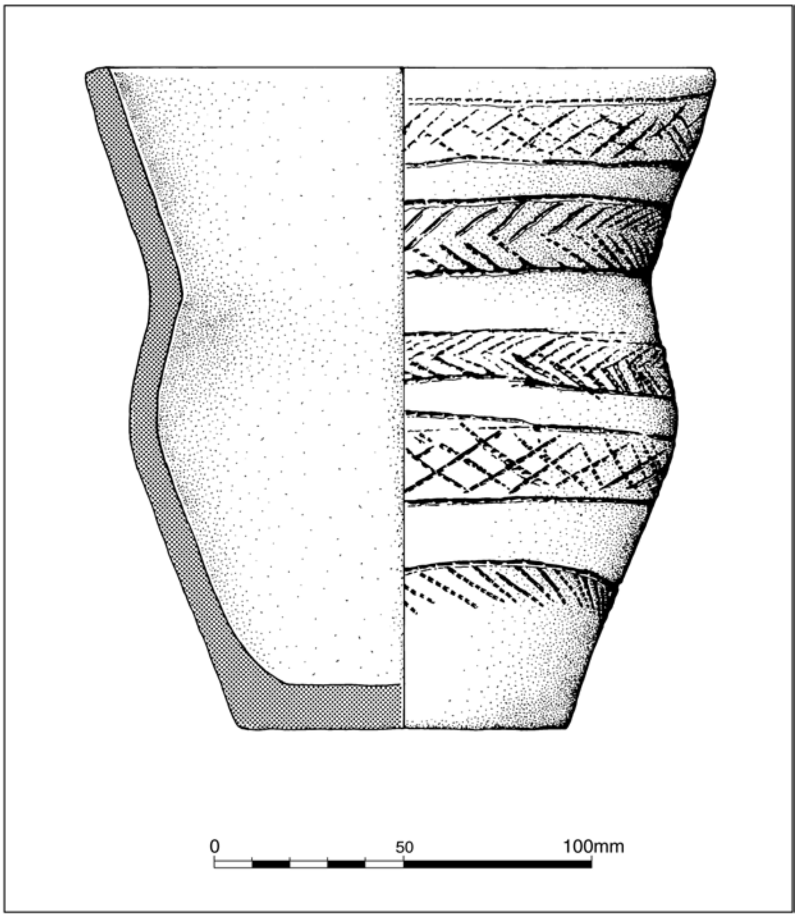
Illus 9 Late Neolithic Impressed Ware

sions and stab-marks characteristic of Impressed Ware (McInnes 1969). At the time of analysis (1982) this material could not be divided into various styles, as can the equivalent Peterborough wares of southern Britain. However, there have for some time been indications that eventually regional styles within the northern material may be isolated (Longworth 1967, 72; Burgess 1976, 173; cf Cowie 1993b, 125–6). These wares vary in the combination of decoration and form from site to site and too few sherds were recovered from Dryburn Bridge for an analysis to find the most commonly used decorative techniques, the most similar assemblage and so on to be meaningful. All that can be usefully achieved is to point out general parallels.

There are, for example, obvious similarities to the assemblage from Hedderwick, East Lothian (Callander 1929, 67–72) where twisted cord impressions in lines, 'maggots' and bird-bone impressions occur. Cat no 46 may come from a bowl similar to several that were found at Brackmont Mill, Fife (Longworth 1967, fig 5.14 and 15). Cat no 49 has similarities to a vessel from Meldon Bridge, Peeblesshire (Burgess 1976, fig 9.7, top; see also Johnson 1999) which shares the narrow neck and herringbone pattern of impressed cord around the rim. Cat no 51 should be noted as it is an unusual fragment and may be from a lug.

Catalogue of illustrated sherds

45 1 flat-topped rim sherd tempered with angular white and grey grits (up to 8mm in length). Fabric fired buff/



Illus 10 Beaker from above Cist 2

brown on rim top and interior surface, dark grey in core and on exterior surface. Top of rim decorated by three diagonal twisted cord impressions; exterior decorated by seven rows of elongate stab marks. Context: Pit EDP.
46 3 rim sherds with outer surface only (1 illustrated). Rim has internal bevel and shape of wall suggests sherd came from a bowl. Tempered with angular grey grits (up to 10mm in length). Fabric fired buff/red/orange. Exterior surface decorated by four rows of deep kidney-shaped, probably bird-bone, impressions. Context: Pit EDP.
49 1 rim sherd, rim out-turned with straight diagonal bevel and straight neck, clay beneath out-turn messily smoothed. Tempered with grey and black and white crystalline grits (up to 4mm in length). Fabric fired dark grey in core and interior, brown/pink on exterior surface. Rim decorated by five rows of diagonal twisted-cord 'maggots' arranged in a herring bone pattern – one row on inside of rim, two rows on bevel and two rows on curve of bevel. Deep groove on neck body junction. Context: Pit EDQ.
50 1 body sherd tempered with dark angular grits (up to 8mm in length). Fabric fired dark grey with brown, cracked interior surface. Exterior decorated by two rows of elongate stab marks. Context: Pit EDQ.
54 1 body sherd tempered with angular grey and black and white crystalline grits (up to 6mm in length). Fabric fired dark grey. Exterior decorated by two rows of small triangular impressions. Context: Pit MAA.

4.3 Beaker vessel (illus 10; illus 11; illus 12; illus 13) *by Alison Sheridan*

This vessel was found lying on its side, resting on the slabs above the cist at the southern edge of the pit for Cist 2. The weight of the pit backfill had distorted the pot so that most of the body had been flattened into an oval shape, measuring 195 × 130mm at its rim (illus 11); its current height of *c* 185mm may therefore be slightly different from its original height. Although thus warped and cracked, the pot is essentially intact, with only a few fragments missing.

The pot has a gently squared-off rim, slightly flaring neck around 60mm in height, slightly bulbous upper belly, and flat base (whose interior is also flat). The pot's profile varies considerably thanks to its distortion: viewed narrow side on (as in illus 12), it appears fairly slender, whereas if viewed broad side on (as in illus 13), the belly appears plumper. The base diameter is 91–2mm and the wall thickness at the neck is *c* 8.5mm. The fabric of the pot is fairly fine, and although it contains fairly numerous angular and sub-angular grits of black and speckled white-black stone (up to 12 × 7mm in size), the surfaces had been carefully smoothed, so relatively few protrude. The exterior and interior surfaces had been slipped prior

Illus 11 Reconstructed Beaker; overhead view

to the pot's decoration. Decoration consists of impressions of rectangular-toothed combs, arranged in zones. On the neck are two bands, the upper one consisting of a criss-cross design, the lower of horizontal running chevrons; each is framed top and bottom by a continuous horizontal line. This scheme is repeated in reverse on the upper belly, and below that there is a horizontal line with diagonal impressions below it. Three combs may have been used to create this decoration, with lengths of around 20, 30 and 50mm, respectively; each comb was 1–1.5mm wide.

The outside of the pot is a mottled reddish-brown-buff-mid brown colour; the reddish-brown extends through the wall and into the interior, indicating that the pot had been fired for long enough to burn out any organic material in the clay. There were no obvious traces of encrusted organic residues on the interior (cf Bohncke's negative results from pollen analysis, Section 3.3.2), although there is a small patch of very thin, blackish material on the outside of the neck. Whether this relates to the pot's former contents (if any) is uncertain.

The Beaker finds its closest parallels in terms of shape and decorative scheme among those vessels classified by Clarke as 'Developed Northern' (N2) and 'Developed Northern (long-necked)' (N2(L); Clarke 1970) and by Lanting & van der Waals as 'step 5' (Lanting & van der Waals 1972), in their scheme for north-east England and south-east Scotland. The Beakers found elsewhere in East Lothian are not generally very similar to the Dryburn Bridge pot, the least dissimilar example being an N2(L) Beaker from Nunraw (Clarke 1970, fig 558), which includes zones of horizontal running chevron comb impressions.

In terms of dating, the Beaker's position with respect to the cist makes it hard to tell whether it had originally belonged with the disarticulated body (Burial 11) or with the articulated body (Burial 10). However, given that these two bodies are chronologically indistinguishable in radiocarbon terms (Section

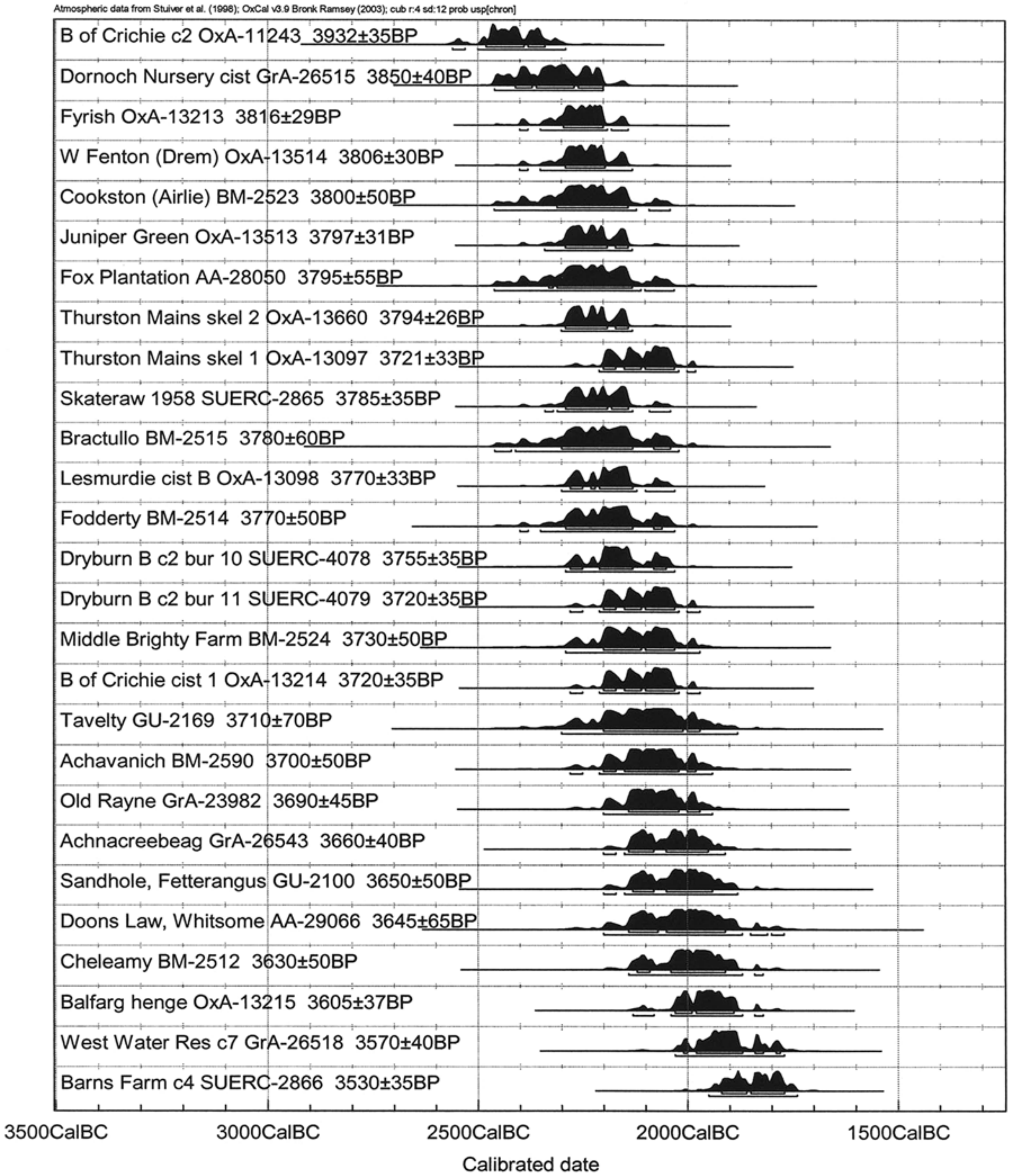
Illus 12 Reconstructed Beaker; 'narrow side' view

5), this uncertainty of association is irrelevant. When viewed within the overall range of reliable dates for Scottish Beakers (illus 14), both dates for Cist 2 fall comfortably within the overall range for Beaker currency in Scotland. This extends from 2500/2400 BC to *c* 1800 BC, with most examples falling within the range 2300–1950 BC (which coincides with the overall Dryburn Bridge Cist 2 date range of 2290–1970 cal BC at 2-sigma). The other dated Beakers of Clarke's N2 and N2(L) types (from Cists 1 and 2, Broomend of Crichie and Tavelty, Aberdeenshire) are not especially similar to the Dryburn Bridge example, and of these the Broomend of Crichie Cist 2 examples are associated with a date of 3932±35 BP (OxA-11243) that is markedly, and inexplicably, earlier than other Scottish Beaker dates.

As noted elsewhere in this report, the position of the Beaker above the cist is very unusual, and the significance of this placement is hard to ascertain. It appears to have been deposited immediately before the cist pit was backfilled, and on top of the slabs that have been interpreted as evidence for paving, a pit lining or a two-tier structure (Section 6.2). That it had probably been deposited upright, and had tipped over by the weight of the backfill, is suggested by the gravel found inside it.

Illus 13 Reconstructed Beaker; 'broad side' view

Other examples where Beakers (or parts thereof) have been found above graves do not provide an exact parallel for the practice here. At Chapelden, Aberdeenshire, fragments of an incomplete second Beaker were placed on the capstone of a cist containing a complete Beaker (Greig *et al* 1989). Here the practice was interpreted in terms of an act of mourning, perhaps the smashing of a pot to make a libation over the closed cist, or depositing fragments of a pot used by the mourners to drink to the deceased. Other examples of mourning practices were cited by the authors: patches of burning on top of two Beaker cists in the cemetery at Borrowstone, Aberdeenshire, and the deliberate breakage of jet pendants at Barns Farm, Fife (Greig *et al* 1989, 78). On Biggar Common, a Beaker smashed into nearly 200 sherds was found at various locations in and over a grave containing a handled Beaker: on the floor of the burial pit, within the cairn covering it, and on top of the cairn (Sheridan 1997, 211, 213–5). Here, once more, the pot's deliberate breakage and deposition during the course of the burial was regarded as part of the mourning rituals. At Dryburn Bridge, however, the Beaker was deposited intact, as if it should have been inside the



Illus 14 Radiocarbon dates for Scottish Beakers (courtesy of Alison Sheridan)

cist accompanying the deceased on their journey to the afterlife. The uncertainty over whether it had originally been intended as a grave good for Burial 10 or Burial 11 (or indeed as a votive offering for both) makes definitive interpretation impossible.

4.4 Human remains from the cists *by Julie Roberts*

4.4.1 Introduction

The skeletons recovered from the cists were originally analysed *c* 1980 (Harman, typescript in project archive deposited with National Monuments Record for Scotland). Burials 4, 10 and 11 were dated by radiocarbon methods in 1979/80, a process that involved the destruction of substantial quantities of bone (by comparison to the much smaller sample sizes now required). This was particularly unfortunate in the case of Burial 11 where the dated elements (both tibiae) might have helped to confirm the diagnosis of leprosy (see Section 4.4.7). In re-sampling the remains for fresh dating (Section 5) an attempt was made to take the minimum amount of bone necessary for the dating to be successful. Methodologies used in the analysis of the skeletal remains are recorded in Appendix I.

4.4.2 Preservation

In general terms the cist burials were in a far better state of preservation than the Iron Age pit burials (Section 9.2). The former had been protected from taphonomic agents, such as fluctuating water levels and mechanical disturbance (animal or human), by the stone slabs of the cist. They had not been physically disturbed by Iron Age, or later, activity until the time of the 1978 excavations. An assessment of the state of preservation of each skeleton was made, based on the percentage of the skeleton surviving, the amount of fragmentation present and the degree of surface erosion to the bones.

The two disarticulated skeletons (Burials 4 and 11) were in a fair condition (40–70% complete) and the two articulated skeletons (Burials 5 and 10) were in a good state of preservation (over 70% complete). If it is assumed that only one burial event took place within each cist, an explanation for the differential states of preservation and articulation of the burials within the cists might relate to the condition of the bodies when they were actually placed within them. If the occupants of the cist had not died at the same time it would have been necessary to store the body of the individual who had died first, perhaps above the ground or in another temporary grave, until such a time that they could be buried with their 'partner'. Excarnation prior to burial would certainly have speeded up the decomposition process and could also have caused the skeleton to become disarticulated (cf Carr & Knüsel 1997). The same could have resulted from temporary burial and subsequent exhumation. Either of these practices might account for the under-representation of the hand and foot bones in Burials 4 and 11.

4.4.3 Age at death and sex

Table 2 summarizes information on age at death and sex of the four individuals interred in the two cists. Despite using multiple methods (including dental attrition) wherever possible, in almost all cases the ages at death estimated using methods developed since the time of Harman's original report corresponded closely with those proposed initially by Harman, based on dental attrition alone.

Table 2 Summary of ages at death and sex of burials from cists

Burial no	Age at death (years)	Sex
4	35–45	Male
5	30–35	Male
10	45–60	Male
11	6–8	Unknown

4.4.4 Cranial metric data

Table 3 shows all the cranial measurements taken on each adult skeleton. Unfortunately, although most of the cranium of Burial 5 was present, it was fragmented and had been glued back together in such a way that any measurements taken would have been inaccurate.

Table 3 Cranial measurements of the adult skeletons from the cists. –, measurement not possible; /, L/R

Measurements (mm)	Burial no		
	4	5	10
Maximum cranial length	195	–	180
Maximum cranial breadth	151	–	154
Bi-zygomatic diameter	145	–	140
Basion-bregma height	150	–	153
Upper facial height	70.5	–	68
Minimum frontal breadth	103	–	98
Upper facial breadth	110	–	106
Nasal height	53	–	48
Nasal breadth	26	–	24
Orbital breadth	42/44	–	43/42
Orbital height	31/30	–	33/33
Inter-orbital breadth	15.8	–	15
Foramen magnum length	39	–	34
Foramen magnum breadth	28.8	30	30
Mastoid length	34/36	35	35/36
Chin height	37	32	30
Mandibular length	105	98	91
Bi-gonial breadth	–	109	105
Bi-condylar breadth	–	–	129
Maxillo-alveolar breadth	62	–	53
Maxillo-alveolar length	52	–	48

It was possible to calculate the cranial index, upper facial index, nasal and orbital index of Burials 4 and 10. Burial 4 had a mesocranic/medium-shaped head, while Burial 10 had a brachycranic/broad-shaped head (values of 77.4 and 85.5, respectively). Both individuals had wide faces, average nasal apertures and wide orbits (values being 48.6 in both individuals for upper facial index, 49 and 50 for nasal indices and 73 and 76 for orbital indices). The metric data actually belied the appearance of Burial 10 who had distinctive facial features that gave the impression of being narrow. This was perhaps due to the fact that he had a prominent overbite and large hooked nasal bones. It was his comparatively short jaw that caused the prognathism (overbite), rather than any abnormalities of the maxilla.

4.4.5 *Post-cranial metric data*

Table 4 Post-cranial metric data for the skeletons from the cists

Measurements	Burial no 4	5	10	11
Clavicle length	–/–	–/154	–/–	–/–
Glenoid length	–/38	–/40	37/37	–
Glenoid breadth	–/30	–/30	28/29	–
Humerus head diameter	47/46	–/46	–/50*	NA
Humerus epicondylar width	–/60	–	–/64	NA
Humerus length	–/321	–	–/315	–/200
Radial head diameter	21/23	–	–	NA
Radius length	253/255	–	–	–/146
Ulna length	–/280*	–	–	–/–
Femoral head diameter	–/47	50/–		NA
Femur A–P diameter	–/28	25/–	25/–	NA
Femur M–L diameter	–/36	35/–	37/–	NA
Platymeric index	79	71/–	67/–	NA
Femur length	–/446	–/–	446/–	–/–
Femur bicondylar	–/–	–/–	–/–	NA
Tibia A–P diameter	38/39	36/36	–/–	NA
Tibia M–L diameter	24/24	20/21	–/–	NA
Platycnemic index	63/61	56/58	–	NA
Tibia length	369/–	383/–	–/–	–/–
Fibula length	–/–	–/–	–/–	–/–

From the data in Table 4 it was possible to calculate the statures and examine the upper femoral shape of the three males from the cists, and the upper tibial shape of two of the males. The three males measured 168±3.27cm/5′5″ (Burial 10), 171±3.37cm/5′6″ (Burial 4), and 175±3.37cm/5′7″ (Burial 5) in height. This gave a mean value of 171.3cm, which was comparable to the average height of a British male in the Neolithic (see Table 5; also see Roberts & Manchester 1997). It is likely that the men buried at Dryburn Bridge had been sufficiently well nourished to achieve their full growth potential, and these findings are consistent with the virtual absence of stress indicators and nutritional disorders.

Table 5 Average British male height through time

Time period	Height (cm)
Neolithic	171.8
Bronze Age	176.4
Iron Age	167.8
Anglo-Saxon	173.2
Medieval	171.8
British 1979	175

The long bone lengths of the child (Burial 11) indicated that (s)he was within the correct height range for their age, as they were consistent with the dental development age. In a sickly or malnourished child this is often not the case as although dental development is well buffered against environmental influences, the growth of the rest of the skeleton (with the exception of the clavicles) can be affected. This implies that the child was adequately nourished and reasonably healthy during their short lifetime, although this contradicts the pathological findings.

It was possible to calculate the platymeric index of the three adult males, using the right femur in one case and the left in the other two. All of the femora were platymeric (flattened from front to back in the region of the proximal shaft). Values ranged from 67 to 79, with the mean being 73. These findings are consistent with other pre-modern populations where the predominant femoral shape is platymeric (Roberts 1999).

It was possible to calculate five cnemic indices relating to the tibiae of two males (Burials 4 and 5). Values ranged from 56 to 63. Burial 5 had platycnemic tibiae that were flattened from side to side, and the other male had one platycnemic and one mesocnemic (moderately rounded) tibia. The mesocnemic tibia was the left and it only just fell within that range, so that the difference was barely discernible.

The causes of platymeria and platycnemia are uncertain. The former relates to the degree of anterior–posterior (front to back) flattening of the femoral shaft, and the latter to the degree of medio–lateral (side to side) flattening of the tibial shaft. The extent of flattening is thought to be related to physical activity (Brock & Ruff 1988). The shape and robusticity of the leg bones are thought most likely to be related to biomechanical factors, activity and terrain (Jackes *et al* 1997, 649). Flattening of the femora is suggested to be related to greater mechanical stresses on the bone and may be related to a more rugged terrain or more strenuous work.

4.4.6 *Non-metric data*

Tables illustrating the frequency rates of all the cranial and post-cranial non-metric traits recorded can be found in the project archive (Roberts 2002). When interpreting the results, the very small sample size must be taken into account.

Common cranial traits in this group included parietal foramina, open foramen spinosum and foramen of Huschke.

Burial 4 had some unusual features of the cranium. A raised area running from the bregma along the anterior half of the sagittal suture gave the appearance of a small sagittal crest, and there was also a slight bulge along the line of the metopic suture, which had fused and was no longer visible. A slight occipital bun was also present. These anomalies all relate to the fusion of the cranial sutures and may be an indication that this had occurred slightly prematurely.

Few post-cranial traits were observed. Those that occurred most frequently were right and left lateral tibial squatting facets and right and left double anterior calcaneal facets. All three adults had one or both traits. Both traits may be related to habitual activity. It has been suggested that an habitual squatting posture, such as that adopted by various populations in India, can cause squatting facets on the tibia, but they have also been seen in fetuses of both Indian and European origin (Kennedy 1989).

Pronounced muscle insertion points on the bone can sometimes indicate heavy or repeated usage of a particular muscle. Burial 5 had a well-developed insertion point for the right deltoid muscle and a large indentation (with lipping around the edges) at the insertion site for the costo-clavicular ligament on the right clavicle. These muscles relate to the shoulder girdle and upper arm, and are involved such activities as lifting, pushing and pulling. Unfortunately, the left humerus was not available for comparison, but there was no such anomaly/feature on the left clavicle, suggesting that the repeated activity might have been unilateral. The same individual also had a pronounced indentation at the insertion point for gastrocnemius, a muscle used extensively in walking. The right femur was not present for comparison.

The left femur of Burial 10 had a lateral flange, widening and flattening of the lateral aspect of the proximal shaft, and both patellae were elongated laterally. Both of these regions are insertion points for the quadriceps muscle vastus lateralis, which is a powerful extensor of the knee.

4.4.7 Health and disease

Dental disease The preservation of the dentition was generally good. Even in cases where the roots and pulp of the crown had degraded leaving only the outer enamel shell it was still possible to examine the teeth for oral pathologies such as caries and dental enamel hypoplasia. A total number of 98 teeth were present from the individuals buried in the cists.

Four carious lesions were identified, giving an overall prevalence rate of 4%. This is comparable to that of 4.2% observed in European Neolithic populations (Roberts & Manchester 1997). All affected teeth belonged to the oldest male, Burial 10, who also suffered from a total of six dental abscesses. All of the affected teeth were mandibular molars and all of the lesions observed were large and deep. The abscesses and the caries together would have caused him a considerable amount of pain. A small periapical abscess was observed in Burial 4.

Only one individual, the unfortunate Burial 10, suffered from ante-mortem tooth loss (AMTL), having lost seven teeth prior to death. AMTL generally occurs as a result of periodontal disease, a term used to describe the inflammatory changes that can occur in the soft tissues and bone around a tooth in response to plaque. As the disease progresses, resorption of the alveolar bone of the maxilla and mandible may occur and if the periodontal ligament becomes affected then the result can be the loss of the tooth.

It was difficult to assess the amount of dental calculus (mineralized plaque) present on the teeth because many were loose and broken off at the cervix. Some of the teeth also had the appearance, evident by slight discolouration, of calculus once having been present but subsequently having flaked off either during excavation, cleaning or simply while being handled. Where calculus was observed, it was generally slight (categorization after Brothwell 1981).

No dental enamel hypoplasia was observed. Dental enamel hypoplasia is the name given to the defects, linear grooves and pits, which appear in the enamel of the teeth representing a cessation in amelogenesis (growth and development of the tooth). These defects are considered to be indicators of various types of physiological and even psychological stress. The absence of the condition amongst the individuals from Dryburn Bridge is further evidence that they were well nourished and healthy during childhood.

Traumatic injury Two individuals showed evidence of traumatic injury. Burial 4 had a well-healed fracture of the right ulna. The bone was well aligned but there was still a considerable amount of callus evident. The position of the fracture, in the lower third of the midshaft, might indicate that it was sustained while warding off a blow, although it was located more distally than the midshaft ‘parry fracture’ typically associated with this action. The individual had also suffered a compression fracture of the 10th thoracic vertebra and there were secondary degenerative changes associated with that in the same vertebra and also in the 11th and 12th thoracic vertebrae. This type of injury is normally associated with a vertical compression force transmitted directly along the line of the vertebral bodies while the spine is flexed, for example during a heavy fall on the feet or buttocks (Crawford-Adams 1987). In this instance the damage was restricted to the anterior portion of the vertebra, and the posterior ligaments would probably have remained intact. As a result the fracture would have been held in a stable position and there would have been little chance of complications involving the spinal cord.

Burial 10 also had similar types of vertebral fractures in the 12th thoracic and 2nd lumbar vertebrae (the first lumbar vertebra was missing). The actual fractures were less obvious in this instance and the bodies of vertebrae were compressed on the right side. Burial 10 was the older male and it is possible that these fractures were age-related. Again there were secondary arthritic changes in the vertebrae, most noticeably in the 12th thoracic. In addition to the vertebral fractures, this individual also had a well-healed fracture of a left middle rib and a healed fracture of the nasal septum, which had caused it to deviate slightly. This type of injury would have been caused by a blow to the nose, which may, or may not, have been the result of interpersonal violence.

Degenerative joint disease The most frequently identified disease found in any archaeological population is osteoarthritis, which, together with osteophytosis, is often termed degenerative joint disease. The aetiology of the disease is multifactoral, the most common causes being age and repeated stress. It may be primary or secondary, occurring subsequent to traumatic injury when the stresses on a joint have been realigned, or when the actual joint surface has been damaged. In the osteoarchaeological record certain joints do appear to be more susceptible than others, most notably the spine, elbow, shoulder and knee, although the prevalence rates vary between populations (Ortner & Putschar 1981; Larsen 1984). The system used to categorize the severity of the disease observed in the Dryburn Bridge burials was a modified version of that devised by Jurmain, adapted by King in her analysis of a group of medieval skeletons from the Isle of May (Jurmain 1990; King 1994). Schmorl's nodes were not included in the figures for prevalence rates of spinal degenerative joint disease, and are discussed separately below.

Severe degenerative changes were observed in only one individual, the 45- to 60-year-old male, Burial 10. The right acromio-clavicular and sterno-clavicular joints showed evidence of severe porosity, moderate to severe osteophytes and flattening of the joint surfaces. There was also moderate degenerative disease of the right head of humerus and slight changes in the right glenoid fossa. These joints all relate to the right shoulder, and the condition was most likely related to repeated wear and tear on this joint over the years. The same changes were not evident in the left shoulder joint, although the left proximal humerus was not available for examination. This unilateral degenerative joint disease suggests that it was related to a specific right-handed activity that involved repeated movement of the shoulder. Moderate degenerative changes were also identified at the distal ends of the right radius and ulna (the wrist), but there were only slight changes in the carpals and metacarpals of the right hand.

Burial 10 also suffered from spinal joint disease, with all of the 23 vertebrae present being affected. The condition was slight in the upper cervical region, becoming more severe in the region of C6 to T1. Severe changes were also observed in the lower thoracic and lower lumbar regions.

Burial 4 also suffered from moderate degenerative joint disease of the spine, most of the changes being related to the traumatic injury described above.

Prevalence rates of spinal degenerative joint disease in this small group were as follows: seven out of 12 cervical vertebrae (58%), 15 out of 28 thoracic vertebrae (54%) and four out of five lumbar vertebrae (80%).

Other spinal pathology Burial 5 suffered from changes to the spine characterized by Schmorl's nodes only. Schmorl's nodes are thought to represent herniations of the contents of the inter-vertebral discs onto the superior and inferior surfaces of the vertebral body. They tend to occur in older juveniles and young adults in whom the discs are still turgid. Often they are the result of a compression force, which might be sustained during heavy lifting or in a fall onto the feet, and they may accompany actual compression fractures. They have also been associated with repeated flexion and lateral bending and may have an underlying congenital cause (Kennedy 1989). Further research into the lesions, which may alter the above interpretation, is currently being undertaken (McNaught, pers comm).

Infectious disease Burial 11 displayed abnormalities of the facial bones that were characteristic of leprosy (illus 15; illus 16). These changes comprised resorption of the nasal spine and the region around and above the central incisors, remodelling of the bone and widening of the nasal aperture and slight pitting of the palatal surface. There was evidence of slight new bone growth on the inner surfaces of the nasal bones, and when the face was looked at in profile it had a dished appearance around the nose and mouth area. The central incisors themselves had been lost post-mortem.

The changes described and observed above are typical of rhino-maxillary syndrome, which is in itself pathognomic of leprosy (Manchester 1989; Aufderheide & Rodriguez-Martin 1998; C Roberts & M Lewis, pers comm). In order to make a definite diagnosis of leprosy, some researchers state that characteristic lesions should also be present in the hands, feet and tibiae (D Brothwell, pers comm), although it has been noted that changes in these areas are often very slight and sometimes even absent in juveniles (M Lewis, pers comm). Unfortunately, in this instance, it was not possible to examine other potentially affected regions, as the hands and feet were missing at the time of excavation and both tibiae had been sent previously for radiocarbon dating. The early date of the skeleton also casts doubt on a diagnosis of leprosy. Current perception of the disease is that it was introduced into Europe in the fourth century BC by the armies of Alexander the Great, returning from their campaigns in India. The earliest known example to date in Britain is from the Roman period, although the disease did not become widespread until the 11th century (Roberts & Manchester 1997).

DNA analysis of portions of the skull in order to attempt to identify the potential leprosy invasion was considered to be the only method available to confirm the morphological changes (Roberts *et*

Illus 15 Burial 11; widening and remodelling of nasal aperture; and resorption of the alveolar process of the maxilla

Illus 16 Burial 11; rhino-maxillary changes in profile

al 2004). It was thought that DNA analysis had a reasonable chance of success, as the pathogen is distinctly non-human and therefore not prone to contamination to the same degree as human DNA. Scrapings of bone were taken from the nasal and palatal areas by two independent researchers, Dr Will Goodwin (University of Central Lancashire) and Dr Michael Taylor (Imperial College London). No evidence of *Mycobacterium leprae* DNA was detected, indicating either that the child had not been infected with leprosy, or that any *M. leprae* DNA which had been present had degraded to the point where it was no longer traceable. One of the researchers, Dr Taylor, noted the presence of *M. tuberculosis*, although the results were not repeatable owing to a lack of further sample material. The skeletal changes observed in Burial 11 were not typical of tuberculosis, but the facial bones can become involved in rare cases as a result of secondary infection from longstanding tuberculosis of the facial skin and soft tissues. Destruction of the nasal bones can occur, as in leprosy (Ortner & Putschar 1981, 164).

No evidence of infection was identified on the older male buried with the child.

With the exception of the above, only one possible example of a superficial infection was identified. Evidence of periostitis, inflammation of the periosteum surrounding the bone, was observed on the left tibia of Burial 4. Scanty patches of striated lamellar bone were located on the medial aspect of the proximal shaft. This type of remodelled bone indicates an inflammation that had subsided and was no longer active at the time of death. The cause of the inflammation may have been a superficial infection, or even simply direct trauma, perhaps transmitted from the type of soft tissue injury that is common in the lower leg, for example kicks or bangs to the shins. There was no evidence to suggest that it was associated with a more serious widespread specific infection.

Metabolic disorder The skeletons were remarkably free from stress indicators such as dental enamel hypoplasia, and iron deficiency anaemia (Larsen 1984; Stuart Macadam 1992; Grauer 1993). The one possible exception to this was Burial 5 who displayed some of the characteristics associated with porotic hyperostosis. Porotic hyperostosis is one of the skeletal manifestations of iron deficiency anaemia, whereby the skull becomes thickened and the outer surface pitted. There are many causes of iron deficiency anaemia, amongst the most common being lack of absorbable iron in the diet and a high pathogen load within the body (Stuart Macadam 1992). The changes observed in Burial 5 were, however, not very convincing, with porosity being the only feature evident. Although this was fairly widespread, affecting the posterior part of the frontal bones, the medial parts of the left and right parietal bones and all of the occipital except for the most lateral part, it was not particularly severe and neither was there any thickening of the cranium.

4.4.8 Burial catalogue

Skeleton number: 4
Preservation: Fair. 60% complete. Minimal surface erosion. Cranium intact.
Elements present: Cranial: intact cranium with exception of fragmented ethmoid.
Dentition: All maxillary dentition except left central incisor and 2nd premolar, lost post-mortem (pm). All mandibular dentition except right central incisor and canine and left lateral incisor, lost pm.
Post-cranial: Right scapula and clavicle, left and right humerus radius and ulna, left ilium and pubis, right femur and patella, left and right tibia, fibula, min no six left and five right ribs, 5th metacarpal, left talus, one hand phalanx, six thoracic, one lumbar and three sacral vertebrae.
Age at death: 35–45 years
Sex: Male
Stature: 171.6±3.37cm (5′6″).
Pathology: Dental disease, healed fracture of the right ulna, healed compression fracture of T10, degenerative joint disease of the spine, mild porotic hyperostosis, slight periostitis left tibia.
Non-metric traits: Bilateral parietal foramen, left ossicle at parietal notch, bilateral mastoid foramen extrasutural (and accessory foramen), posterior condylar canal open, open foramen spinosum, accessory palatine foramen, absent zygomatico-facial foramen, accessory supra-orbital foramen, and occipital bun. Right Allen's fossa, bilateral lateral tibial squatting facets.
Additional information: Left femur previously sent for C14 dating (Lab Code GU-1406).

Skeleton number: 5
Preservation: Good, although some fragmentation and cranium glued back together. 90% complete. Minimal surface erosion.
Elements present: Cranial: left and right mandible, frontal, parietal, occipital, temporal, sphenoid, and zygomatic bones. Fragment of right maxilla, incomplete ethmoid, vomer.
Dentition: All maxillary and mandibular dentition in very good condition.
Post-cranial: All postcranial elements present except the right femur, right patella, left lunate, pisiform, scaphoid, trapezoid and hamate, right lunate, triquetrum, pisiform, trapezoid, capitate, two cervical, two thoracic and all lumbar vertebrae.
Age at death: 30–40 years (closer to 30 than 35–40).
Sex: Male.
Stature: 175±3.37cm (5′7.5″).
Pathology: Schmorl's nodes.
Non-metric traits: Left parietal foramen, bilateral foramen of Huschke, precondylar tubercle, left double anterior condylar canal, left bridging of supra-orbital notch. Bilateral lateral tibial squatting facet, acetabular crease, left acromial articular facet, bilateral double anterior calcaneal facet. Small mandibular tori, larger on right.
Additional information: Well developed insertion for right deltoid (left incomplete). Also enthesopathy/large indentation at insertion for right costo-clavicular ligament, not present on left. Pronounced indentation for gastrocnemius left distal femur.

Skeleton number: 10
Preservation: Good. >75% complete. Cranium intact except for defect in right parietal. Minimal surface erosion.
Elements present: Cranial: all elements present.
Dentition: right maxillary lateral incisor, canine and 1st molar, central incisor and both premolars lost pm, 2nd and 3rd molars lost am. Left maxillary canine and 1st premolar, incisors lost pm, 2nd premolar and all molars lost am. All right mandibular teeth present, but crown of canine broken off and root has polished appearance. All left mandibular teeth present except for 2nd molar. Canine as on right side.
Post-cranial: all elements present except sternum, left pubis, left scaphoid, lunate and pisiform, left 4th and 5th metacarpals, right pisiform, trapezoid and 1st metacarpal. Left talus, cuboid, navicular, all cuneiforms and 4th and 5th metatarsals. L1 and S5.
Age at death: 45–60 years.
Sex: Male.
Stature: 168±3.27cm (5′5″).
Pathology: Degenerative joint disease, spinal joint disease, healed fracture of rib, fractured nasal septum?, dental disease – caries and abscesses.
Non-metric traits: Ossicle at lambda, right ossicles in lambdoid, bilateral parietal foramen, foramen of Huschke, mastoid foramen absent, right double anterior condylar canal, bilateral open foramen spinosum, maxillary foramen, accessory supra-orbital foramen. Right acromial articular facet, double anterior calcaneal facet, C7 transverse foramen bipartite.
Additional information: Right femur previously sent for C14 dating (GU-1408). Ossified thyroid and cricoid cartilage. Lateral flange and noticeable flattening of proximal shaft of femur. Slender although muscle insertions rugged.

Skeleton number: 11
Preservation: Cranial good, post-cranial fair. 40% complete. Minimal surface erosion to cranium, moderate to mandible and post-cranial remains.
Elements present: Cranial: all elements.
Post cranial: Right scapula, left clavicle, right and left

humerus, radius, left ilium, pubis, right femur and fibula, min no seven left and eight right ribs, left talus, one thoracic and one lumbar.
Age at death: 6–8 years.
Sex: NA.
Stature: NA.
Pathology: Possible congenital abnormality of the facial bones, possible infectious disease affecting maxillo-nasal region.
Non-metric traits: NA.
Additional information: 'Tibiae' (right and left?) previously sent for C14 dating (GU-1409).