Chapter 7: The Finds

HUMAN REMAINS
by Angela Boyle

Introduction

The assemblage was originally examined by Mary Harman in the 1980s and a draft report was produced. The human bone was re-examined in 1992 with the aim of asking specific questions, in line with Roberts' view that there is no place for 'a catalogue with little or no interpretation' (1986, 110). Questions investigated include the treatment of the corpse prior to burial or burning and the evidence for ritual or ceremonial use of human remains. It should be stressed that no criticism of the basic anthropological data is implied.

In addition the re-examination of the material has allowed for the integration of all evidence from the earlier excavations (barrows 2, 3, 4, 11, 15, 16 and 17). Indications of *in situ* burning of individuals are confined to these particular monuments (Table 7.6), possibly because any evidence from the more recently excavated barrows had been destroyed by extensive ploughing or indeed by the machining of the site in preparation for excavation. Certain of the earlier deposits could not be located (cremations from barrows 7 and 14, the inhumation from pit 2 of barrow 17, and some of the cremations from barrow 16).

It was believed that re-examination of the human remains from the Abingdon causewayed enclosure might be particularly profitable, since its period of use overlapped with that of the oval barrow, the linear mortuary structure and the Neolithic flat graves. Unfortunately none of the material excavated at various times during this century can now be located (Leeds 1927, 1928, 1929; Case 1956a; Avery 1982).

Problems also arose because all of the skulls from the 1983–85 seasons of excavation have since been lost. Fortunately however, the necessary information could be derived from the detailed record sheets which form part of the original archive report. Additionally samples from the majority of inhumations (those from the oval barrow, linear mortuary structure 5352, Neolithic grave 5355, pit 942, Beaker 'flat' graves 919, 950 and 4660, graves 607 and 605 in barrow 12, graves 206 and 203 in ring ditch 201, graves 5274, 4906, 4968 and 4970 around pond barrow 4866 and both burials from pond barrow 4583) and certain of the cremations (that from the centre of ring ditch 611, one of two from the 'pond' of pond barrow 4866, those from cremation pits 4700 and 4321 and one of those from cremation pit 4245) were used for radiocarbon dating and therefore destroyed. Details of preservation and condition of the relevant missing bones were based on the data in the original record sheets. This is indicated in the text where appropriate. Well-preserved leg bones were generally used for dating and this has obvious implications for the calculation of stature.

Methodology

The inhumations were examined primarily with the intention of assessing both the level of completeness of individual skeletons as a whole and the preservation of every individual surviving bone. This was based on the following criteria which are broadly those devised by Waldron (1987, 58):

i. Completeness of Skeletons

A = complete or nearly so (100–75%), liable to give all or most of the required information
B = incomplete but still liable to give some information
C = partial (< 40%), some information may be obtainable
X = small fragments only, liable to give little or no information

ii. Preservation of Individual Bones

1 = complete or easily reconstructible
2 = incomplete, more than 50% survival (of epiphyses if recording a longbone)
3 = incomplete, less than 50% survival (of epiphyses if recording a longbone)

Initially such an approach might seem a little time-consuming, but, in the opinion of the writer, as soon as the criteria are defined, the numeric recording system is objective and can be put into operation rather more quickly than the use of written descriptions for each bone. It was hoped that a study of completeness in particular might illuminate aspects of burial such as ancestor worship. Indeed, clear evidence for the removal of bones from certain graves was recovered. This further suggests that these graves were clearly marked in some way.

The approach to the recording of the cremated deposits was based on the system devised by McKinley (1989, 65–76) and used with some success on the large sample from the Anglo-Saxon cemetery at Spong Hill, Norfolk. This expanded on the original approach to the recording of cremations, which consisted of providing the total weight of a deposit accompanied by a few sentences on which bones were identifiable.

During excavation, cremation deposits were recovered as samples for sieving. Certain of the complete pottery vessels were excavated as soil blocks for detailed examination by conservators. The recording system employed can be defined as follows: each deposit was passed through a series of three Endicott laboratory test sieves with mesh sizes of 10, 5 and 2 mm, beginning with the largest and ending with the smallest mesh size.

The weight of bone present in each sieve size was calculated as a percentage of the total weight of the cremation. At each of the three stages the bone sample recovered was examined in detail and sorted into identifiable bone types, which were defined as skull (including mandible and dentition), axial (clavicle, scapula, ribs and vertebrae), upper limbs and lower limbs. Where a distinction could not be made between upper and lower limbs, fragments were grouped under the heading 'longbones' (these are indicated in Table 7.5 by an asterisk). Metapodials were recorded with the appropriate upper or lower limbs. Each of these samples was then weighed on digital scales and details of colour and largest fragment were recorded, also, where possible, the presence of individual bones within the categories was noted. This procedure was followed for each of the three sieve samples in order to assess the level of fragmentation. McKinley has recently noted (1994, 5) that the *percentage fragmentation* provides a more representative, overall view of how fragmented each cremation actually is, and that a subjective comment on fragmentation is insufficiently exact and does not promote comparability of data. It would seem that evidence for the selective burial of only certain parts of the body has been recovered.

The main aim of both systems is to provide an objective and meaningful way of both quantifying and comparing individual inhumations and cremations with others from the same burial unit as well as from other monuments within the complex. It was hoped that any significant similarities or differences would then be more discernible.

The sexing of adult inhumations was based on the morphological and metrical guidelines set out by Ferembach *et al.* (1980). In keeping with standard practice no attempt was made to sex subadult remains. Age estimates for subadults are based on dental development (van Beek 1983), diaphyseal length and epiphyseal fusion (Ferembach *et al.* 1980; Brothwell 1981). Age estimates for adults are based on processes of skeletal degeneration (most particularly vertebral) and dental attrition. The original examination employed a method which was based on an Anglo-Saxon population (Miles 1963, 884) and it was felt that the substitution of the method devised by Brothwell (1981, 72) would be more appropriate, as it is based on an extensive group dating from the prehistoric through to the medieval period. Stature was based on the formulae devised by Trotter and Gleser (1952, 1958). Where the most reliable longbones had been destroyed by the process of radiocarbon dating, measurements of longbones were taken from the original recording sheets. The standard range of discontinuous traits was scored (Berry and Berry 1967; Finnegan 1978) and pathology, where present, was recorded and described in detail. Vertebral degeneration was recorded using the method devised for the cervical vertebrae by Sager and reproduced in Brothwell (1981, 150).

The assessment of the age and sex of cremated individuals was far less straightforward. Age categories were broad and based on dental development, epiphyseal fusion and thickness of skull vault (these allowed only for very broad differentiation). The assessment of sex depended on the survival of the relevant morphological features and a consideration of the general size and shape of bones as well as the development of muscle markings such as the *linea aspera*. It must be emphasised that this is problematic where extensive shrinkage of the bone has occurred and there are implications for both identification and sex assessment.

Results

The assemblage examined comprised 33 in-humations and 39 deposits of cremated bone. A further five deposits could not be located (barrows 7 and 14 and deposits F, K and N from barrow 16).

Inhumations

There were 13 males, 8 females and 12 subadult inhumations, ranging in age from newborn to perhaps upwards of 50 years. If the inhumations are broken down according to date then the results are as follows: in the middle Neolithic period there are 3 males, 4 females and 1 subadult; in the period spanning the final Neolithic and early Bronze Age there are 9 males, 4 females, 11 subadults (12 if data from pit 2 of barrow 17 are included) and one individual for whom there is no data. Details can be found in Tables 7.1–3 and in the descriptions of the relevant subsites.

Pathology and general health. The presence of osteophytes, Schmorl's nodes and degeneration of vertebral bodies and articular facets was seen in eight individuals (2127 from the oval barrow, burials A and B from linear mortuary structure 5352, Neolithic inhumation 5355, Beaker 'flat' grave 4660, Beaker grave 203 in ring ditch 201, grave 4906 of pond barrow 4866 and later Bronze Age burial B in pond barrow 4583). Osteophytes are bony growths which develop on the margins of the articular surfaces in response to stresses over time and Schmorl's nodes are formed by a rupture in the intervertebral disc. Osteo-arthritis had affected the left shoulder, elbow and ankle of one individual (5352/3 burial B) and the shoulder and knee of another (4906). Some degeneration of the jaw articulation of 5352/3 burial C had taken place.

Three individuals displayed healed fractures. 2127 in the oval barrow had a healed mid-shaft fracture of the left clavicle. This is one of the most common fracture sites (Manchester 1983, table 5) and is often caused by falling onto an outstretched hand. Both burial B in pond barrow 4583 and burial A in linear mortuary structure 5352 had suffered serious injury to the left lower arm and in the case of 5352 burial A this had resulted in serious malalignment of the radius, although the ulna appeared relatively normal apart from some thickening of the shaft.

Cribra orbitalia was present in the orbits of three individuals all of whom were subadults (Neolithic inhumation 5354, graves 5274 and 4969 of pond barrow 4866). The aetiology of pitting of the roofs of the orbits is not fully understood but it has been considered to be representative of childhood iron deficiency anaemia

(Stuart-Macadam 1991). The 4–6 year old inhumation 5274 showed signs of enamel hypoplasia affecting the crowns of the permanent canine and first molar teeth suggesting that a metabolic disturbance had occurred. Cribra orbitalia in this case was particularly severe. 2127 from the oval barrow and 4660 from one of the Beaker 'flat' graves had possible haematomas affecting the lower legs. A haemotoma is a swelling containing blood on the cortex of the bone and possible causes include trauma.

Four individuals exhibited carious teeth (burial A from linear mortuary structure 5352, Neolithic inhumation 5354, grave 4906 of pond barrow 4866, and burial B in pond barrow 4583). Two of the four also had dental abscesses. One of these individuals must have suffered considerable pain when eating as no less that 11 abscesses were recorded (4583 burial B).

Wormian bones were recorded in the skulls of nine individuals (Tables 7.1–7.3). These are extra sutural bones within the vault which have always been seen as morphological variations, although environmental pressures, such as possible parturition trauma, have been suggested as possible causes (Bennet 1965). Two of the individuals in the Neolithic mortuary structure had palatine tori which are bony protrubrances located along the median line of the hard palate. Burial 607/2 exhibited spina bifida occulta of the sacrum. This is a well known condition which results from failure of fusion of the laminae of one or more of the sacral segments. This is rarely of clinical significance and it is likely that the individual was unaware of the condition.

Preservation and completeness. The degree of completeness of individual skeletons was extremely variable. To a certain extent it would appear that the archaeological age of the remains was a factor in this. Among the middle Neolithic group (Table 7.1) all skeletons were classified either B or C, whereas a number of inhumations dating to the later Neolithic/ Beaker period and the early Bronze Age were in excellent condition and were classified A (later Neolithic pit 942, Beaker 'flat' graves 950 and 4660, grave 203 of ring ditch 201, the central grave of barrow 4A, grave 4970 of pond barrow 4866, grave 604 of barrow 12, later Bronze Age burial C from pond barrow 4583).

Figure 7.1 Human clavicle from grave 950, showing cut mark. © The Natural History Museum, London

This is of particular interest in the case of the inhumations from 942 and 950. The individual from 942 was recovered in a disarticulated state from one of a series of intercutting pits (Fig. 4.42–3). Part of the right femur was found in a spread of burnt soil overlying the pits and two Saxon SFBs. The skeleton was virtually complete and the preservation of individual bones was 2–1, the bones of the extremities being in particularly good condition. On the basis of this information it might be argued that the skeleton was originally placed in the grave in a complete and fully articulated state and that disturbance initially occurred in antiquity.

Inhumation 950 was recovered in a disarticulated state, though again completeness and preservation were particularly good. The bones were entirely contained within the outline of a possible 'tree trunk' coffin. Although the W corner of the grave was cut by a later cremation pit 951, it is quite clear that the level of disarticulation of the skeleton cannot be attributed to this factor (Figs 4.18–19). The level of preservation and completeness suggests that the individual was originally placed in the grave in a fully articulated state and was subsequently disturbed. The fact that the spread of bone was confined within the original coffin space may indicate that disturbance occurred in antiquity and certainly prior to the decay of the coffin. The only missing bones are the right humerus, right scapula and the first cervical vertebrae. All these factors suggest that the grave was deliberately opened, probably prior to the insertion of the cremation, and that certain of the bones and perhaps artefacts were removed. A cut mark was present on the medial clavicle (Fig. 7.1) and the possibility that the skeleton was dismembered has been considered. However, no other such cut marks were seen and it is perhaps more likely that the clavicle was accidentally damaged when the grave was re-opened.

In a number of other cases individuals clearly seem to have been buried in an incomplete and at least partially disarticulated state. Grave 206 contained the leg bones and a skull fragment of a late adolescent or adult who has been very tentatively classified as female. The bones themselves were destroyed by the process of radiocarbon dating and consequently not seen by the present writer, although the original archive report records that they were in reasonable condition. The location of the bones of the leg in relation to each other suggests that they may have been at least partially articulated when buried (Fig. 4.73), though the presence of the single parietal fragment is difficult to explain if this was the case.

The upper body of a newborn infant was contained in a Beaker in grave 919. The vessel (Fig. 4.14, P25) was too small to contain the complete fleshed remains of a newborn infant, so it seems certain that the flesh was at least partially decayed and the skeleton at least partially disarticulated when placed there. This might account for the loss of the more fragile bones of the spine and the extremities.

Pit 2 of barrow 17 was said to contain the disarticulated remains of a subadult which could not be located for the purposes of the present examination.

Ring ditch 201	203	A	2–1	Fully articulated, crouched	20–30	M	1.79	Minor osteophytes, Schmorl's nodes	-	-
	206	C	3–2	Disarticulated	Late adolescent or adult	F??	-	-	-	-
Barrow 3 Eu.1.45	Central grave	B	3–1	Described as articulated, though much decayed	Ageing	M?	-	-	-	-
Barrow 4A Eu.1.4.3	Central grave	A	1	Fully articulated, crouched	25–35	M	-	-	-	-
		-	-	-	Subadult	-	-	-	-	-
Barrow 15 Eu.1.4.6	Pit 1	C/B	3–2	Disarticulated, arranged in two deposits, ?dismembered	Adult	M	-	-	-	-
Eu.1.4.7	Pit 2	B	2	Skull fragments only	9–10	-	-	-	-	-
Eu.1.4.7a	Pit 2	C	2	Skull fragments only	11	-	-	-	-	-
Barrow 17 Eu.1.4.4	Pit 1	B	3–2	Fully articulated, crouched	35–45	M	1.78 m	-	4 caries, calculus throughout	-
	Pit 2	Not found		Disarticulated	c. 1	-	-	-	-	-

The skeleton was said to be complete and the location of the bones suggested to the excavator that they had been 'thrown pell-mell' into the grave (Williams 1948, 40). This might be taken as indication that the bones were initially placed there in a disarticulated state. It is perhaps more likely, however, that, along with 942 and 950, this grave was actually disturbed in antiquity.

The inhumation from pit 1 of barrow 15 was recovered in a partly articulated state, apparently in three separate deposits (Riley 1982). Unfortunately no plan of the burial survives. It was noted that 'there was some evidence that the tibia and fibula of both legs had been dismembered after partial desiccation' (Anon. 1942, 103) although the evidence on which this assessment was made was not specified. The right fibula was identified by the present writer. There is, however, no reference to either right or left fibulae in the field identifications of the bone by Miss B Blackwood (Riley 1982, 76, 78). The original descriptions do suggest that certain of the bones were at least partially articulated: sacrum and fifth lumbar vertebrae were attached, a complete left foot was found within one deposit, right ulna and radius lay close together. Many more bones appear to have been present than have survived to the present day, in particular a near-complete torso, hands and feet. Riley suggests that the bone was originally buried in three deposits and that fires were lit along the side of the pit (1982, 78). It is equally possible that the body was originally buried intact with subsequent disturbance in antiquity, as in grave 2 in the Vicarage Field, Stanton Harcourt (Case 1982b, 105).

Comparable examples of disarticulation have been recorded in the first phase of a barrow at Fordington Farm, Dorset, at a similar late third millennium cal BC date to that of grave 950 at Barrow Hills (Bellamy 1991). Here two broadly contemporary grave pits, which had originally contained timber structures, housed the disarticulated remains of two and three individuals respectively, the bones of each piled together in a discrete heap. Preservation was described as variable in one grave. Four individuals were missing substantial bones, including two pelvic bones, two scapulae, a humerus and a mandible, although some of the smaller bones of the hands and feet were present, as in inhumations 942 and 950 at Barrow Hills. This led to the conclusion that certain larger bones had been deliberately removed, and either that disarticulation prior to burial took place in a guarded environment or that graves were reopened for the purpose of removal of certain bones at which time the originally articulated individuals were re-arranged (Jenkins 1991).

Cremations

Only five cremated individuals were sexed, most of them tentatively. Three were considered to be possibly female (the central cremation of barrow 2, central cremation E of barrow 16 and

Table 7.3. Later Bronze Age inhumations

	Context	Degree of completeness	Preservation of individual bones	Degree of articulation	Age	Sex	Stature	Skeletal pathology	Dental pathology	Non-metric traits
Pond barrow 4583	4583 burial A/B	C	3–2	Fully articulated, tightly crouched	40–50	M	1.75 m	Osteophytes and vertebral degeneration, serious injury to left radius and ulna	2 caries, 11 abscesses, 5 lost ante-mortem	2+ lambdoid wormians
	4583 burial C	A	3–2	Fully articulated, tightly crouched	14–16	-	-	-	-	-

cremation 614), and two to be possibly male (central cremation 802 of ring ditch 801 and pond barrow deposit 4866/II). The sexing of cremated individuals is usually based on isolated surviving features rather than on a total morphological assessment which means that such assessments should be clearly defined as tentative (cf Browne 1992, 346–7).

Cremated individuals ranged in age from newborn to adult and only in the case of immature individuals were the ranges at all specific. Details can be found in Tables 7.4–7 and in the descriptions of the relevant subsites.

The weight of deposits is extremely variable and ranges from 2 g (scatter dated 6.6.37 from barrow 16) to 1639 g (cremation 1101). Although in the majority of cases all parts of the body are *represented* it is fair to say that none of the deposits are likely to comprise the burnt remains of a complete individual (Table 7.5). The quantity of bone recoverable from a modern adult cremation is 1600–3600 g, with an average of 3000 g, which is roughly the same as a dry bone specimen (McKinley 1989, 66).

The weights of the cremations were extremely variable. In order that patterns might be discerned each deposit was fitted into one of four categories according to weight: <100 g, 100–500 g, >500–1000 g and >1000 g. The largest deposits were 1101 (1649 g) and 4245/II (1529 g) and, although both of these were a part of the linear Collared Urn cremation cemetery, only 4245/II was originally contained within a Collared Urn vessel.

Nine deposits weighed between 501 and 1000 g. They were 802, 951/1, 4866/II, central cremation 11 of barrow 1, the central cremation of barrow 2, 5351, the central cremation of barrow 4, the central cremation of barrow 11, and central cremation E of barrow 16. With the exception of 951/1, in a pit cut into 'flat' grave 950, and 4866/II, which was cut into the base of pond barrow 4866, all of these deposits were central deposits in round barrows or ring ditches.

Sixteen deposits weighed between 100 and 500 g. They were 2218, 919/1, barrow 12 deposits 605 and 614, 4866/I, 4979, 4700, 1063, 1064/2, 1067, 4623, 4321, 4245/I, barrow 16 deposits C, J and Scatter dated 31/10/36. Deposits 4979, 4700, 1063, 1064/2, 1067, 4623, 4321 and 4245/I were all part of the linear cremation cemetery, though only four were associated with Collared Urns (4700, 1064/2, 4321, 4245/I). Five were secondary deposits in barrows (605, 614 and, from barrow 16, C, J and scatter dated 31/10/36). Deposit 4866/I was cut into the base of pond barrow 4866. Perhaps the most interesting of the group is 919/1, which had been placed in a Beaker which also contained flecks of copper alloy and the incomplete skeleton of an inhumed neonate.

Seven deposits weighed less than 100 g. They were ring ditch 611 deposit 611/D/2, barrow 12 deposit 601/B/3, 4405, barrow 16 deposits H, P and scatter dated 6/6/37. With the exception of 4405, which was contained in a cremation pit and associated with a heavily burnt plano-convex flint knife, all were secondary deposits in round barrows or ring ditches.

At Barrow Hills it is clear that deposits other than the central ones were on the whole very much smaller. It seems likely that this is evidence of the deliberate selection and burial of a *token* deposit. While other possible causes of loss need to be considered (incomplete recovery, disintegration in soil, truncation due to ploughing), it seems clear in the vast majority of cases at Barrow Hills that they could be ruled out, as the central deposits do not appear to have been affected by such problems. It may be useful to determine the volume of the pottery vessels used in cremation in order to determine whether or not they were used to their full capacity. It is perhaps noteworthy that pits A and D in barrow 16 contained miniature pottery vessels which had been refired (probably on a cremation pyre), although no burnt bone was associated with them.

In general the proportion of skull fragments within deposits is greatest. It seems unlikely that this is merely a function of the fact that skull is particularly easy to identify as, for example, the cremation from barrow 2 comprised 285 g of skull and 105 g of upper limb in the 10 mm sample with no unidentifiable bone. Similarly almost half of cremation 4866/II comprised skull (162 g out of a total of 331 g with only 72 g of unidentifiable bone). It seems that certain parts of the body may have been deliberately selected either for burning or burial. All parts of the body with exception of lower limb were present in 951/1 and the central cremation of barrow 2.

Fragmentation and colour. Poorer oxidisation would cause a grey, blue, black or even brown colouration. At Spong Hill the bones affected were the

Table 7.4. Cremations (1)

	Context	Age	Sex	Comments
Ring ditch 611	611/D/2	2-3	-	-
Segmented ring ditch	Pit 2123, layer 2118	Adult	?	-
Ring ditch 801, central cremation	802	Young adult	?	Possible female (MH)
'Flat' grave 919	919/1	*c.* 2-3	-	-
'Flat' grave 950	951/1	11-13	-	Small quantity of ?adult skull vault also present
Barrow 12	606 (not found)	Adult	?	-
	601/B/3	Newborn	-	-
	601/B/3	*c.* 4	-	-
	605 (not found)	17-23	?	-
	614	Adult	F?	-
Pond barrow	4866/I	Young adult	?	-
4866	4866/II	Adult	?	Possible male (MH)
	4979	Adult	?	-
Cremation pits	4700	Adult 30+	?	-
	1063	Adult	?	-
	1064/II	12-15	-	?Adult skull vault also present
	1067	16-20	?	-
	1101	16-23	?	-
	4623	Adult	?	-
	4321	5-7	-	-
	4405	Adult	?	-
	4245/I	5-7	-	-
	4245/II	Adult	?	-
Barrow 1	11	Adult	M	-
Barrow 2	Central cremation	Adult, not young	F??	Young adult ??male (MH)
	5351	8-10	-	-
Barrow 4	Central cremation	Adult	?	-
Barrow 7 (not found)	Central cremation	-	-	-
Barrow 11	Central cremation	Adult	M?	-
Barrow 14 (not found)	Central cremation	Adult?	F?	(data MH)

Table 7.4. Cremations (2)

	Context	Age	Sex	Comments
Barrow 16	E	Adult	F?	-
	C	Adult	?	-
	F (not found)	-	-	-
	G	0-6 m	-	-
	H	Adult?	-	-
	J	Adult?	-	Scatter
	K (not found)	-	-	-
	L	Adult?	?	Scatter
	M	Adult?	?	Scatter
	N (not found)	-	-	-
	P	?	?	Scatter
	Scatter 31.10.36	Adult?	?	-
	Scatter 6.6.37	Adult?	?	-

lower leg and feet, dorsal vertebrae and sometimes the proximal femur, innominates and the small bones of the hand. Legs have little soft tissue covering them so they tend not to cremate as fully as other parts, hands and feet may hang over the pyre edge, innominates and vertebrae suffer poor oxidisation due to their spongy nature, with a greater infiltration of organic material. If bones were poorly oxidised then we might assume that little tending of the pyre took place, as at Spong Hill (McKinley 1994, 84). Spongy bone may have been lost as dust from exceptional dehydration during the cremation process or indeed because the individual suffered from osteoporosis in life (this will give a low percentage in the axial or in the limbs due to the difficulty in the identification of certain fragments of long bone).

Where colouration and cracking are variable the skeleton is likely to have been exposed to a variety of temperatures, in the sense that the body may have shifted position during the cremation process, perhaps due to collapse of the pyre. Where bones are mainly charred black or blue-grey one might suggest insufficient time for the completion of the cremation process and/or that the pyre was not tended to ensure complete oxidisation. Where fragments are predominantly large, a lack of pyre-tending which might serve to break up the bone might be implied. Alternatively, the poorly-fired fragments may be those which fell to the lower, and therefore cooler, parts of the pyre in the initial stages of the process.

A cremation at Fordington, Dorset, exhibited much poorer oxidisation of the right femur shaft as opposed to fairly good oxidisation of the left, and of left malar as opposed to right. Where spongy bone is orange-brown this is an indication of incomplete oxidisation, as spongy bone generally takes longer to oxidise than compact bone, due to its higher infiltration by organic material. It has been suggested that the corpse shifted on the pyre with the left side of skull and the right lower limb becoming buried in the wood ash at the bottom of the pyre, cutting off oxygen and thereby the cremation process (McKinley 1991). A similar argument might be applied at Barrow Hills to deposits where the pattern of colouration appears to be uneven, eg the central cremation of barrow 2. In a number of cases (eg cremations 11 and 605/A) femora are noticeably less burnt than the other bones represented. Details of colour and distortion can be found in Table 7.7.

Pyre technology and post-burn treatment (Tables 7.6–7). Three of the cremations were associated with seed and plant remains. Cremation 11 from barrow 1 included vegetative grass fragments and a large number of leguminous seeds while 802 was associated with onion couch tubers and vegetative remains and 614 with cereal grain, dock seed and spike rush seed. It has been suggested that the remains from 11 and 802 may indicate the use of grass or hay as tinder for the lighting of the cremation or as bedding for the corpse (Moffett, this Chapter). However the possibility of accidental inclusion cannot be discounted.

Charcoal from selected cremations was examined (Table 7.33) and it was seen that each of the samples was dominated by a single taxon: oak was present in all of them with additionally hawthorn type (802), blackthorn (611) and maple (11). All of these could have been growing in the immediate environs. Charcoal has been recovered from cremation pits dating to the early Bronze Age in Scotland (McKinley 1992). Ethnographic and anthropological evidence for pyre construction indicates that the main structure would be of large logs infilled with brushwood to aid the initial ignition and

*Table 7.5. Weights of cremated bone within anatomical categories and size ranges (1). * = bone classified as upper and lower limb bones*

	Context	10 mm Skull	Axial	Upper limbs	Lower limbs	Unident-ified	5 mm Skull	Axial	Upper limbs	Lower limbs	Unident-ified	2 mm Skull	Axial	Upper limbs	Lower limbs	Unident-ified	Total Weight
Ring ditch 611	611/D/2	-	1 g	-	-	-	-	-	3 g	-	-	-	-	-	-	-	4 g
Segmented ring ditch	2118	8 g	-	-	25 g	33 g	-	-	-	-	45 g	-	-	-	-	12 g	123 g
Ring ditch 801	802	192 g	76 g	56 g	15 g	94 g	17 g	8 g	22 g	-	45 g	-	-	-	-	7 g	532 g
'Flat' grave 919	919/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	208 g
'Flat' grave 950	951/1	70 g	25 g	16 g	-	227 g	6 g	17 g	2 g	1 g	310 g	-	-	-	-	114 g	788 g
Barrow 12	601/B/3	9 g	-	-	-	-	12 g	-	-	-	-	-	-	-	-	< 1 g	22 g
	614	-	3 g	38 g	*	-	-	-	-	-	77 g	-	-	-	-	13 g	131 g
Pond barrow 4866	4866/I	98 g	64 g	25 g	112 g	85 g	-	-	-	-	11 g	-	-	-	-	11 g	406 g
	4866/II	160 g	32 g	194 g	96 g	28 g	2 g	2 g	-	-	197 g	-	-	-	-	37 g	748 g
	4979	31 g	4 g	1 g	20 g	63 g	2 g	-	3 g	-	121 g	1 g	-	-	-	44 g	290 g
Cremation	4700	209 g	25 g	58 g	31 g	88 g	27 g	9 g	17 g	-	-	-	-	-	-	6 g	470 g
pits	1063	47 g	12 g	22 g	3 g	64 g	5 g	-	6 g	-	23 g	-	-	-	-	5 g	187 g
	1064/2	43 g	3 g	-	-	33 g	5 g	2 g	-	-	122 g	-	-	-	-	80 g	288 g
	1067	140 g	9 g	-	40 g	27 g	2 g	-	-	-	7 g	-	-	-	-	3 g	228 g
	1101	90 g	14 g	23 g	128 g	504 g	18 g	10 g	-	-	655 g	-	-	-	-	207 g	1649 g
	4623	22 g	1 g	1 g	1 g	43 g	-	-	-	-	58 g	-	-	-	-	29 g	155 g
	4321	64 g	4 g	-	-	20 g	23 g	17 g	1 g	-	11 g	-	-	-	-	-	140 g

*Table 7.5. Weights of cremated bone within anatomical categories and size ranges (2). * = bone classified as upper and lower limb bones*

	Context	10 mm Skull	Axial	Upper limbs	Lower limbs	Unident-ified	5 mm Skull	Axial	Upper limbs	Lower limbs	Unident-ified	2 mm Skull	Axial	Upper limbs	Lower limbs	Unident-ified	Total Weight
Cremation	4405	6 g	1 g	4 g	1 g	26 g	3 g	-	2 g	*	39 g	-	-	-	-	8 g	90 g
pits (ctd)	4245/I	48 g	1 g	14 g	*	3 g	55 g	2 g	7 g	*	2 g	-	-	-	-	5 g	137 g
	4245/II	240 g	-	64 g	288 g	55 g	108 g	-	13 g	*	591 g	-	-	-	-	170 g	1529 g
Barrow 1	11	252 g	49 g	94 g	115 g	125 g	47 g	4 g	8 g	-	15 g	-	-	-	-	24 g	733 g
Barrow 2	Central cremation	290 g	-	108 g	-	-	-	31 g	-	-	279 g	-	-	-	-	121 g	829 g
	5351	57 g	6 g	9 g	*10 g	84 g	1 g	2 g	-	-	249 g	-	-	-	-	96 g	514 g
Barrow 4	Central cremation	126 g	21 g	37 g	40 g	247 g	2 g	7 g	-	-	176 g	-	-	-	-	12 g	668 g
Barrow 11	Central cremation	60 g	59 g	58 g	149 g	286 g	1 g	11 g	-	-	128 g	-	-	-	-	19 g	771 g
Barrow 16	E	85 g	50 g	60 g	79 g	151 g	4 g	1 g	3 g	-	105 g	-	-	-	-	7 g	567 g
	C	123 g	6 g	5 g	-	47 g	1 g	1 g	3 g	-	-	-	-	-	-	2 g	188 g
	G	1 g	-	-	1 g	-	1 g	-	1 g	-	-	2 g	-	-	-	-	6 g
	H	6 g	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6 g
	J	6 g	1 g	-	7 g	62 g	?	1 g	1 g	-	109 g	-	-	-	-	-	187 g
	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36 g
	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.5 g
	P	-	-	-	-	4 g	-	-	-	-	2 g	-	-	-	-	1 g	7 g
	Scatter 31.10.36	5 g	2 g	42 g	42 g	225 g	4 g	3 g	3 g	-	-	-	-	-	-	11 g	337 g
	Scatter 6.6.37	1 g	2 g	5 g	10 g	2 g	2 g	-	3 g	-	2 g	-	-	-	-	< 1 g	28 g

Table 7.6. The range of burial treatment represented in cremations (1)

	Context	Evidence of *in situ* burning	Separation of bone from pyre debris	Associated objects	Associated structure	Comments
Ring ditch 611	611/D/2	-	Pyre debris *could* be represented by charcoal in layers 2 and 3, around and above the urn	Fragmentary urn	-	-
Segmented ring ditch	Pit 2123, layer 2118	-	-	-	-	-
Ring ditch 801	802	-	-	Bronze awl, fired clay bead; rim of charcoal around cremation may suggest container	-	-
'Flat' grave 919	919/1	-	-	Middle style Beaker, flecks of copper or copper alloy in cremation deposit	-	In same vessel as skeleton of neonate
'Flat' grave 950	951/1	-	-	-	-	-
Barrow 12	606	-	-	Possibly buried in organic container	-	-
	601/B/3	-	-	Biconical Urn	-	-
	605	-	-	-	?Wooden tray or coffin	-
	614	-	-	-	-	-
Pond barrow 4866	4866/I	-	-	-	-	-
	4866/II	-	-	-	-	-
	4979	-	-	-	-	-
Cremation	4700	-	-	Collared Urn	-	-
pits	1063	-	-	-	-	-
	1064/2	-	-	Collared Urn	-	-
	1067	-	-	-	-	-
	1101	-	-	-	-	-
	4623	-	-	-	-	-
	4321	-	-	Collared Urn	-	-

Table 7.6 (continued). The range of burial treatment represented in cremations (2)

	Context	Evidence of *in situ* burning	Separation of bone from pyre debris	Associated objects	Associated structure	Comments
	4405	-	-	Plano-convex knife, heavily burnt	-	-
	4245/I	-	-	Collared Urn	-	-
	4245/II	-	-	Collared Urn	-	-
Barrow 1	11		Yes	Bronze knife-dagger, sheath, ?in organic bone tweezers, bone ring-headed pin	-	-
Barrow 2 cremation	Central	-	Yes	2 gold foil cones (crushed and stained by fire), bronze awl	Wooden tray or coffin below deposit	Large fragments, little burning
	5351	-	-	Possibly buried in an organic container	-	-
Barrow 4	Central cremation	-	Yes	Bronze knife-dagger	-	-
Barrow 7	Central cremation	Yes	No, wood traces and bone mixed together	-	-	-
Barrow 11 cremation	Central	Yes	-	Accessory-type vessel	Associated posthole with ramp, ?associated stakeholes	-
Barrow 14		Yes	Yes	Biconical Urn, bronze razor/knife	?Associated stakeholes	-
Barrow 16	E	-	Yes	Bronze awl, copper knife-dagger with bronze rivets, 14 beads (jet/shale, amber and faience)	-	-
	C	-	Yes	-	-	-
	A	-	Yes	Refired miniature Food Vessel	-	Pyre debris and refired pot but no cremated bone
	B	-	Yes	-	?Stakeholes	Probable pyre debris ('earth and charcoal', fire-reddened pebbles), but no cremated bone
	D	-	Yes	Refired miniature Collared Urn	-	Possible pyre debris (charcoal and 'pot-boilers'), but no cremated bone

Table 7.6 (continued). The range of burial treatment represented in cremations (3)

Context	Evidence of *in situ* burning	Separation of bone from pyre debris	Associated objects	Associated structure	Comments
F	Yes	-	-	-	-
G	-	-	'Daub', 'many' burnt stones	-	-
H	Yes	-	Deverel-Rimbury vessel(s), flint scraper	-	-
J	-	-	Deverel-Rimbury vessel(s)	-	-
K	Yes	-	Deverel-Rimbury vessel(s)	-	-
L	-	-	Deverel-Rimbury vessel(s)	-	-
M	-	-	-	-	-
N	-	-	-	-	-
P	-	-	-	-	-
Scatter 31.10.36	-	-	-	-	-
Scatter 6.6.37	-	-	-	-	-

to open the pyre to facilitate the circulation of air (McKinley 1994, 82). Experimental work has shown that among Norwegian species birch, spruce, lime, oak, pine, ash and beech, in descending order, produced the greatest kcal/kg (Holck 1986). Wahl (1982) identified beech, poplar, willow, Scots pine and fir with a predominance of oak.

GOLD FROM BARROWS 4A AND 2
by Alistair Barclay and Jonathan Wallis

The central graves of barrows 4A and 2 both produced goldwork. The earlier example, a pair of 'earrings' (Fig. 5.4, G3–4), was found in the central grave of barrow 4A, in association with an inhumation radiocarbon-dated to 2650–2000 cal BC (95% confidence)(3880±90 BP; OxA-4356) and with a European Bell Beaker (Fig. 5.2, P76). The later goldwork, a pair of foil cones or bead covers (Fig. 5.3, G1–2), came from the central cremation deposit of barrow 2. Significantly, both barrows lay close together at the SW end of the linear group of barrows, 1–11 (Fig. 5.1).

Sheet gold basket 'earrings' are presumptively the oldest goldwork in Britain (Taylor 1985, 187). Six pairs have been found in Britain. The barrow 4A 'earrings' are very similar in type to the two pairs found in a Beaker grave at Chilbolton, Hampshire. These formed part of a rich male grave assemblage which included a gold bead and a fine European or Wessex / Middle Rhine Beaker. The associated skeleton was radiocarbon-dated to 2500–1950 cal BC (95% confidence)(3740±80 BP; OxA-1072; Russel 1990). An example from Alston, Northumbria was found in the central area of a ring cairn which also produced an All-Over-Comb Beaker, although the association is doubtful (Maryon 1936, 212). A pair was excavated from a cist burial at Orbliston Junction, Moray and a single 'earring' came from a secondary context at Boltby Scar, Yorkshire (Brailsford 1953, 34).

Basket 'earrings' were also manufactured from copper and copper alloy, possibly at a later date, (May 1976, 68–71; Taylor 1985, 187). A female inhumation inserted into the mound of the long barrow at Redlands Farm, Stanwick, Northamptonshire was dated to 1890–1670 cal BC (95% confidence)(3450±45 BP; BM-2833) and accompanied by a Late style Beaker, shale armlet and flint flakes and a single basket 'earring' apparently of copper alloy (Bradley 1998).

The function of basket 'earrings' has been discussed at length by Sherratt (1986, 61–6; 1987, 119), who has suggested that they could have functioned as hair ornaments, and more recently by Russel (1990, 164–6). Russel's microscopic examination of the Chilbolton objects revealed worn and rounded edges on the tang, except for the 5 mm nearest the basket, and virtually no scratches inside the basket. This pattern he sees as compatible with the tang passing through a pierced ear and the basket encasing the edge of the ear. The barrow 4A 'earrings' were also examined microscopically for traces of wear, but similar evidence could not be found.

The cones probably functioned as bead covers. They could have covered two similar conical beads or one

Table 7.7. Degree of burning of cremations measured by bone colour and level of distortion (1)

	Context	Skull	Axial	Upper limbs	Lower limbs
Ring ditch 611	611/D/2	Vault, dentition	Vertebrae	-	-
Segmented ring ditch	2118	-	-	-	-
Ring ditch 802	802	Vault, petrous, maxilla, mandible	Vertebrae, rib shafts, illia	Humerus, ulna, radius, carpals	Patella, ?fibula shaft
'Flat' grave 919	919/1	Vault fragments, tooth crowns	-	-	-
'Flat' grave 950	951/1	Vault fragments, two petrous bones, frontal, malar, mandible, dentition	Sacrum, vertebrae, ribs	Radius, humerus	Patella
Barow 12	606	Skull vault, right maxilla, dentition	-	Yes	Yes
	601/B/3	Skull, dentition, axial, petrous is blue-grey	Vertebrae, blue-grey and white	-	-
	605	Yes, dentition	Yes	Yes, humerus, ulna	Femur
	614	Dentition	Blue-grey/black cervical vertebrae and ?clavicle	White shaft fragments	White patella, femur shaft
Pond barrow 4866	4866/I	Mandible, vault, petrous	Vertebrae, pelvis, ribs, ?scapula	Humerus, radius, ulna, metacarpal	Femur, tibia, fibula, tarsals
	4866/II	Vault, maxilla, mastoid, petrous	Vertebrae, ribs, ?pelvis	?Humerus	Tibia, talus, metatarsals
	4979	Vault mostly white and well calcined, 1 fragment blue-grey, dentition	Well calcined atlas facet, rib, ?scapula	White radius and ulna, phalanges	Tibia, patella, blue-grey femur
Cremation pits	4700	Temporal, zygomatic, maxilla, mandible, vault, white and a few grey-blue, separation of skull tables	Clavicle, rib, cervical vertebrae, pelvis is partly black	Humerus, radius, ulna	Femur, tibia, fibula
	1063	Splitting of skull tables, vault is white and grey-blue, maxilla, dentition	Vertebrae, ribs	Humerus, radius, ulna, heavy transverse fissuring of ?ulna	Fibula
	1064/2	Skull bluish-white, vault and petrous, dentition	Vertebrae	Shaft fragments	Shaft fragments
	1067	Parietal, frontal, mandible, maxilla, much distortion and cracking especially of parietal	Vertebrae some blue-black, blue-black ?pelvis, scapula, clavicle		Femur is blue-grey and black, fibula is bent and fissured
	1101	Vault, mandible, petrous, dentition	Rib, vertebrae, ?pelvis, scapula only very slightly burnt	Humerus, radius, ulna	Femur, tibia, fibula, all slightly burnt
	4623	Vault mostly white and well calcined	Rib shaft fragment	Phalanges	Femur with blue-grey inner shaft
	4321	Much distortion and cracking of skull vault, petrous, temporal, occipital, ?mandibular condyle, zygomatic, dentition	Ribs, vertebrae	-	-

Table 7.7. Degree of burning of cremations measured by bone colour and level of distortion (2)

	Context	Skull	Axial	Upper limbs	Lower limbs
	4405	White and calcined, petrous and skull vault	Rib, white and calcined	Humerus white and calcined	Femur, white and calcined
	4245/I	Skull vault, dentition, petrous bones	-	Shoulder, hands	-
	4245/II	Skull, dentition, petrous bones	-	-	-
Barrow 1	11	Vault, petrous, malar, frontal, maxilla, mandible	Pelvis, cervical vertebrae, rib shafts	Humerus, radius, ulna	Femur, tibia, fibula, patella
Barrow 2	Central cremation	Skull pale blue, more fissuring than distortion, some splitting of outer table from diplöe, minimal burning of mandible	All vertebral bodies are very well burnt	Left humerus exhibits signs of cracking and fissuring but otherwise is little burnt, right humerus is merely charred black, phalanges are well calcined, many completely white	Femoral shafts are charred black with no distortion
	5351	White and blue-grey skull vault, dentition	Scapula, ?sacrum, vertebrae, rib	Brown and blue-grey epiphyses, humerus, radius and ulna white and well calcined, cracked with transverse fissuring	-
Barrow 4	Central cremation	Mandible blue-grey	-	Articular heads merely charred though humeral shafts are cracked and fissured	Articular heads merely charred
Barrow 11 cremation	Central	Vault and petrous white, tooth root, much cracking and fissuring of skull	Vertebrae, ribs and ?pelvis grey-blue	Humerus bent and fissured, radius, ulna, phalanges	Patella, curved fibula shaft, femur tibia, femur shaft crushed
Barrow 16	E	Well calcined, minimal distortion	Well calcined, minimal distortion	Well calcined, minimal distortion	Well calcined, minimal distortion
	C	-	-	-	-
	G	Well calcined	-	Well calcined	Well calcined
	H	Some blue-black fragments, slight distortion	White	White, much cracking and fissuring	White, much cracking and fissuring
	J	Mostly white	Mostly white	Mostly white	Mostly white
	L	Completely calcined	?Pelvis charred	-	Largely blackened tibia shaft, some cracking; two unburnt pieces, one is femur
	M	Diplöe is mostly black, vault fragments blue-black, petrous fragment only slightly burnt	-	Shaft fragment incompletely burnt, blackened cortex	-
	P	-	-	-	White and completely calcined
	Scatter 31.10.36		-	-	- -
	Scatter 6.6.37		-	-	- -

large biconical bead made from wood, bone or jet / shale. The Radley bead covers can be compared with similar finds associated with graves of the Wessex culture. Among these are a spherical gold-covered shale bead from Wilsford barrow G7, Wiltshire (Taylor 1980, pl. 26). This bead came from a primary burial with other dress ornaments, a Grape Cup and a Collared Urn (Annable and Simpson 1964, 44, 98). Goldwork of this period is concentrated in southern England, especially Wessex (Taylor 1980, map 3). An imprecise parallel is provided by the gold bead covers from the Upton Lovell barrow G2, also in Wiltshire (Annable and Simpson 1964, 48, 103). Barfield (1991) sees the similarity of British gold-covered objects like these to a gold-bound amber bead from Zürich Mozartstrasse, Switzerland, as contributing to the evidence for exchange connections between Britain and the north Alpine region at the end of the early Bronze Age.

The only other possible example of contemporary goldwork from the Upper Thames Region is a strip decorated with close-set parallel lines (Palmer 1980, fig. 3, 11) found in an apparently early Bronze Age alluvial clay silt on the Thames floodplain at the Hamel, Oxford. Beaker sherds were found in the fill of a nearby inhumation which was radiocarbon-dated to 2030–1610 cal BC (95% confidence) (3470±80 BP; HAR-3410; Palmer 1980, 128–34).

RADLEY AND THE DEVELOPMENT OF EARLY METALWORK IN BRITAIN
by Stuart Needham

Ornaments

The three copper rings from 'flat' grave 919, although very simple forms, are amongst the most interesting finds from Barrow Hills. This is partly due to the lack of good parallels in early Bronze Age Britain, despite the frequency with which small metal ornaments were put into graves (Needham 1988, 230, table 1) and partly on account of the radiocarbon determination. The latter is on human bone and should closely date the burial event; 2700–2100 cal BC (93% confidence)(3930±80; OxA-1874). Almost as early is the radiocarbon date of 2650–2000 cal BC (95% confidence)(3880±90 BP; OxA-4356) associated with Barrow 4A, again with sheet metal ornaments, in this case gold basket ornaments (Wallis and Barclay, above). These are as yet the earliest well-associated dates for metalwork in Britain.

In many regions of Europe small trinkets are a dominant, or at least noteworthy, aspect of the earliest metalwork assemblages (eg Butler and van der Waals 1967, 76; Randsborg 1979; Ottaway 1973; Greeves 1975), and this is probably no less true of Britain and Ireland. Continental repertoires include rings of wire and sheet strip generally similar to the pieces from grave 919. Copper beads are one of the dominant early ornament types in central Europe (Strahm 1991). In western France copper beads occur in some megalithic tombs and Artenacien contexts, all of which could or should predate the appearance of Beakers (Briard 1991, 183; Vuaillat 1991; Blanchet 1984, 67). In the Paris basin beads are known from SOM collective graves, although some of the deposits contained can be as late as Beaker period (eg Argenteuil — Maudit *et al.* 1977; Blanchet 1984, 94). Given their diverse impurity patterns, it has been suggested that beads in pre-Beaker contexts in western France are imports from different metal-producing regions such as the Alpine zone and Mediterranean France (Briard 1991, 183; cf Guilaine 1991).

At present then, strong evidence for indigenous pre-Beaker metalworking is lacking in the areas of France along the Atlantic and Channel seaboards. On the other hand, some evidence for Beaker period metallurgy, in the form of copper globules, has recently come to light during the excavation of a domestic site at Val-de-Reuil (Eure) towards the Seine estuary (Billard 1991, 157–8, 167–8). This context is probably later than grave 919 at Barrow Hills, but it may be suggested that the relative paucity of metal objects and metalworking evidence in northern France has as much to do with survival and recovery as any real lacuna. There is increasingly less obstacle to the idea that the opposite coasts of the English Channel, from Brittany to the Low Countries, were the likely springboard for the introduction of metal and metallurgy to southern Britain. If further evidence sustains this suggestion, it may diminish the need to invoke long-distance jumps from Iberia to Ireland or from the Middle Rhineland to south and eastern Britain as responsible for propagating the new technology (as distinct from explaining individual exchanges, some of which might perhaps have been long-range).

It is difficult to determine either from composition (Northover, this chapter) or morphology whether the grave 919 ornaments are imports or could already be the products of a local industry. It is worth noting that the technology involved could have been relatively simple, at the bare minimum these objects could have been fashioned from pre-existing small objects (ultimately from imports) by cutting, hammering and, if necessary, heating to anneal the metal. At this simple level no high temperature pyrotechnology or thermally stable crucibles are necessary for melting, nor would moulds be required. It may be no coincidence that such technologically undemanding pieces of metalwork are amongst the earliest. Further evidence that simple metalwork at least was being produced locally before about 2200 cal BC comes from the radiocarbon-dated gold basket ornaments (Table 7.8), since this type appears to be an insular development of loosely related continental ornaments (Butler 1963, 187; Sherratt 1986).

Although the British Isles have yielded a wide variety of Copper and early Bronze Age ornaments, it has not been possible to date many specifically to an inception phase. Early gold ornaments (lunulae, sun-discs and basket ornaments) have been difficult to date closely due to a poverty of useful associations. Current interpretations (eg Burgess 1979) favour these forms as having been present as early as the copper-using stages based largely on occasional 'early' Beaker associations, such as in the barrow 4A grave group. Copper ornaments have been even less visible at an early stage; rare finds include copper pins at Sewell, Bedfordshire, (Kinnes 1985, A9) and Roundway, Wiltshire (Clarke

1970, 296, fig. 132) and copper tubular beads at Beggar's Haven, Sussex (Kinnes 1985, A10). The rare bar neckrings with spatulate terminals, represented in the Upper Thames valley at Yarnton, Oxfordshire (Clarke *et al.* 1985, 270–2), are of copper and thus presumably of Copper Age date. Early bronze ornament types — notably various bracelets, basket ornaments, beads, button covers — are presumably a little later and are also more frequent.

Daggers, knives and razors

Six metal implements fall into this general category, within which functional differentiation is not clear cut. Most, however, are of small size and only the blade from barrow 3 (Fig. 5.2, M10) can be classed formally as a dagger. The remainder can be termed knives or knife-daggers, with the possible exception of M12 (Fig. 5.9) which might alternatively be attributed to the forms known as razors and razor-knives. These terms tend to be applied rather loosely and are not yet defined to be mutually exclusive of one another. This does, however, have the virtue of emphasising our inability to judge whether shape, size or some other attributes would have been considered most important in the classification recognised by the people using the articles. That classification may itself have changed through time. For example, the writer feels intuitively that size differentiation amongst tanged copper blades had more to do with raw material availability than with considerations of social status, whereas at a later stage there is a sense of legitimate and meaningful distinction between larger implements (daggers) and smaller ones (knives etc.), a distinction that could have evolved to meet both utilitarian and symbolic needs (for example gender differentiation). Accepting such suggestions as feasible does not necessarily mean that longer blades among the tanged copper class would not have made a greater impression on contemporary society than more diminutive examples, especially if extremes in the range came into direct 'competition'. Rather it would mean that during the early period of metal currency size differences were not enshrined in any intra-societal classification relating to age, gender or occupation and that these only emerged subsequently. Another problem in making any judgement on the visual impact or perceived value of the implements is that archaeologists normally only see the metal components, where size is the most obvious aspect of variation. We must also allow for relative value to be measured in terms of craftsmanship, the ornateness of hilt and sheath (eg Clarke *et al.* 1985, pl. 5.54; Henshall 1968), and any mythology associated with the individual object.

The majority of British tanged copper blades apparently fall into a single size population between 50 and 165 mm long, peaking at around 100 to 120 mm. I have included here Gerloff's 'knife-daggers with projecting butt' (1975, nos 237–9) which, along with M5 from Barrow Hills (Fig. 4.23), fall at the lower end of the spectrum and need not necessarily be regarded as a discrete type. A minority of tanged copper blades are somewhat longer, ie over 225 mm, a differential that seems to be mirrored in western France and beyond (Briard 1991, 186).

The bronze dagger from barrow 3 (M10) has been classified by Gerloff as variant East Kennet within her type Milston (1975, no. 63). These belong essentially to a family of early flat riveted blades being distinguished by the provision of more rivet emplacements around the butt. The Barrow Hills example had at least five rivets. Its cutting edges have been given a double edge bevel. Although a slight feature, it seems possible that it was deliberately executed, deriving from the practice of 'hollow-grinding' blade edges on copper daggers (eg Piggott 1963, 70). Double bevels are also a regular feature on early, mostly copper, flat axes where neat execution often suggests that they were considered to be an embellishment (Kinnes *et al.* 1979, 142).

The flat riveted daggers of types Butterwick, Milston and Masterton are generally held to stand at the beginning of the alloyed bronze series (cf Gerloff 1975). The date, nature and speed of transition from copper to bronze metallurgy are issues that have long commanded attention and the Radley evidence broaches them again. Recent analytical work, primarily on axes, looked at against typology and associations has suggested that the metallurgical change was effected relatively quickly, at least in the sphere of axe production (Needham *et al.* 1989, 391–3). The fact that a strong typological / compositional correlation has also long been recognised for the dagger series (eg Britton 1963) might suggest a parallel development. However, the possibility of co-existent metalworking traditions giving rise to distinct 'Metalwork Assemblages' potentially involving, *inter alia*, different alloying and depositional practices, cannot be ruled out; only independent dating evidence is likely to add conviction to any such suggestion. There are still very few radiocarbon dates that can be applied directly to the issue of the copper / bronze transition, but the new Barrow Hills determinations for 'flat' grave 4660 and the central grave of barrow 3 add valuable evidence. Only three tanged copper blades have been dated by means of associated grave goods or furniture (Table 7.8). The calibrated date ranges are much overlapping and suggest a conservative date bracket prior to about 1900 cal BC (90–95% confidence); the most likely currency lies between 2190 and 1890 cal BC for Barrow Hills (95% confidence) (3650±50 BP; BM-2704), and earlier for Chilbolton and Barnack, *c.* 2300–1900 (Table 7.8). These tanged blade graves thus seem to belong to the closing centuries of the third millennium.

Six flat bronze daggers have directly associated radiocarbon measurements (Table 7.8), one of which is uncomfortably late, perhaps due to multiple insertions into the grave (Manor Farm), and another is worthless on account of its large standard deviation and the unclear nature of the sample (Ashgrove). The remaining three examples, however, have earlier date ranges, either bridging the turn of the millennium (Gristhorpe — note the poor precision of this result), or effectively pre-dating 2000 cal BC. Thus it would appear that the earliest flat riveted bronze blades can, like tanged copper blades, be attributed to the closing centuries of the third millennium. This radiocarbon evidence taken at face value does not necessarily mean that the two general types overlapped in time significantly. If we follow the suggestion that the metallurgical transition from copper-based to bronze-based dagger/knife production was relatively swift, then the evidence points to that transition having occurred at some point within the period *c.* 2200–2000 cal BC. Further evidence for the introduction of tin alloying prior to 2000 cal BC comes from Barrow Hills awl M6 (Fig. 4.50), which is of an early form and has an early radiocarbon date of 2330–1950 cal BC (95% confidence)(3720±60 BP; BM-2699), but contains 5% tin. The Upper Thames area has yielded other metalwork potentially bridging the transition: the now well known Dorchester-on-Thames copper knife employing a bronze rivet (Hawkes 1955, GB 1); and, conversely, a bronze dagger from Gravelly Guy which employs three copper rivets (Gerloff forthcoming). Given that virtually all the more 'developed' types of dagger and axe that have been analysed have proved to be tin-bronzes (Gerloff 1975, 266, app. 10; Needham *et al.* 1989), it would appear that most production soon became dependent on regularised tin-bronze supplies. This does not exclude the possibility of occasional unalloyed copper objects at later dates, especially due to *ad hoc* production close to copper sources, or importation of objects or metal from regions not yet using tin-bronze consistently, a circumstance that has been invoked to account for one of the Bush Barrow daggers (Needham *et al.* 1989, 392). Such importation might also explain the unalloyed composition of knife-dagger M15 at Radley (Fig. 5.11), the form and associations of which suggest a full early Bronze Age, rather than Copper Age, date.

Setting aside the tanged copper knife (M5) already discussed, the remaining three at Barrow Hills are riveted forms, all with two rivets (M8, M11, M15; Figs 4.82, 5.2, 5.11). M8 and M11 have essentially 'flat' blade sections, although the better preserved M11 shows distinct side hollowing to thin the edges; M15 may have carried converging ribs on its blade.

Gerloff concluded that 'flat' knife-daggers were unlikely to pre-date the Wessex culture, although she was a little cautious on this point (1975, 167–8). A continuing problem lies in the fact that relatively few of the type occur in association with diagnostic artefacts, and these few tend to have distinctive 'Wessex' affiliations. Possible pre-Wessex origins for flat bronze knife-daggers should not, however, be ruled out, especially if they are seen to stem from similar-sized copper blades. The radiocarbon date associated with Barrow Hills M8 gives an early span of *c.* 2040–1680 cal BC (95% confidence)(3520±70BP; OxA-1886) which should equate broadly with both Wessex 1 (Burgess stage VI) and earlier stages (IV and V). This is intriguing in the light of the associated bone tweezers and ring-headed pin which are generally taken to be parts of a Wessex 2 package (currently datable *c.* 1700–1500 cal BC). However, Garwood's evaluation gives this date a 'moderate value', essentially a *terminus post quem* (Ch 4, footnote 43).

There are few other radiocarbon dates well associated with knife-daggers or knives which also have good precision (see Table 7.8). The Gairneybank example (Kinross-shire), associated with a Food Vessel bowl (Cowie and Ritchie 1991) has a very similar date range to Barrow Hills M8, as does that from Manor Farm burial 2 (Olivier 1987). A very damaged blade associated with Cremation E at Welsh St Donats (Ehrenberg *et al.* 1981–2, 829 no. 1) has been dated broadly to the middle Bronze Age by radiocarbon; 1550–1000 cal BC (95% confidence) (3020±100 BP; BM-1679R, Bowman *et al.* 1990, 67). Another riveted blade with a groove-defined midrib from a cremation at Easton Down is thought to pre-date the deposition of charcoal in the top of the primary ditch silts (Fasham 1982). The charcoal has yielded a date range which is again too imprecise to be of use here (generally middle Bronze Age). A three-riveted knife with a gently thickened centre line from Hodcott Down, Berks, accompanied a cremation thought to be roughly contemporary with an old ground surface which yielded charcoal dated within the 19th–16th centuries cal BC (Richards 1986–90, 12, fig. 13). There is, however, the problem of possible age offsets with the Easton Down and Hodcott Down samples, as the former was unidentified and the latter consisted of samples from large and mature timbers (Jordan et al. 1994; 80, 104).

Awls

Five of the Barrow Hills graves have yielded single copper or copper alloy awls. Awls are generally one of the more common metal associations in funerary contexts, where they are almost invariably single examples, although rare graves may have two or three together (Gibbs 1989, 105–6, 156–7).

Thomas has advanced a relatively complex classification of awl morphology (1968). This serves to illustrate the degree of variation, albeit in terms of subtle feature distinctions, but in the absence of a corpus it is difficult to see whether it aids interpretation. Other writers have tended to deal only with the broader distinctions. Clarke noted that Beaker-associated metal awls were without exception of the double-tapered, thickened centre type — Thomas' group 1 (Clarke 1970, 261). Burgess (1979, 209) also sees this as the earliest form, having been introduced with other Beaker paraphernalia from the continent. Single-point, or tanged, awls (Thomas' group 2) are held to have been added to the repertoire much later, in Burgess' early Bronze Age stage VI. He believed the double-pointed form continued in use as the minor type alongside the newer class (*ibid.*; Burgess 1980, 115).

The Barrow Hills awls can be classified in one case as Thomas' group 1 (M6: type 1B) and in three cases as group 2 (M1: type 2A or 2B; M9: type 2D; M14 type 2A). The fifth awl, M7, is uncertain owing to the loss of one end. The dating evidence from the site conforms to the broader pattern in that the awl dated to before *c.* 1950 cal BC by radiocarbon (M6) is of the early group; 2330–1950 cal BC (95% confidence)(3720±60 BP; BM-2699). The associated radiocarbon or artefact evidence for the other awls suggests dates after 2000 cal BC, indeed in the case of M7 (from grave 203 in ring

Table 7.8. Comparative radiocarbon dates for the Barrow Hills metalwork (1). Calibrated age ranges were calculated as described on p.xxiii. 1σ ranges printed in bold

Site	Sample	^{14}C date	Lab. no.	Calibrated ranges, and % confidence	Associations / comments	References
A. Tanged copper blades						
Barrow Hills 'flat' grave 4460	Human bone collagen	3650±50	BM-2704	2050–1960 (37%) **2140–2070 (31%);** 2190–1890 (95%)	This volume	
Barnack, Cambridgeshire, primary	Charcoal from coffin	3660±60	BM-1412	**2140–1960 (68%);** 2210–1880 (94%)	W / MR Beaker, gold-studded bracer, 'bow' pendant	Donaldson 1977; Kinnes *et al.* 1991, 55
	Charcoal from coffin	3570±80	HAR-1645	**2040–1870 (54%)** **1850–1770 (13%);** 2140–1700 (95%)		
	Human bone collagen	3770±35	BM-2956	**2290–2140 (68%);** 2330–2130 (90%)		
Chilbolton, Hampshire, primary	Human bone	3740±80	OxA-1072	**2290–2030 (68%);** 2500–1950 (95%)	W / MR Beaker, gold baskets, spatula, stone beads, flint flakes	Russel 1990
B. Flat rivetted bronze daggers						
Barrow Hills, barrow 3	Human bone	3785±90	OxA-4355	**2360–2130 (57%);** 2500–1950 (95%)	This volume	
Gristhorpe, Yorkshire	Oak branches (on coffin)	3590±100	HAR-4424	**2140–2070 (12%)** **2050–1870 (46%)** **1840–1780 (9%);** 2300–1650 (95%)	Contracted inhumation in log coffin; bone pommel and pin, horn ring, wooden instrument, 3 flint flakes, bark vessel.	Gerloff 1975, no. 55
Manor Farm, Lancashire, burial 1	Human bone	3270±80	HAR-5628	**1680–1500 (61%);** 1750–1410 (95%)	Contracted inhumation and other human remains; flat bronze axe; surprisingly late date due to intrusive secondary burials?	Olivier 1987
	Associated animal bone	3450±70	HAR-5661	**1880–1690 (68%);** 1960–1600 (95%)		
Gravelly Guy, Oxfordshire, grave 4013/12	Human bone	3709±35	UB-3122	**2190–2110 (35%);** **2090–2030 (33%)** 2210–2020 (95%)	Pommel, fragmentary Cu alloy awl or pin, bracer, antler spatula, 'sponge finger' stone, S3 Beaker, flint scraper and flakes	Lambrick *et al.* in prep.
Ashgrove, Fife, cist 1	Vegetable material	2950±150	Q-764	**1390–990 (68%);** 1550–800 (95%)	Contracted inhumation; bone pommel, horn hilt, S4 Beaker; large standard deviation, and doubt about nature of association	Henshall 1963–4, 174; Gerloff 1975, no. 27
Collesie, Fife	Sheath remains attached	3690±80	OxA-4510	**2200–1960 (68%);** 2450–1850 (95%)	Cremation on old ground surface; gold binding to dagger	Hedges *et al.* 1995, 424

Table 7.8. Comparative radiocarbon dates for the Barrow Hills metalwork (2). Calibrated age ranges were calculated as described on p.xxiii. 1σ ranges printed in bold

Site	Sample	¹⁴C date	Lab. no.	Calibrated ranges, and % confidence	Associations / comments	References
C. Flat and midribbed, rivetted knife-daggers						
Barrow Hills, barrow 1, grave 11	Oak charcoal and seeds	3520±70	OxA-1886	**1940–1750 (68%);** 2040–1680 (95%)	This volume	
Gairneybank, Kinross-shire, cist 1	Human bone collagen	3470±80	GU-1118	**1900–1680 (68%);** 2030–1610 (95%)	Contracted inhumation; FV bowl	Cowie and Ritchie 1991
Manor Farm, burial 2	Human bone	3440±70	HAR-6857	**1880–1680 (68%);** 1950–1600 (93%)	Contracted inhumation.	Olivier 1987
Hodcott Down A, Berkshire	Charcoal in old ground surface	3370±70	HAR-3608	**1750–1600 (59%) 1570–1530 (9%);** 1880–1510 (95%)	Cremation; burial may be contemporary with OGS and charcoal?	Richards 1986–90
		3340±70	HAR-3599	**1740–1520 (68%);** 1780–1450 (95%)		
Welsh St Donats, Glamorgan, burial E	Charcoal 'pole' across burial	3020±100	BM-1679R	**1410–1130 (68%);** 1550–1000 (95%)	Cremation; sheep bones. Large standard deviation limits usefulness	Ehrenberg *et al.* 1981–2, 8 22; Bowman *et al.* 1990
Easton Down, Hampshire	Charcoal in top of primary ditch fill	3070±120	HAR-1040	**1460–1130 (63%);** 1650–1000 (95%)	Cremation; 3 amber beads, twisted wire. Large standard deviation and TAQ relationship to burial limit usefulness	Fasham 1982
D. Awls						
Barrow Hills, barrow 12, grave 607	Human bone collagen	3720±60	BM-2699	**2210–2030 (63%);** 2330–1950 (95%)	This volume	
Barrow Hills, ring ditch 801, cremation 802	Charcoal (mixed species)	3450±70	OxA-1888	**1880–1690 (68%);** 1970–1600 (94%)	This volume	
Barrow Hills, ring ditch 201, grave 203	Human bone collagen	3360±50	BM-2700	**1740–1610 (67%);** 1770–1520 (93%)	This volume	
Down Farm, Dorset, F2	Oak charcoal, >15 years	3620±110	BM-2189R	**2140–1870 (61%)** 2350–1650 (95%)	Cremation; large standard deviation limits usefulness	Barrett *et al.* 1991a
Down Farm, F12, L9	Mixed young charcoal	3500±130	BM-2190R	**2030–1680 (68%);** 2200–1500 (95%)	Cremation; Collared Urn, 2 bone awls; large standard deviation makes worthless	Barrett *et al.* 1991a
Amesbury G51, Wiltshire, burial A	Plank over body	3740±60	BM-287	**2290–2120 (53%) 2090–2040 (15%);** 2360–1970 (94%)	Crouched inhumation, S2 Beaker, spatulae, flint knife	Kinnes *et al.* 1991, 55

Table 7.8. Comparative radiocarbon dates for the Barrow Hills metalwork (3). Calibrated age ranges were calculated as described on p.xxiii. 1σ ranges printed in bold

Site	Sample	14C date	Lab. no.	Calibrated ranges, and % confidence	Associations / comments	References
D. Awls (ctd)						
Welsh St Donats, burial C	Charcoal associated with burial on OGS	3470±100	BM-1681R	**1940–1680 (68%);** 2150–1500 (95%)	Crouched inhumation. FN Beaker; large standard deviation limits usefulness	Ehrenberg *et al.* 1981–2, 814; Bowman *et al.* 1990
Roxton, Bedfordshire	Charcoal from burial	3620±80	HAR-997	**2140–2070 (18%) 2050–1890 (50%);** 2300–1750 (95%)	Cremation in Collared Urn, bone bead, flint flake, pottery vessel	Longworth 1984, 140
Garton Slack 7, Yorkshire	Charcoal from large timbers	3550±70	HAR-1236	**1980–1870 (41%); 1850–1770 (20%);** 2050–1700 (89%)	Double cremation; Food Vessel	Brewster 1980, 219, fig. 100; Dent 1983, 10
Cowleaze B, Dorset, cremation 2	Charcoal from burial	3120±120	HAR-5620	**1530–1210 (68%);** 1700–1210 (95%)	Cremation, shale-like stud	Woodward 1991
Gravelly Guy, grave 4013/12	Human bone	3709±35	UB-3122	**2190–2110 (35%); 2090–2030 (33%);** 2210–2020 (90%)	Possible awl - see entry under 'B'	Lambrick *et al.* in prep.
Dorchester-on-Thames, Oxfordshire, site 4	Charcoal in pit	3690±130	BM-2167R	**2290–1910 (68%);** 2500–1750 (95%)	Adult cremation in inverted Collared Urn with flint flake.	Whittle *et al.* 1992, 193–4
Bedd Branwen, Anglesey	Charcoal in accessory vessel	3224±80	BM-453	**1610–1420 (68%);** 1700–1370 (92%)	Collared Urn with cremation, accessory vessel and 2 flint flakes. Awl fragmentary	Lynch 1971, 30, 82; Longworth 1984, 140
E. Early metal ornaments						
Chilbolton	Human bone	3740±80	OxA-1072	**2290–2030 (68%);** 2500–1950 (95%)	W/MR Beaker, gold baskets, spatula, stone beads, flint flakes	Russel 1990
Barrow Hills barrow 4A	Human bone	3880±90	OxA-4356	**2500–2270 (61%);** 2650–2000 (95%)	Gold basket ornaments *et al.*	This volume
Barrow Hills grave 919	Human bone	3930±80	OxA-1874	**2510–2310 (58%);** 2700–2100 (93%)	3 copper rings *et al.*	This volume
Garton Slack 6	Human bone	3487±70	HAR-1282	2030–1670 (95%); **1910–1730 (67%)**	Crouched inhumation; 6 bronze beads, jet toggle, buttons and beads	Dent 1983, 10; Brewster 1980, 202, figs 89–92
Shorncote, Gloucestershire	Human bone collagen	3480±60	BM-2892	**1890–1740 (68%);** 1980–1670 (95%)	Crouched inhumation; bronze bracelet, Beaker; flint flake	Barclay and Glass 1995
Migdale, Sutherland	Wooden core of bead	3665±75	OxA-4659	**2140–1940 (63%);** 2300–1750 (95%)	Migdale hoard of eponymous phase - early use of bronze	Hedges *et al.* 1995, 424

ditch 201) probably later than 1770 cal BC; 1770–1520 cal BC (93% confidence) (3360±50 BP, BM-2700). The dating of British material in relation to the latest continental evidence would place Burgess' metal-working stage VI *c.* 19th and 18th centuries cal BC. Tanged awls could then first appear at about this time, ie the Bush Barrow/Wessex 1 phase of graves, or conceivably a little earlier.

Longworth defined three awl forms amongst those associated with Collared Urns (1984, 59). Only two urn burials had double-pointed awls, his form 1, whereas 20 contained single-pointed varieties which he divided into two forms (forms 2 and 3). Form 2 (broadly equating with Thomas' type 2D) gives a good parallel in the Winterbourne Stoke example for Barrow Hills M9. This form occurs with just two Collared Urns, both belonging to the Primary Series.

For Beaker-associated awls, Clarke reported a ratio of 3:8 skeletons identified as male/female (1970, 449, app. 3.3). This preponderance of female associations he saw as perhaps implying 'duties concerned with piercing and stitching leather clothing (?)' (*ibid.*, 265). Gibbs has extended this analysis to include all Beaker/early Bronze Age grave contexts. For the Beaker tradition she found that 16% of female-sexed burials were accompanied by metal awls, compared to only 6% of male-sexed burials. In subsequent early Bronze Age traditions (her 'RG/MV') this imbalance increased to figures of 21% (23 examples) and 2% (2 examples) respectively (Gibbs 1989, 105–6, 156–7). She suggests that awls may have served for decorating a variety of materials rather than as specific hole-piercing implements to aid sewing. The Glentrool hoard implements which Coles interpreted as for decorating metalwork (1963–4, 117, 121, fig. 16) are of a slightly different form from objects normally classed as awls. Nevertheless, different functions could cut across these morphologies.

The significant minority of Beaker male associations for awls, represented by nine grave groups, is in part accounted for by three groups regarded by Smith and Simpson as leather-working kits, which can include antler/bone spatulae and stone sponge-fingers (1966, 134 sqq). These and other grave groups similarly interpreted but lacking metal awls (although in one case with a bone awl) are all from burials either sexed as male, or left unsexed (*ibid.*, 136, table I). Foxon reviewed bone and antler spatulae in Beaker graves in the light of the new Chilbolton example (1990, 166–7). He reminds us of other interpretations that have been advanced for the function of spatulae, relating to potting, netting and components of archery equipment.

The Beaker types associated with 'leather-working kits' and/or metal awls are varied, but focus primarily on Clarke's Southern and Northern series Beakers (1970, 448, app 3.2; Smith and Simpson 1966, 136, table I). These would traditionally be seen as belonging to the later part of the Beaker sequence; however, recent radio-carbon dating points to a less systematic typo-chronological seriation with Southern and Northern styles of Beaker appearing relatively early (Kinnes *et al.* 1991), perhaps before 2200 cal BC. Regardless of precise chronology, it would seem that metal awls, which were usually female accoutrements, could be drawn into male Beaker graves as part of a package having specific functional connotations. With the demise of the 'leather-working' assemblage in non-Beaker burial traditions, the association of metal awls with females became almost universal.

Only ten awl-associated burials outside the Barrow Hills cemetery are dated as yet, some with very poor precision. Burial A at Amesbury 51 with a group 1 awl has a date of 3740±60 BP which on calibration (at 94% confidence) gives a date of 2360–1970 cal BC (BM-287) (Table 7.8). Most of the others are group 2 awls and probably belong to a later period.

ANALYSIS OF EARLY BRONZE AGE METALWORK FROM BARROW HILLS

by Peter Northover

It has proved possible to analyse all the copper alloy metalwork included in the catalogue, although in one or two cases the objects proved to be totally corroded. Some items were analysed twice because the first samples taken were thought to be inadequate with regard to either size or corrosion state. In fact, all analyses turned out to be acceptable so that the data provide a good measure of the consistency of the analytical technique within this project. Of the gold objects, one 'earring' has been analysed quantitatively, while one of the bead covers has been analysed qualitatively in the course of determining whether there was any form of solder attached to them. The compositions were determined by electron probe microanalysis, the methods used being summarised as an appendix to this discussion. The results are tabulated in Table 7.9.

The three copper rings (M2–4) from Beaker 'flat' grave 919 (Figs 4.14–16) are of the first importance for the history of metallurgy in England, because of their early date, which must be very close to the very middle of the third millennium BC. They are probably the earliest absolutely dated metalwork from England. Although there are small variations, the three are evidently all of the same type of copper with <0.10–0.19% arsenic, 0.04–0.07% antimony, 0.01–0.14% nickel and 0.08–0.15% silver. The key question must be the origin of the metal. The theory has been advanced that copper metalwork entered England from two directions: from Ireland, often in the form of large products such as axes, and from continental Europe, mainly in the form of small or élite products such as knives, awls, and ornaments (Northover 1983). The two could be distinguished by the almost universal association of an arsenic/antimony/silver impurity pattern with the Irish metal and a wide variety of compositions, often with significant nickel contents, with the continental metalwork. The involvement of British copper was discounted because at that time there was no knowledge of copper mines in Britain at so early a date. This still remains the case but the possibility of metal from the British Isles being used in these rings can no longer be completely excluded.

At Ross Island, Co. Kerry, Beaker pottery is associated with a sulphide ore deposit containing tennantite which would be capable of producing the typical Irish copper impurity pattern, the earliest working of which is so far dated to 2400 cal BC. The Barrow Hills rings are definitely not of this type; however copper with rather low levels of impurities can be found in some flat axes which can be dated somewhat later in the third millennium cal BC and can be tentatively attributed to British sources. No British copper sources have so far yielded dates much before 2000 cal BC, much later than those associated with the rings.

For pieces as early as the Barrow Hills rings there must then be some presumption in favour of a continental origin for the metal if not the rings themselves. Unfortunately for this proposition, parallels of comparable date are not easy to find and later copper metalwork from northern and western France and the Low Countries is radically different in composition. Closer comparisons can be found with metal further afield, for example early to middle Neolithic finds from Denmark (Northover unpublished; Vandkilde 1990 and forthcoming). This in turn raises the possibility that the metal had been carried a very long distance from its ultimate source by the time it was deposited at Barrow Hills; we can say nothing about the direction in which that source was located.

Two later objects from Barrow Hills are also of copper: the knife-dagger M5 from the Beaker 'flat' grave 4660 (Fig. 4.23) with a date of 2190–1890 cal BC (95% confidence)(3650±50 BP; BM-2704), ie the last quarter of the third millennium cal BC, and the knife-dagger M15 from pit E of Barrow 16 (Fig. 5.11). These two objects have very similar compositions indeed, with 0.84–0.91% nickel, 1.55–1.63% arsenic and 0.35–0.38% antimony. Both have an iron impurity while M5 has 0.08% bismuth and silver and M15 has these two elements at or below the limit of detection. The accumulated analytical evidence from early Bronze Age Britain makes it highly unlikely that the metal in these blades came from a British mine, and a continental origin for the metal can be accepted. British parallels for the composition can be found among tanged copper daggers (Gerloff 1975, 266) and can also be traced across the Channel (Butler and van der Waals 1967). The small tanged dagger from the primary burial at Chilbolton, Hampshire (Russel 1990, 162-63) contained 0.58% arsenic, 0.43% antimony, 0.07% silver, but only 0.17% nickel. The burial is associated with a radiocarbon date of 2500–1950 cal BC (95% confidence)(3740±80BP; OxA-1072). These associations of compositions and dates, together with analyses published by Gerloff (1975, 266) show the types of copper likely to be in circulation in southern Britain up to the end of the third millennium cal BC. Not enough knife-daggers have been analysed to know whether there are any other parallels among the British riveted examples.

The knife dagger M15 contained a bronze rivet and was deposited with a bronze awl. At a time of transition from copper use to bronze use such combinations are to be expected but have a tendency to be misinterpreted. For metal produced in the British Isles (Northover, 1983) the transition from copper to bronze appears to have been rapid and complete. Bronze forms are rarely found in copper and *vice versa,* while finds combining copper and bronze seem to be confined to the period 2200–2100 cal BC. A striking example of this is the bronze dagger from Gravelly Guy, Stanton Harcourt (Gerloff forthcoming) which has four copper plug rivets which must have been a matter of design rather than necessity and a consequence of the local availability of two metals of contrasting colour. Driving the general adoption of bronze must have been the combination of the availability of tin and the very great improvement in properties over typical copper tools and weapons.

The position on the Continent was different, with possibly much more limited access to tin, at least initially, and effective competition from other alloys. Thus copper objects in a 'bronze' context in southern Britain do not necessarily represent heirlooms or a conservative streak among local metalworkers, but simply the use or reuse of copper objects from the Continent where their use persisted longer. The blade M15 might even be a Continental blade cut down and re-hafted in Britain by a smith with a supply of bronze wire suitable for making rivets already in his scrap box. The awl has a rather high tin content of nearly 13% which means that it could potentially be forged to a high hardness. The rivet is corroded but could originally have been a similar alloy and, probably, of a similar copper type with low levels of nickel, arsenic, antimony, etc., much as in the copper of the copper rings.

The other bronzes from Barrow Hills fall into two alloy groups. Three objects are of a low to medium tin bronze with 5–6% tin: the awls M6 and M7 (Figs 4.50, 4.78), with dates from the last quarter of the third millennium BC and the second quarter of the second millennium BC, and the dagger rivet from the central burial from barrow 3 (Fig. 5.2, M10), dated to the second half of the third millennium. The copper types vary somewhat: the rivet has nearly all impurities below 0.1% while the awls have almost identical compositions with 0.05% nickel, 0.33–0.44% arsenic, 0.12–0.15% antimony, 5.12–5.17% tin and 0.09–0.17% silver, even though they were deposited at very different times. It is very likely that such small objects as awls were made of recycled metal from more than one origin; the same is possibly less probable for the dagger, the low impurity metal of which could indicate a British origin. The low tin contents convey no particular chronological or other information other than the choices of the smiths who made them, moderated by the availability or otherwise of particular metals. Certainly the tin contents are sufficient to produce a perfectly adequate tool or blade. The remaining bronzes with 9–14% tin generally have arsenic and nickel as their principal impurities. Such compositions are common throughout the early Bronze Age in southern Britain and indicate the general consistency of much of the metalworking from the end of third millennium and the first half of the second millennium BC. There are no exotica at Barrow Hills like the imported Armorico-British arsenical copper dagger at Wilsford G5 (Gerloff, 1975, 267).

Table 7.9. Analyses of Bronze Age metalwork from Barrow Hills

Sample	Context	Drawing/ object no.	Object	Fe	Co	Ni	Cu	Zn	As	Sb	Sn	Ag	Bi	Pb	Au	S
Copper and copper alloy																
OX16	Ring ditch 801, cremation 802	M1/sf 642	Awl	0.02	0.01	0.32	86.11	0.00	0.19	0.04	13.20	0.01	0.00	0.10	0.00	
OX17	'Flat' grave 919	M2/sf 595	Ring	0.07	0.00	0.14	99.46	0.02	0.10	0.06	0.01	0.11	0.00	0.00	0.03	
OX15		M3/sf 598	Spiral ring	0.02	0.00	0.12	99.56	0.00	0.09	0.07	0.00	0.08	0.02	0.03	0.01	
OX13		M4/sf 599	Ring	0.00	0.01	0.06	99.68	0.00	<0.05	0.04	0.01	0.15	0.01	0.00	0.01	
OX97	'Flat' grave 4660	M5/sf 652	Knife dagger	0.09	0.01	0.84	96.83	0.01	1.63	0.35	0.02	0.08	0.08	0.02	0.04	0.01
OX14	Barrow 12, grave 607	M6/sf 544	Awl	0.08	0.00	0.05	94.02	0.00	0.33	0.15	5.17	0.17	0.03	0.00	0.00	
OX18	Ring ditch 201, grave 203	M7/sf 515	Awl	0.01	0.01	0.05	94.12	0.01	0.44	0.12	5.12	0.09	0.01	0.02	0.00	
OX96	Barrow 1, grave 11	M8/sf 507	Knife-dagger	0.05	0.01	0.21	88.60	0.00	0.38	0.16	10.22	0.14	0.11	0.01	0.06	0.05
OX23	Barrow 2, central grave	M9/1945.111	Awl	0.58	0.02	0.03	87.92	0.01	<0.05	0.00	11.30	0.00	0.03	0.11	0.00	
OX26	Barrow 3, central grave	M10/1945.112	Dagger blade	0.10	0.01	0.05	90.19	0.00	0.35	0.02	9.25	0.00	0.02	0.01	0.00	
ASH222			Dagger blade	0.01	0.00	0.02	88.67	0.00	0.70	0.00	10.45	0.00	0.08	0.04	0.01	0.01
OX27			Dagger rivet	0.01	0.03	0.04	94.33	0.01	0.01	0.00	5.43	0.12	0.01	0.01	0.00	
ASH221			Dagger rivet	0.00	0.01	0.04	94.00	0.02	<0.05	0.00	5.74	0.05	0.01	0.07	0.00	0.03
OX98	Barrow 4, cremation	M11/1944.126	Knife-dagger blade	0.05	0.00	0.12	84.72	0.03	0.00	0.06	14.39	0.07	0.00	0.25	0.06	0.05
OX99			Knife-dagger rivet	*0.32*	*0.02*	*0.04*	*61.44*	*0.05*	*0.05*	*0.05*	*16.37*	*0.14*	*0.01*	*0.08*	*0.00*	*0.27*
OX100	Barrow 14, central cremation	M12/1931.239	Leaf-shaped razor?	0.04	0.00	0.05	84.78	0.01	0.77	0.00	14.19	0.01	0.05	0.04	0.04	0.03
ASH220	Barrow 16, pit E	M14/1937.170	Awl	0.06	0.02	0.11	86.55	0.01	<0.05	0.04	12.91	0.04	0.00	0.11	0.00	0.12
OX25		M15/1937.169	Knife-dagger blade	0.16	0.01	0.91	96.96	0.00	1.55	0.38	0.00	0.02	0.00	0.01	0.00	
ASH219			Knife-dagger rivet	*0.05*	*0.01*	*0.25*	*57.57*	*0.02*	*0.00*	*0.13*	*41.17*	*0.02*	*0.00*	*0.52*	*0.02*	*0.25*
Gold																
OX	Barrow 2, central cremation	G1–2	Bead cover				+					++			++++	
OX20	Barrow 4A, central burial	G3–4	Basket 'earring'	0.05	0.00	0.00	0.81	0.00	0.00	0.01	0.00	6.88	0.00	0.00	92.33	0.00

The graves at Barrow Hills contained four gold objects, two basket 'earrings' from Barrow 4A (Fig. 5.4, G3–4) and two domed sheet objects probably bead covers, from Barrow 2 (Fig. 5.3, G1–2). The two bead covers probably combined via a mechanical joint to cover completely a single bead. One 'earring' was analysed quantitatively and contained 6.88% silver and 0.81% copper, with a small iron impurity. The detection limit for tin is slightly increased in alloys containing silver because of interference from a minor line in the silver X-ray spectrum; the tin content of the 'earring' must be less than 0.05%. The qualitative analysis of the bead covers indicated the use of very similar metal.

The burial at Chilbolton already referred to also contained a gold bead and two pairs of basket 'earrings'. The compositions of all these are not dissimilar to those of the Barrow Hills example with 9.3–11.0% silver and from less than 0.1% up to 1.5% copper. The earliest gold working in Britain which, as at Radley and Chilbolton overlaps the transition from copper to bronze metal-working, is almost entirely based on sheet, although small gold rivets become a decorative feature of dagger hilts soon afterwards. The gold metal is unalloyed, unrefined natural gold. Silver is a component of almost all natural gold, which also contains some copper. The copper contents of Bronze Age gold gradually increase with time until, in the last quarter of the second millennium cal BC it can definitely be described as alloyed (Taylor 1980). The copper content of unalloyed natural gold, though, is generally well below 1%, so that the 0.81% in the Barrow Hills 'earring' and the 1.3–1.5% in the Chilbolton examples may be simply some contamination from copper particles picked up in the workshop. The lower values recorded at Chilbolton truly do represent natural gold. The relatively low silver contents are consistent with the use of alluvial gold, although the use of vein gold cannot be ruled out. Gold analysis has not yet advanced to the stage where detailed information as to provenance can be determined. The dating of the Chilbolton burial has already been discussed and the date of 2650–2000 cal BC (95% confidence)(3880±90 BP; OxA-4356) for the Barrow Hills 'earrings' places them at a similar horizon in the second half of the third millennium.

The rich collection of metalwork from the late Neolithic/early Bronze Age cemetery at Barrow Hills has great significance for our understanding of early metalwork in the Oxford area. The number of pieces from excavated contexts and their associations, the number of pieces with associated radiocarbon dates, and the range of dates all contribute to this. The collection also has a national importance in that chronologically it bridges the introduction of bronze as opposed to copper artifacts and sheds some light on the dating of this change.

Appendix: methods

Copper alloy samples were drilled using a hand-held model maker's electric drill with either 0.5 mm or 1 mm diameter bits, hot-mounted in copper-filled acrylic resin, ground and polished. The sample from the 'earring' was cut with a scalpel, while the qualitative analysis of the bead cover was made on the whole object. Analysis was by electron probe microanalysis with wavelength dispersive spectrometry. Operating conditions were an accelerating voltage of 25kV, a beam current of 30nA and an X-ray take-off angle of 40°. Initially twelve elements were analysed; for later samples sulphur was added to the element set; detection limits were 100–200 ppm, with the exception of 300 ppm for gold and 500 ppm for arsenic. The accuracy is ± 1–2% for major elements ranging down to ± 10–20% for trace elements. To avoid the interference between the strongest lines in the lead and arsenic X-ray spectra, the lead Lα and arsenic Kα, the strong lead Mα line was used for area analyses while the arsenic Kα was used in a separate point analysis at the centre of each analysis square. The solid solubility of lead in copper and bronze is so low that for selected points lead would not, in any case, be detectable. Pure element or mineral standards were used with a count time of 10 s per element.

Three areas, each 50μ square, were analysed on each sample. The mean of the three analyses is given in the Table 7.9.

PREHISTORIC POTTERY

by Rosamund M J Cleal
with a contribution by Alistair Barclay
Completed early 1993

Introduction

The prehistoric pottery from Barrow Hills comprises nineteen whole or reconstructable vessels from the 1983–5 excavations and four from the previous excavations, mainly from the burials, together with fragmentary material from other contexts. It ranges in date from the earlier Neolithic to the later Bronze Age.

The majority of the pottery was examined, and the report compiled, in 1985–6. Some additional material, not made available to the writer at that time, has subsequently been recorded by Alistair Barclay who has also re-examined the pre-1983 pottery. Both these groups of material are integrated here. The report was revised in 1992–3.

Methods

The pottery was examined with a x10 hand lens, and 52 fabrics were identified, mainly on the basis of type and frequency of the non-plastic inclusions present, with the texture and general appearance of the fabrics also taken into consideration. The term 'non-plastic inclusion' (or simply 'inclusion') is used throughout to describe any materials present in the fabric, other than the clay, which may or may not occur naturally. The term 'temper' is only used in the case of materials which must have been added by the potter in the preparation of the clay body. Colour was not considered to be an important variable because of the tendency of prehistoric vessels to display great ranges of colour variation, but it was recorded for featured sherds.

Throughout the report fabrics are designated by an alphanumeric code, which gives the initial letter(s) of all but the rare non-plastic inclusions in the fabric, and a number which refers to the detailed description in Table 7.10. The abbreviations used for the inclusions are as follows:

C — Chalk
F — Flint
G — Grog (comminuted potsherds)
S — Sand
Sh — Shell
Q — Angular Quartz
U — No visible inclusions
V — Voids, where the type of inclusion formerly present in the fabric is not known.

(V) is used where the inclusion type represented by the voids is known, usually because some of the original inclusions survive; the (V) code follows the abbreviation used for the inclusion type (eg Sh(V) indicates that although shell inclusions are present some have been leached or burnt out). Three inclusion types were not positively identified in the examination with hand lens (types 'A', 'B', and 'C'). The petrological analysis (Williams, this Chapter) suggests that these are argillaceous material (possibly mudstone) ('A' and 'C') and flint/chert ('B').

The following terms are used in fabric descriptions.

Hardness:

hard — cannot be scratched easily with the fingernail;
soft — can be scratched easily with the fingernail

Fracture:

hackly — irregular break;
smooth — self-explanatory.

Frequency:

is estimated as surface area of inclusion as a percentage of total surface area, using the Shvetsov method of estimation (Terry and Chilingar 1955):

rare — may not occur in all sherds of a fabric;
sparse — <10%;
moderate — *c.* 10% to 20%;
dense — 20% and greater.

Thin sections of some of the fabrics are described by David Williams below. The fabrics of the complete and reconstructable vessels are not as full as those for the sherd material, as in the case of the former the core of the fabric is generally obscured. Sherds and vessels which were not assignable to fabrics are given an abbreviated code consisting only of the inclusion types visible (eg 'Sh:-' indicates that shell only was visible).

In Table 7.10 and the tables in Chapters 3, 4 and 5 fabrics are shown with an abbreviation indicating ceramic style, or as indeterminate. Not all the sherds in these fabrics are themselves diagnostic, and the occurrence of only featureless sherds in a context is indicated by an asterisk. Clearly, those sherds which are assignable to style on fabric alone must be regarded as having a less secure identification than featured sherds.

Illustrated sherds are designated by 'P' numbers. Asterisks in the catalogue entries which follow the description of each subsite indicate that the sherds may be considered to belong to individual vessels for the purposes of an estimate of minimum number of vessels.

Sherd counts ignore breaks which are clearly fresh, ie two sherds separated by a fresh break are counted as one, whereas two sherds joining along an ancient break are counted separately.

Earlier Neolithic pottery

The amount of earlier Neolithic material recovered from Barrow Hills is very small in comparison with the later Neolithic and Bronze Age pottery from the site, and this is particularly surprising in view of the proximity of the Abingdon causewayed enclosure. Only two fabrics (SSh'A':1 and Sh(V):3) could be identified as certainly earlier Neolithic in date from the 1983–5 excavations, although one other (Sh(V)'C':1) may also belong to this period. In addition, a single sherd manufactured from the Abingdon flint-filled fabric was found during the excavation of Barrow 15. A total of 33 sherds, weighing 125 g, were of Fabric SSh'A':1, including two rim sherds, and one rim sherd was in Fabric Sh(V):3. Only a single body sherd occurred in Fabric Sh(V)'C':1.

The pottery appears to belong within the general range of fabrics and forms exhibited by the large assemblage from the Abingdon causewayed enclosure, only 100 m away. At Abingdon the vast majority of the pottery is in a fabric with dense shell inclusions, almost certainly fossiliferous in origin (Williams' Group 1; 1982, 27, 33–35). A small percentage of the pottery (*c.* 5% of the sherds) is of a sandy fabric with varying but small amounts of flint, quartz, and other stone fragments (Williams' Groups 2–4). Four thin sections of the shelly fabric from Abingdon were taken by Dr Williams, who also noted small amounts of limestone, quartz, and argillaceous matter, while thin sections of the sandy fabric revealed fragments of limonite, flint, mica, and some argillaceous matter, as well as quartz. Dr Williams suggests that the limonite is probably altered glauconite, which would indicate a source in the Upper Greensand, the nearest source for glauconite being at West Hagbourne, about 9 km from Abingdon (Williams 1982, 35).

The vessel represented by P1 (Fig. 3.4), with its heavy rounded rim and grooved decoration, is clearly paralleled at the Abingdon causewayed enclosure where similar rims are classified as type R1 (rounded, bulbous; Avery 1982, 28, table 3). Simple rounded, everted rims such as that exhibited by P55 (Fig. 4.55) from Radley are not common in the assemblage from the causewayed enclosure, but do occur (eg Avery 1982, fig. 17, 34–5). The form of P2 (Fig. 3.4), however, is not closely paralleled at Abingdon: internally projecting rim forms are present in the assemblage but this feature is rarely combined with a flat rim top, the rims more

Table 7.10. Pottery fabrics (1)

Fabric Code	Hardness	Fracture	FLINT	GROG	ANGULAR QUARTZ	QUARTZ SAND	?CHALK	Inclusion A (soft, grey-green, matt, subangular)	Inclusion B (matt, grey, angular)	Inclusion C	?LIME-STONE	Dark red grains (?iron oxides)	SHELL	VOIDS (rounded)	?Iron oxides (reddish, soft)	Dark grains (?iron oxides or glauconite)
CGS:1/ Bkr	Soft	Hackly	-	Moderate well-sorted rounded <2 mm	-	Sparse rounded coarse	Sparse well-sorted subangular rounded 2-4 mm	-		-	-	-	-	-	-	- -
CGS:2/ EBA	Soft	Hackly	-	Sparse ill-sorted subangular <3 mm	-	Sparse	Sparse ill-sorted rounded		-	-	-	-	-	-	-	- -
F:1/ D-R	Hard	Smooth	Dense well-sorted angular <2 mm	-	-	-	-	-	-	-	-	-	-	-	-	-
F:2/ D-R	Hard	Hackly	Dense ill-sorted angular <6 mm	-	-	-	-	-	-	-	-	-	-	-	-	-
F:3/ indet.	Hard	Hackly	Moderate dense ill-sorted angular <6 mm, most <3 mm	-	-	-	-	-	-	-	-	-	-	-	-	-
F:4/ indet.	Soft	Laminated	Sparse-moderate ill-sorted angular <6 mm, most <5 mm	-	-	-	-	-	-	-	-	-	-	-	-	-
F'B':1/ indet.	Hard	Hackly	Moderate dense well-sorted angular <3 mm	-	-	-	-	-	Sparse angular <3 mm	-	-	-	-	-	-	-

usually being of a rounded, bulbous form, or markedly angular (eg Avery 1982, fig. 14, 2–3, 10; fig. 15, 13 and 16; fig. 16, 24, 27 and 28). The rim form of P2 resembles Mortlake Ware forms, rather than those of Abingdon Ware, but the fabric is so similar to that of the Abingdon Ware sherds from Radley that it must be seen as belonging to that tradition rather than to any other, although radiocarbon dates for its context (the outer ditch of the oval barrow; Table A.1) indicate that it may have been deposited at a time when Mortlake Ware was developing.

The main focus of earlier Neolithic activity, at least as indicated by the distribution of the pottery, is clearly the oval barrow, from which all but one of the sherds were recovered. Eight featureless sherds came from layers 2 and 3 of the inner ditch, and twenty sherds, including the rim P2, from the outer ditch, mainly from layers 1 and 2, and from the topsoil (Table 3.1). One body sherd was discovered during the excavation of the Saxon SFB which cut the oval barrow. Feature 2144, the pit associated with the oval barrow, produced the typical Abingdon Ware rim and associated body sherds of P1. It must be noted, however, that both ditches of the oval barrow contained Beaker and Bronze Age sherds in their upper fill (layer 1), which implies that the Abingdon Ware sherds in that layer were redeposited long after their original use.

The single sherd of earlier Neolithic pottery not recovered from the area of the oval barrow is the rim P55 (Fig. 4.55), which was found in layer 3 of the outer ditch (601) of barrow 12, which also contained Beaker and Fengate Ware sherds in its lower levels (Table 4.25).

Peterborough Ware

The quantity of identifiable Peterborough Ware is very small, as it comprises only four sherds, weighing 18 g, all of the Fengate substyle. Two vessels are represented by rims typical of Fengate Ware: P8 (Fig. 3.11) and P56 (Fig. 4.55). Both sherds are very poorly-fired and are laminated: one of the fabrics represented (U:1) has no visible inclusions, and the other (S:4) has only sparse coarse sand, but the differences in fabric may be more apparent than real as the sherds involved are very small and it is possible that considerable variation existed within each vessel.

Two other body sherds of fabric U:1 were recovered, one of which, from the oval barrow, has a single indistinct impression, but the identification of these sherds as Fengate Ware is on the basis of the fabric identification only, and this must be regarded as doubtful because of the small size of the sherds.

A single other rim sherd (P18) in a fabric containing angular quartz (QV:1), from the upper fills of ring ditch 801 (Fig. 4.11), may be Fengate Ware, or possibly of the Ebbsfleet substyle. The identification is tentative and rests on the possible presence of incised lattice on the interior as well as the exterior surface. Neither the rim form, nor the colour are typical of either substyle, and the identification of the decoration is uncertain because of the worn condition of the interior surface. If the sherd is Peterborough Ware it is clearly redeposited, and can only be taken as indication of activity associated with this style somewhere in the area.

The two Fengate Ware rim sherds (P8 and P56) are sufficiently alike in fabric, form, and decoration to suggest that they may have been deposited or discarded during a single episode of activity.

Sherds of Fengate Ware were recovered from the inner ditch of the Abingdon causewayed enclosure (Case and Whittle 1982, 30; Case 1956a, fig. 4, 35–6). Only one rim sherd (Case 1956a, fig. 4, 36) resembles either of the Radley rims: both this and P56 have a curvilinear motif on the collar exterior and decoration of the internal rim bevel. No fabric descriptions of the Abingdon Fengate Ware are given in the published report and the decorative techniques cannot be identified from the published illustrations.

Grooved Ware

Only two fabrics, Sh:1 and FGS:4, were identified, most sherds being in Sh:1. In general the Grooved Ware appears very homogeneous; the vessels do vary slightly in quality of finish, although some of the variation in appearance is undoubtedly due to differences in preservation. Because of the homogeneity of fabric Sh:1 it is almost impossible to identify separate vessels, especially from body sherds alone, so that although this is attempted such identifications should be regarded as tentative.

The three vessels represented by the sherds from the pit 3196 are an exceptionally fine group. Both P33 and P38 (Fig. 4.32) are probably assignable to the Woodlands substyle of the tradition as their thin-walled flared tub shape is characteristic, but only P38 is typical of the substyle. The impressions on the knot and pellets of P38 may be a regional preference, as a pellet with impressed or grooved decoration occurs on a vessel from pit 5 at Cassington (Case and Whittle 1982, fig. 69, 2), only 14 km from Radley, and the same feature also occurs on a pellet at the Loders, Lechlade (Jones 1976, fig. 2, 2), 30 km from Radley. An extremely close parallel for P33 occurs at Tolley's Pit, Cassington (Case and Whittle 1982, fig. 69, 8), and in this case the parallel is so close that it seems at least within the bounds of possibility that both vessels are the work of one potter. The form of the plastic decoration of P33 is described in the appropriate catalogue entry. Apart from the Radley vessel, this type of decoration is represented at Roughground Farm, Lechlade (Darvill 1993, 9–10 and fig 8.3), and, much further afield, at Pool, Orkney (information from Dr A MacSween). A possible occurrence of this type of decoration is also represented by a single sherd from Shalbourne, in north-eastern Wiltshire (approximately 40 km south of Radley and 50 km south of Cassington). This sherd (Johnston 1963, fig. 6), which has proved impossible to locate, is a body fragment possibly illustrated with an incorrect orientation. If turned through 90° the decorative motif appears as a plastic lozenge trellis rather than as a ladder pattern.

No close regional parallels are known for P39, the vessel associated with P33 and P38, and this vessel does

Table 7.10. Pottery fabrics (2)

Fabric Code	Hard-ness	Fracture	FLINT	GROG	ANGULAR QUARTZ	QUARTZ SAND	?CHALK	Inclusion A (soft, grey-green, matt, subangular)	Inclusion B (matt, grey, angular)	Inclusion C	?LIME-STONE	Dark red grains (?iron oxides)	SHELL	VOIDS (rounded)	?Iron oxides (reddish, soft)	Dark grains (?iron oxides or glauconite)
FG:1 ?D-R	Hard	Hackly	Sparse angular <5 mm	Sparse angular <8 mm	-	-	-	-	-	-	-	-	-	-	-	-
FGQ:1/ indet.	Soft	Slightly laminated	Sparse well-sorted angular <2 mm	Sparse well-sorted rounded <2 mm	Moderate dense well-sorted angular <2 mm	-	-	-	-	-	-	-	-	-	-	-
FGS:1/ indet.	Hard	Hackly	Sparse ill-sorted angular 1-7 mm	Sparse well-sorted rounded <2 mm	-	Moderate rounded coarse	-	-	-	-	-	-	-	-	-	-
FGS:2/ Bkr	Hard	Hackly	Sparse well-sorted angular <2 mm	Moderate-dense well-sorted rounded <2 mm	-	Sparse rounded fine	-	-	-	-	-	-	-	-	-	-
FGS:3/ indet.	Soft	Slightly laminated	Moderate ill-sorted angular <4 mm	Sparse-Moderate ill-sorted rounded <3 mm	-	Sparse rounded fine-coarse	-	-	-	-	-	-	-	-	-	-
FGS:4/ GW	Soft	Hackly	Sparse ill-sorted angular <5 mm	Sparse ill-sorted angular <4 mm	-	Sparse	-	-	-	-	-	-	-	-	-	-
FQ:1/ ?D-R	Hard	Hackly	Sparse angular <2 mm	-	Moderate angular <4 mm	-	-	-	-	-	-	-	-	-	-	-
FQ:2/ indet.	Soft	Hackly	Moderate well-sorted angular <2 mm	-	Sparse angular <2 mm	-	-	-	-	-	-	-	-	-	-	-
FQ:3/ indet.	Hard	Hackly	Sparse subangular <6 mm	-	Moderate ill-sorted angular <5 mm	-	-	-	-	-	-	-	-	-	-	-

not seem to clearly belong to any one of the southern substyles of Grooved Ware, as defined by Wainwright and Longworth (1971) and others. P39 is a large, thick-walled vessel, probably of a fairly straight-sided form. The decoration is arranged in horizontal zones, although the decorative motifs in each zone appear to vary around the circumference of the vessel. The lowest zone carries some fingernail impressions, and zones filled with parallel grooves appear to alternate with plain zones, and the opposed paired spiral motif is also contained within one of the zones filled with parallel lines. Converging grooved lines may be present, although so little of the decorative scheme is represented that the impression of converging lines may simply be the result of irregular execution of parallel lines. Some plastic decoration may also be present, as P37 may belong to this vessel, but the nature of the plastic motif and its location on the vessel are not clear. Curvilinear motifs, normally consisting of single units of concentric circles or spirals occur in the Durrington Walls substyle, but the form of P39 is not characteristic of that style, and a decorative scheme consisting of horizontal zones is certainly alien to it. Complex designs featuring spirals are a notable element of the Rinyo substyle, and are also a feature of passage grave art (Wainwright and Longworth 1971, 246) but no exact parallels for the Radley motif are known to the author, although there is the famous opposed single spiral motif from Skara Brae (Clarke *et al.* 1985, fig. 5.33) and it is a type of motif which would not appear out of place in passage grave art.

Three other sherds from pit 3196 also deserve comment. P34 and P36 (Fig. 4.32) are thin-walled sherds in sandy fabrics, both of which have slashes across the rim. P34 appears to have been thickened around the rim. Neither fall readily into any of the three substyles of the Grooved Ware tradition. There is, however, a minor occurrence of sandy fabrics in Grooved Ware assemblages, and exceptionally thin-walled vessels in such fabrics are known, as, for instance, at the type site for the Woodlands substyle. There, at least two of the vessels are very small, thin-walled, and in sandy fabrics (Stone 1949, fig. 1).

The third atypical sherd from 3196 is P35 (Fig. 4.32), which was originally interpreted as from just above the base angle of a Beaker, and the radiocarbon date for this feature has not invalidated this as a possibility. The interpretation was based on the partially oxidised (dark orange) colouring, and the fabric, which appears Beaker-like. The writer has, however, questioned the Beaker presence at Durrington Walls, arguing that some of the vessels with apparently Beaker features could be accommodated within the Grooved Ware tradition (Cleal 1991, 146) and it is possible that the same applies here. One other sherd (Fig. 4.38, P44) to which these arguments also applies was recovered from pit 3831, layer 2. On balance, it appears likely that both these are Grooved Ware.

The Grooved Ware from the other contexts at Radley is much more fragmentary that from pit 3196, and is much smaller in quantity (Table 4.17). Pit 917 produced a considerable amount of Grooved Ware, although less than half that from pit 3196, and a minimum of three vessels appears to be represented (P40–3, Fig. 4.37). None of these vessels can be assigned to a substyle of Grooved Ware because too little of each survives, but it does not seem unlikely that they belong to the same potting tradition as the material from context 3196, especially in view of the similarity of fabric. Indeed, all the decorated Grooved Ware is very consistent in fabric, suggesting that it may all belong to a single episode of use of the site. The radiocarbon dates for pits 3196 — 2600–2000 cal BC (95% confidence) (3830±90 BP; BM-2706) and 917 — 2700–2200 cal BC (95% confidence) (3940±60 BP; BM-2715) are not inconsistent with this, given their calibrated ranges.

Pits 917 and 3196 appear to belong to the southernmost of two foci of Grooved Ware deposition, and pits 913 and 3831, which are within 3 m of each other and only 10 m from 917, also appear to belong to this group. Neither 913 nor 3831 produced a large quantity of pottery and in each case the sherds may belong to single vessels.

The northern focus of activity is represented by two pits in the vicinity of the oval barrow: features 2179 and 2180. 2179 produced only a single small sherd with applied ribs or cordons, from layer 2, and pit 2180 produced nine sherds, possibly representing more than one vessel (P28–31, Fig. 4.25). One large sherd from this feature carries grooved lines and wavy cordons (P29) and others have grooved and incised decoration. One small sherd from 2180 appears to exhibit an applied 'knot' at the junction between cordons (P28), and this confirms the general impression that the Grooved Ware from this feature belongs within the Woodlands substyle.

There seems little evidence to suggest that there are fundamental differences between the Grooved Ware from the northern features and that from the southern, except in quantity and in the state of the pottery at deposition. One outlying feature with Grooved Ware also occurs, feature 2082, near the Victorian tree circle, but only one featureless body sherd in fabric Sh:1 was recovered from it.

The Oxford region forms a major focus of Grooved Ware-associated activity, and the occurrence of Grooved Ware in the area has been extensively discussed in recent years (Bradley and Holgate 1984; Case 1986, 31–32). Within the region, the virtually identical vessel to P33 from Tolley's Pit, Cassington, has already been referred to, and sherds of other Woodlands substyle vessels were recovered from the same 'fire-hole' (Leeds 1940, pl. 2, F; Case 1982a, fig. 69, 7) and from at least one other pit (Pit 5; Case and Whittle 1982, fig. 69, 2–6).

Closer to Radley, two pits at Sutton Courtenay produced Woodlands substyle Grooved Ware. There, several sherds of a single Woodlands substyle vessel were recovered from Pit P, associated with a small quantity of worked flint, a worked bone point, and about half a stone axe of Group VI. Pit T at the same site produced one Woodlands substyle sherd in association with some worked flint and burnt clay (Leeds 1934; Case 1982a; Wainwright and Longworth 1971, 261). The pottery from at least Pit P was in a shelly fabric (Leeds 1934, 265).

Table 7.10. Pottery fabrics (3)

Fabric Code	Hard-ness	Fracture	FLINT	GROG	ANGULAR QUARTZ	QUARTZ SAND	?CHALK	Inclusion A (soft, grey-green, matt, subangular)	Inclusion B (matt, grey, angular)	Inclusion C	?LIME-STONE	Dark red grains (?iron oxides)	SHELL	VOIDS (rounded)	?Iron oxides (reddish, soft)	Dark grains (?iron oxides or glauconite)
FS:1 / Bkr	Hard	Hackly	Sparse-moderate ill-sorted angular <3 mm	-	-	Sparse-moderate rounded coarse	-	-	-	-	-	-	-	-	-	-
FS:2 / Bkr	Soft	Smooth	Sparse angular <2 mm	-	-	Moderate dense rounded coarse	-	-	-	-	-	-	-	-	-	-
FS:3 / indet.	Hard	Hackly / slightly laminated	Moderate ill-sorted angular <4 mm	-	-	Sparse-moderate rounded coarse	-	-	-	-	-	-	-	-	-	-
G:1 / BA	Soft	Hackly	-	Moderate dense subangular <4 mm	-	-	-	-	-	-	-	-	-	-	-	-
G'A':1 indet.	Hard	Smooth	-	Sparse-moderate well-sorted rounded 1-4 mm	-	-	-	Sparse subangular <3 mm	-	-	-	-	-	-	-	-
GQ:1 / indet.	Hard	Hackly	-	Sparse well-sorted rounded <2 mm	Moderate-dense ill-sorted angular <4 mm, most <2 mm	-	-	-	-	-	-	-	-	-	-	-
GQ:2 / ?BA	Hard	Hackly	-	Sparse ill-sorted angular <5 mm	Moderate ill-sorted angular <4 mm	-	-	-	-	-	-	-	-	-	-	-
GQS:1 / indet.	Hard	Slightly laminated	-	Dense ill-sorted rounded <6 mm	Sparse angular <4 mm	Moderate rounded coarse	-	-	-	-	-	-	-	-	-	-

The Woodlands substyle of the Grooved Ware tradition is not as well represented in central southern England, or indeed generally, as the Durrington Walls substyle, or even the Clacton substyle. The Durrington Walls substyle is represented by large quantities of material from the Durrington Walls, Marden, Woodhenge and Mount Pleasant henge monuments, from Lawford, Essex, a site of unknown, but possibly non-domestic use, and from probable settlements, such as Fengate, Cambridgeshire, while Clacton substyle vessels occur in considerable quantities at sites such as Hunstanton, Norfolk, Creeting St Mary, Suffolk, and Clacton, Essex (Wainwright and Longworth 1971, figs 69–91). The number of sites listed by Wainwright and Longworth illustrate the smaller number of sites with Woodlands substyle vessels then known, although it must be noted that at many of the sites listed in the figures for each substyle the features noted are an absolutely minimal part of the whole assemblage: the Woodlands presence at Durrington Walls, for instance, is represented by one rather atypical rim sherd. At none of the sites with Woodlands substyle Grooved Ware in central southern Britain known at present are there large numbers of vessels, and the commonest form of assemblage with this substyle is a very few vessels, usually between one and three, in a pit with other artefacts. This is true, for instance, of pit 29, Firtree Field, Down Farm, Woodcutts, Dorset (Cleal 1991, 136–137, P47–P49), and Poundbury, Dorset (Smith 1987). Bradley has drawn attention to the fact that Grooved Ware sites tend to be richer than those with Peterborough Ware, especially in the occurrence of 'exotic' artefacts such as stone axes, and that sites with the largest ranges of all raw materials are generally those within 3 km of a major ceremonial monument — ie a henge or a cursus (Bradley 1984b). Barrow Hills lies within an area rich in ceremonial monuments, and although pit 3196 lacks exotic artefacts, with the exception of a point made on a white-tailed eagle ulna, its ceramic decoration is so unusual as to make it remarkable on that count alone. As noted above, the complex applied decoration of P33 is only otherwise paralleled exactly on a vessel from Cassington, and the particular type of spiral decoration of P39 seems to have more in common with passage grave art and the Grooved Ware of the Rinyo substyle than with the slightly more common, though still rare, occurrences of spiral motifs in the Durrington Walls substyle.

In particular there seems to be a predilection in passage grave art and in Grooved Ware for the juxtaposition of lozenges and spirals. This is, in Eogan's terms, the Angular-Spiral style of passage grave Art (Eogan 1986, 155), and occurs, for instance, at Newgrange, where the motif on stone K67 is remarkably similar to the lozenge-spiral motif on the Skara Brae Grooved Ware, as is that on Barclodiad y Gawres stone C1 (Eogan 1986, figs 82 and 81). The cross-over into portable art is exemplified by that 'baroque expression' (Eogan 1986, 155) of the art, the superb Knowth ovoid flint macehead, with its lozenge lattice motif and opposed spirals (Eogan 1986 pl. X, figs 34–37, fig. 57; Clarke *et al.* 1985, fig. 3.17). This object, as well as demonstrating the extension of the art to portable objects, also forms a link with non-ceramic portable art in Britain, as the so-called faceted maceheads, of which the diagnostic feature is a lozenge lattice formed of dished facets ground into the surface of the maceheads, exhibit at least part of the same decorative motifs and techniques as the Knowth object (Piggott 1954; Roe 1968; Clarke *et al.* 1985, fig. 5.7). These occur in both stone and antler, and have generally been found without associations. The juxtaposition of the lozenge lattice and spiral decorated vessels at Radley is strikingly similar to the juxtaposition of the two motifs on the Knowth macehead, and the existence of the faceted maceheads in central southern Britain which show an overwhelming correspondence to the Knowth macehead suggests strongly that there is more than coincidence to this occurrence. It seems not outside the bounds of probability that the large sherds of the Radley vessels were deliberately included in the one deposit because the *association* of the motifs had a strong symbolic meaning for the people depositing them.

The dating of the Knowth macehead is not entirely clear, but may be earlier by some centuries than the deposition of the pottery in pit 3196. This does not invalidate the explanation, however, as rather than direct contact it would seem plausible to see the use of symbols from passage grave art in Grooved Ware contexts as a memory, or reflection, of a symbolic system which had been in existence for perhaps many generations and the sphere of influence of which had changed over time.

In summary, the Grooved Ware assemblage from Barrow Hills is exceptional in certain specific respects, but there are similar sites in both the local area and in southern Britain generally. In particular, pit 3196 seems to be one of several in the country as a whole to contain a small number of high quality, fairly well-preserved, Woodlands substyle Grooved Ware vessels, often in the vicinity of ceremonial monuments.

Beakers

The Beaker pottery from the 1983–5 excavations includes six whole or reconstructable vessels as well as more fragmentary material. In addition a single vessel comes from the pre-1983 excavations. The fabric descriptions of the complete vessels are not as detailed as are those for the sherd material, as most of the vessels are well-finished and the nature of the fabric is masked by the interior and exterior surface treatment.

The Beaker pottery from Radley was initially classified according to Clarke's (1970), Lanting's and van der Waals' (1972), and Case's (1977) schemes, but this has largely been rendered redundant by the extensive radiocarbon dating programme, which has provided dates for all seven of the whole Beakers (Table 9.1), and by the British Museum's Beaker dating programme (Kinnes *et al.* 1991). The dates fall into three fairly clear groups (Tables 9.1 and 9.2), and the Beakers will be discussed in these groups, as follows:

a. P24 and P25, from 'flat' grave 919, dated by OxA-1874 and -1875 (Figs 4.14–5). The calibrated

Table 7.10. Pottery fabrics (4)

Fabric Code	Hardness	Fracture	FLINT	GROG	ANGULAR QUARTZ	QUARTZ SAND	?CHALK	Inclusion A (soft, grey-green, matt, subangular)	Inclusion B (matt, grey, angular)	Inclusion C	?LIME-STONE	Dark red grains (?iron oxides)	SHELL	VOIDS (rounded)	?Iron oxides (reddish, soft)	Dark grains (?iron oxides or glauconite)
GQS:2/ indet.	Hard	Smooth	-	Sparse ill-sorted rounded <6 mm	Sparse well-sorted angular <10 mm	Sparse rounded coarse	-	-	-	-	-	-	-	-	-	-
GS:1/ FV	Soft	Hackly	-	Sparse ill-sorted rounded <5 mm	-	Sparse rounded coarse	-	-	-	-	-	-	-	-	-	Rare angular <6 mm
GS:2/ Bkr	Hard	Hackly	-	Sparse ill-sorted rounded <3 mm	-	Moderate dense ill-sorted rounded fine-coarse	-	-	-	-	-	-	-	-	-	-
GS:3/ CU	Soft	Hackly	-	Sparse well-sorted rounded <2 mm	-	Moderate rounded coarse	-	-	-	-	-	-	-	-	-	-
GS:4/ CU	Soft	Hackly		Moderate- dense ill-sorted subangular <10 mm, most <5 mm	-	Sparse rounded fine	-	-	-	-	-	-	-	-	-	-
GS:5/ ?FV	Hard	Hackly	-	Moderate angular <5 mm	-	Rare-sparse	-	-	-	-	-	-	-	-	-	-
Q:1/ indet.	Hard	-	-	Rare rounded <2 mm	Moderate ill-sorted <3 mm	-	-	-	-	-	-	-	-	-	-	-
Q:2/ indet.	Hard	Laminated	Rare angular <3 mm	-	Sparse well-sorted angular <2 mm	-	-	-	-	-	-	-	-	-	-	-

ranges of these dates cover the middle centuries of the third millennium BC.

b. P26, P27, P74 and P76, from 'flat' graves 950 and 4660, grave 206 within ring ditch 201, and barrow 4A (Figs 4.21, 4.23, 4.75, 5.2). The calibrated date ranges for these Beakers span the centuries around the turn of the third and second millennia.

c. P75, from the central burial in ring ditch 201 (Fig. 4.78). The date for this calibrates to the mid to late first half of the second millennium BC.

a. P24 and P25

Initially this pair of Beakers was identified, using Clarke's 1970 typology, as comprising an atypical Wessex/Middle Rhine (W/MR) Beaker (P25) and a poorly-executed Barbed Wire (BW) Beaker (P24). Neither vessel is typical of it style, although the Barbed Wire group was at best disparate, dependent only on the presence of 'barbed-wire' impressions, probably made with a thread-wound stamp. As doubt has been cast on these identifications in print (Case 1991, 71), and as the dates for this group are somewhat earlier than might have been expected, the reasoning behind these identifications needs to be made explicit.

The form of P25 is certainly not typical of W/MR Beakers, but the combination of both form and decoration in this vessel more nearly approaches that of the W/MR group than any other. The rim diameter and belly diameter are approximately equal, which is consistent with the style, but the upper body of P25 lacks the sinuous profile of the most characteristic vessels. This rather cylindrical upper body is also found in a vessel from Kempston, Bedfordshire, classified by Clarke as W/MR (1970, fig. 147). The lack of a red 'sealing wax' finish is not of course diagnostic, as although a feature of the finest W/MR vessels, it was noted by Clarke as occurring in only 42% of vessels of the group.

P24 is a small, poorly-executed vessel with short impressions which appear to have been made with a sharp-edged implement, such as a flint flake (Fig. 4.17). On a small number of the impressions small irregularities cross the main line of the impression. These seem best interpreted as 'barbed-wire' impressions, that is, made with a sharp-edged thread-wound stamp (Clarke 1970, 130). If impressed into damp clay such impressions can become easily blurred as the stamp becomes clogged with clay; the impressions in this case are certainly not clear or typical of the decorative type, but given the variety of impressions encompassed by this style (cf Clarke 1970, figs 340, 353, 355) it seems reasonable to include this Beaker within it.

The reason for Case's querying the attribution of these vessels is clearly that the dates associated with them are unusually early: given later dates it might be suspected that the identifications would have passed unremarked. Case comments that the occurrence 'by the third quarter of the third millennium of undifferentiated beakers should cause no surprise' (Case 1991, 71), with the implication that a W/MR and BW Beaker with such dates would occasion surprise. The dates are unquestionably early, but the occurrence of these Beakers does not seem to become less problematic by terming them 'undifferentiated'. They are clearly Beakers showing features which would, without the dates, have allowed them to have been considered contemporary with the Beakers of group (b) and their apparent dating, perhaps centuries before the Beakers of that group, remains difficult to explain.

It should also be noted that an association between an W/MR Beaker and a BW Beaker is not unparalleled in Britain, as there is such an association at Winchester, Hampshire (Clarke 1970, figs 222–223), although in that case the BW Beaker was an unusually fine one (Clarke 1970 139–140).

b. P26, P27, P74 and P76

These are, in Clarke's terms, Wessex/Middle Rhine (W/MR; Fig. 4.21, P26), European (E; Fig. 4.23, P27 and Fig. 5.1, P76)) and All-Over-Cord (AOC; Fig. 4.75, P74). It was formerly considered likely that AOC Beakers stood at the head of the Beaker sequence, most being placed within Lanting's and van der Waals' Step 1 (1972). There had already been indications that not all AOC Beakers were early, and before the radiocarbon date for P74 was available it was already suspected that this might be the case with this vessel, on the basis of its similarity of form to Step 3 vessels in Lanting's and van der Waals' typology.

The form of P74 is not a typical AOC or Step 1 Beaker, as its globular form, with no marked belly carination, and the location of its maximum diameter around the belly rather than at the mouth, are not paralleled, to the writer's knowledge, by any other AOC Beaker from the British Isles, although the form does occur in other Beaker groups. Van der Waals and Glasbergen, in their work on Dutch Beakers (1955), isolated a subgroup of 2IIb Beakers composed of 'bottle-shaped' Beakers from the Limberg which seem to bear a striking resemblance to P74. The main feature of the Limberg 'bottle-shaped' Beakers is that the greatest width of the lower part of the body exceeds that of the mouth, and this is almost always accompanied by all-over horizontal twisted-cord impressions. Eleven such vessels are noted by van der Waals and Glasbergen in the Limberg (1955, 29–30) and they also comment on the occurrence of 'bottle-shaped' Beakers in Britain, citing a vessel found at Little Rollright, Oxfordshire (van der Waals and Glasbergen 1955, 28, 48 note 60). Clarke also draws attention to the Little Rollright vessel, which he classes as a W/MR Beaker (Clarke 1970, 87).

P27 (Fig. 4.23) is an exceptionally fine vessel, with an unusual decorative scheme giving an effect of vertical panels, alternately decorated with herringbone and undecorated, the decorated zones comprising alternate lines of opposed oblique comb impressions. Cutting across the vertical panels are unequally spaced lines of comb impression, which also divide each row of the herringbone in the decorated panels. This decoration is unusual because although the decorative zones as marked out by the horizontal lines are in keeping with

Table 7.10. Pottery fabrics (5)

Fabric Code	Hard-ness	Fracture	FLINT	GROG	ANGULAR QUARTZ	QUARTZ SAND	?CHALK	Inclusion A (soft, grey-green, matt, subangular)	Inclusion B (matt, grey, angular)	Inclusion C	?LIME-STONE	Dark red grains (?iron oxides)	SHELL	VOIDS (rounded)	?Iron oxides (reddish, soft)	Dark grains (?iron oxides or glauconite)
Q:3/ indet.	Hard	Laminated	-	-	Moderate ill-sorted angular 1-7 mm	-	-	-	-	-	-	-	-	-	-	-
Q:4/ BA	Hard	Hackly	-	-	Moderate dense ill-sorted angular <4 mm	-	-	-	-	-	-	-	-	-	-	-
QS:1/ indet.	Hard	Hackly	-	-	Sparse angular <3 mm	Moderate-dense rounded coarse	-	-	-	-	-	-	-	-	-	-
QS:2/ ?BA	Hard	Hackly	-	-	Sparse well-sorted angular <2 mm	Sparse-Moderate rounded coarse	-	-	-	-	-	-	-	-	-	-
QV:1/ indet.	Soft	Laminated	-	-	Moderate-well-sorted angular 2-4 mm	-	-	-	-	-	-	-	-	Moderate well-sorted rounded 1-3 mm	-	-
S:1/ indet.	Hard	Smooth	-	-	-	Sparse moderate rounded fine	-	-	-	-	-	-	-	-	-	-
S:2/ Bkr	Hard	Smooth	-	-	-	Sparse rounded coarse	-	-	-	-	-	-	-	-	-	-
S:3/ Bkr	Soft	Slightly Laminated	-	-	-	Dense rounded coarse	-	-	-	-	-	-	-	-	-	-
S:4/ Pet	Soft	Laminated	-	-	-	Sparse rounded coarse	-	-	-	-	-	-	-	-	-	-

normal European Beaker usage, the inclusion of a vertical element to which it is obviously intended that the eye should be drawn, is quite definitely alien to it. Such a decorative scheme appears to be unparalleled among other European Beakers from the British Isles. It certainly shows little resemblance to the simpler decorative scheme of P76, the cordoned European Beaker from barrow 4A, which carries alternating zones of Clarke's motifs 1 and 3 (Fig. 5.2). However, although the decorative scheme of P27 is very unusual, its form, and the use of unequal horizontal zones and herringbone, albeit in an atypical manner, do suggest that the vessel should be seen as an integral part of the British Beaker tradition. P27 is well-paralleled in form, for example, by Beakers from St Osyth, Essex, and Blackbush and Thickthorn, both in Dorset (Clarke 1970 figs. 58, 66, and 69).

The W/MR Beaker P26 is fairly typical of the group as defined by Clarke.

c. P75

P75 (Fig. 4.78), with its almost complete fusion of neck and body, and floating lozenge motif is typical of Lanting's and van der Waals' Step 7 and Clarke's Final Southern Beaker Group (S4). Its associated date of 1770–1520 cal BC (93% confidence) (3360±50 BP; BM-2700), places it towards the end of the Beaker period in the British Isles (Kinnes *et al.* 1991, fig. 5).

Two other Beakers also qualify as typologically late: P32 and P21–3. P32 (Fig. 4.25) represents a vessel of which a large base angle sherd and two body sherds survive. The base sherd is decorated with motif 32ii of Clarke's Southern British motif group 4 (ie a reserved running chevron, Clarke 1970). The presence of this motif, just above the base, suggests that the vessel is likely to belong to Clarke's Developed Southern (S2) or Late Southern (S3) groups, and a Beaker with very similar decoration above the base from Little Downham, Cambridgeshire is illustrated by Clarke and classified by him as S3(W) (1970, fig. 959). The other vessel, P21–3 (Fig. 4.13), is represented by sherds in a shelly fabric, unusual among Beakers. This vessel carries a floating hexagon motif, and must therefore also belong to Clarke's Southern tradition.

Unclassifiable Beaker Pottery

A small number of finger-decorated sherds and small comb-decorated sherds cannot be classified according to the recognised Beaker classifications cited above. Included under this heading are P3 from the upper fill of the outer ditch of the oval barrow (Fig. 3.4), P14 from the upper fill of the segmented ring ditch (Fig. 4.8), P12 from the later phase of ring ditch 611 (Fig. 4.6), and P57 from the outer ditch of barrow 12 (Fig. 4.55). Two undecorated body sherds, probably of Beaker, were recovered from pit 2 of barrow 15 (Ch. 5).

The foot of the polypod bowl, P7, unstratified but from the area of the oval barrow (Fig. 3.4), is also not classifiable according to the schemes used above, as polypod bowls are absolutely rare in the British Isles and do not fit readily into any of the established classification systems. The motif used on P7 is a ladder motif (Clarke's basic European motif group, motif 5), although the 'bars' of the ladder are in a different stamp to that used for the 'uprights'. This motif is one which occurs in almost all Clarke's Beaker groups and is therefore of little use in attempting to identify the relationships of this vessel. Although P7 was not associated with any other prehistoric sherds, and was in fact recovered from a Saxon feature, it is interesting to note that bowls are known to occur with W/MR Beakers, as was the well-known example from Inkpen Hill, Berkshire (Clarke 1970, 101–102), 40 km from Radley. The Inkpen Hill bowl, however, does not bear a particular resemblance to P7, as it is plain except for a number of horizontal parallel lines immediately below the rim on the exterior, but the association of this bowl with a W/MR Beaker, and the association of footless bowls with W/MR Beakers generally noted by Clarke (1970, 101), in comparison with the general dearth of any sort of bowls with Beakers in this country, must surely be taken as an indication that P7 may be contemporary with the W/MR Beakers at Radley. In addition, it seems likely to be the result of more than coincidence that, of six bowls illustrated in Clarke (Clarke 1970, figs 36, 192, 193, 199, 204 and 357, excluding the rather dubious examples figs 918 and 920 and the Dorset Handled Bowls), four out of the five from England occur within 70 km of each other in and around the Middle and Upper Thames valley. These sites include all the then known associations between W/MR Beakers and bowls.

On the continent polypod bowls only form a notable part of the Beaker repertoire in central and eastern Europe, but examples fairly similar to P7 are known from the Netherlands and Germany (eg Harrison 1980, pl. 8).

Beakers — Discussion

There is no clear focus of Beaker activity, and both the stray finds and the burials are widely spread across the site. The AOC vessel P74 and the S4 Beaker P75 were recovered from successive graves in ring ditch 201 in the north-eastern extremity of the 1983–5 excavations, an area only otherwise notable for barrow 1, which did not produce Beaker pottery.

The two W/MR Beakers, the BW Beaker, and one of the European Beakers (P24–7), were found within approximately 50 m of each other, all in 'flat' burials with other grave goods, and about 200 m from P74–5. The two W/MR Beakers (and the associated BW Beaker) were found within a few metres of each other, and this indicates that at least the approximate position of one grave was known to the excavators of the other, although, given the early dates for P24 and P25, it is difficult to envisage the mechanism by which this was achieved unless the earlier grave was marked in some way. The second European Beaker (P76) occurred about 300 m to the E of the 'flat' graves.

The distribution of the unclassifiable Beaker sherds from the site is similar to that of the classifiable sherds: most finds were in the southern part of the site, but activity in the northern part is also represented by a single fingernail-decorated sherd and the polypod bowl foot from the oval barrow.

Table 7.10. Pottery fabrics (6)

Fabric Code	Hardness	Fracture	FLINT	GROG	ANGULAR QUARTZ	QUARTZ SAND	?CHALK	Inclusion A (soft, grey-green, matt, subangular)	Inclusion B (matt, grey, angular)	Inclusion C	?LIME-STONE	Dark red grains (?iron oxides)	SHELL	VOIDS (rounded)	?Iron oxides (reddish, soft)	Dark grains (?iron oxides or glauconite)
SSh(V):1/ indet..	Soft	Hackly	-	-	-	Sparse rounded fine	-	-	-	-	-	Rare rounded <3 mm	Moderate-dense ill-sorted <5 mm (some as voids)	-	-	-
SSh:2/ indet.	Soft	-	-	-	-	Sparse rounded fine-coarse	-	-	-	-	Rare rounded <3 mm	-	Sparse ill-sorted <7 mm	-	-	-
SSh'A';1/ Neo	Hard	Hackly	-	-	-	Sparse rounded fine-coarse	-	Sparse ill-sorted subangular <4 mm, most <2 mm	-	-	-	-	Moderate-dense ill-sorted <5 mm, most <3 mm	-	-	-
Sh:1/ GW	Soft	Hackly	-	-	-	Rare rounded fine	-	-	-	-	-	-	Moderate-dense ill-sorted <7 mm	-	-	-
Sh:2/ ?D-R	Hard	Hackly	-	-	-	-	-	-	-	-	-	-	Dense ill-sorted <5 mm	-	-	-
Sh(v):3/ Neo	Soft	Hackly	-	-	-	-	-	-	-	-	-	-	Dense well-sorted <2 mm	-	-	-
Sh:4/ Bkr	Hard	Hackly	-	-	-	-	-	-	-	-	-	-	Dense <4 mm	-	-	-
Sh:5/ ?BA	Hard	Laminated	-	-	-	-	-	-	-	-	-	-	Moderate <10 mm	-	-	-
Sh(V)'C':1/ Neo	Soft	Slightly Laminated	-	-	-	-	-	-	-	Sparse-Moderate ill-sorted rounded	-	-	(As voids) sparse <3 mm	-	-	-
U:1/Pet	Soft	Laminated	No inclusions visible													

Overall, the small quantity of Beaker material, and the preponderance of funerary vessels, suggests that domestic settlement associated with Beakers was not present in the immediate vicinity; such settlements are normally associated with much larger amounts of pottery than the small quantity from Radley. Although some of the stray finds may represent short episodes of occupation, it is equally likely that some represent destroyed burial deposits: in particular the polypod bowl represented by P7 seems unlikely to have been a casual loss; footless bowls at least tend to occur as grave goods, and this is also thought to have been the case with the Inkpen Hill polypod bowl.

Earlier Bronze Age

The non-Beaker earlier Bronze Age element in the collection is represented by the Food Vessels and related vessels, by the Collared Urns, and by the two miniature vessels from the ditch of barrow 12. From the previous excavations, the Biconical Urn (P77) from barrow 14 (Fig. 5.9) and the miniature Food Vessel (P78) and Collared Urn (P79) from barrow 16 (Fig. 5.11) probably date to the end of this period.

Food Vessels

Vessels P15, P51, P66, P67 and P68, respectively from ring ditch 801, barrow 12 and three of the graves around pond barrow 4866, may be classified as Food Vessels (Figs 4.11, 4.54, 4.63, 4.64). P78 from barrow 16 (Fig. 5.11) seems to be a miniature form within the same tradition. There is a small amount of fragmentary material also probably belonging to similar vessels. In particular, the fingernail-decorated sherds P16–7, from ring ditch 801 (from which P15 also derived; Fig. 4.11) are similar in appearance to P15 and may belong to a Food Vessel.

Only one fabric, GS:1, can be described in detail for this style of vessel, as most of the Food Vessels from the site are complete or reconstructable and therefore the finish of the vessels masks the fabric, as with many of the Beakers. Only one sherd in fabric GS:1 clearly belongs to a Food Vessel, but it has been assumed that the other undiagnostic sherds in this fabric also belong to such vessels. A total of four whole or reconstructable Food Vessels are present in the Radley assemblage, as are twenty-one separate sherds, weighing 195 g.

Food Vessels are not a common ceramic type in southern England, but the Radley vessels fit well into the known forms exhibited by the type. P66–7 are typical basic bipartite vases, which occur widely, with the limited decoration characteristic of southern vessels (Burgess 1980, 87). P66–7, from adjacent graves, are very similar in appearance (Fig. 4.63), and it is perhaps not too fanciful to suggest that they have been made by the same, or associated, potters. P68, with its more slender proportions, is more like a Food Vessel Urn, but is too small to qualify, Gibson suggesting that at approximately 200 mm in height there is a natural division between Food Vessels and Food Vessel Urns (Gibson 1978). P68 is only just over 140 mm in height. P51, in contrast, approaches more the bowl form (Burgess 1980, fig. 3.2), but the presence of the slight raised, slashed, shoulder indicates that the form is intended to be bipartite, even if the profile is slack.

The radiocarbon dates associated with P51 — 2350–1750 cal BC (95% confidence) (3670±80 BP; OxA-1884) and P68 — 1970–1690 cal BC (95% confidence) (3500±50 BP; BM-2698) are extremely welcome additions to the chronology of this ceramic type, which is poorly dated in southern Britain. The dates indicate that the deposition of these vessels did not long precede that of the miniature vessels P53 and P54, and may be contemporary with the use of Beakers P26–7 and P74, while they probably pre-date the deposition of the S4 Beaker P75.

The occurrence of Food Vessels in the Oxford region has been summarised by Case (1982b, 109), who notes that they show considerable variety within the region.

The vessel represented by the fingernail-decorated sherds is impossible to reconstruct and is only considered to belong to this style on the grounds of fabric. The rim sherd P15, although from the same feature as the fingernail-decorated sherds, is unlikely to belong to the same vessel; it may well belong to a southern Food Vessel similar to P51, P66, P67 or P68, although the rim form of P15 is more exaggerated than is the case with those vessels.

Three of the four complete vessels (P66–8) were recovered from inhumations within the arc of burials associated with the pond barrow E of barrow 13 and within a few metres of each other. This, combined with the stylistic similarities exhibited by the vessels, leads to the conclusion that these vessels were made and deposited within a short time of each other.

Collared Urns

The Collared Urn component of the Radley collection is made up almost entirely of whole or reconstructable vessels. A single basal sherd from the ploughsoil, weighing 28 g, is probably derived from another, destroyed, Collared Urn. As with the whole and reconstructable Beakers and Food Vessels the fabrics have been described in detail only where a reasonable area of the core of the fabric was visible, and this is not the case with the majority of the vessels.

All the Collared Urns (P69–73) from the 1983–5 excavations can be classified as belonging to Longworth's primary series, as all of them have two primary traits as defined by Longworth (1984, 21), the minimum for inclusion in the series (Figs 4.65, 4.67, 4.68, 4.70). Burgess (1986) reassessed the chronology of Collared Urns and suggested three phases of Collared Urn use, which appear to be characterised by certain decorative and formal features, including those isolated by Longworth. The Barrow Hills vessels exhibit none of the features regarded by Burgess as Late, ie disproportionately narrow base, crisp angular outline, exaggerated collar, often deep, concave, and undercut, and complex decoration. In summary then, it seems clear that the Collared Urns from the 1983–5 excavations belong to the primary series, in Longworth's terms, and to Burgess' Early or Middle phases.

The Collared Urns were found within 100 m of each other, roughly in a SW–NE line N of barrows 12 and 13

(Fig. 9.11). Stylistically they are not a particularly diverse group, and in form at least they show some similarity, especially in the preference for straight, simple collars shown by vessels P69, P70, P71, and P73. P72 and P73 at least must have been deposited together, and it seems likely that all five represent quite a short episode in the site's history. The radiocarbon dates (OxA-1876, OxA-1877 and OxA-1878), unfortunately, are archaeologicaly anomalous and unreliable due to the problems associated with measurements from charred bone (see Appendix 1).

The only other Collared Urn (P79, Fig. 5.11) comes from barrow 16. This vessel can be classified as belonging to Longworth's Secondary series (1984). This vessel was considerably smaller than the others and had been refired, possibly on a cremation pyre.

Miniature vessels

Two small vessels containing the cremated remains of two children were recovered from the middle silts of the outer ditch of barrow 12 (Fig. 4.54, P53–4). They are associated with a radiocarbon date of 1980–1590 cal BC (92% confidence) (3450±80 BP; OxA-1872), although the fact that this was made on charred bone renders its accuracy doubtful. The typological and stylistic affinities of these two vessels are unclear, and they do not seem to be closely related in either form, decoration, or fabric to any of the ceramic traditions represented at Radley. The biconical form of both vessels, the restrained decoration of P53, and the lack of decoration on P54, may indicate that they are related to Biconical Urns, but their small size would seem to be an indication that they are not strictly classifiable as such. Rather, P53–4 appear to belong to a range of miniature vessels occasionally found in Bronze Age funerary contexts in Wessex and elsewhere (eg Annable and Simpson 1964, figs 548–52), the affinities and date of which are uncertain.

The radiocarbon date associated with these vessels is of interest, if it is to be accepted, as it places them at Tomalin's Biconical Urn Horizon (1988) and illustrates the variety of ceramic forms current at this time. A single Biconical Urn (Fig. 5.9, P77) from barrow 14 may also date from to this period of the second millennium.

Middle to Late Bronze Age

It is clear from the sherd material that there is a post-early Bronze Age component in the collection, represented almost entirely by small sherds. A minority of these may be attributed to the Deverel-Rimbury tradition, using the term in its loosest sense.

Three fabrics are identifiable among the featured sherds: F:1, F:2 and FQ:1. A shelly fabric (Sh:2) may also be represented, but the sherd, P61 from the ditch of barrow 13 (Fig. 4.59) is only tentatively assigned to this tradition. The variation in finish shown between the fabrics is considerable, as F:1 is generally well-finished, although the dense temper shows clearly on the surfaces, and F:2 is generally poorly-finished and coarse. Only two sherds of FQ:1 were recovered, and while P6, from the inner ditch of the oval barrow (Fig. 3.4), has a fine appearance similar to that of sherds of F:1, the other is a coarser sherd lacking the pale-coloured smooth surface of P6 and the fabric F:1 sherds.

This material is represented by the illustrated sherds P59 (fabric F:1) and P64 (F:2), both from barrow 13 (Fig. 4.59), and P6 (fabric FQ:1) from the oval barrow (Fig. 3.4). P61 (fabric Sh:2) from barrow 13 probably also belongs to this group. Of these sherds it would seem that P6 and P59 probably belong to Globular Urns, perhaps of the rather slack-sided forms exhibited by similar vessels from the Middle and Lower Thames valley (eg Barrett 1973, fig. 5.2; material from Bray, Berkshire, Cleal 1995a). P61 and P64, in slightly coarser fabrics, appear to belong to Bucket Urns. Barrel Urns do not appear to be represented. By extrapolation from these sherds, body sherds in these fabrics are classed as middle Bronze Age or later in the tables.

From the pre-1983 excavations a concentration of Deverel-Rimbury pottery was associated with secondary cremations in barrow 16 (Table 5.2).

There is also, however, a less easily definable component, consisting mainly of carinated sherds, such as P65 (F:2) and P62 (F:2), both also from barrow 13 (Fig. 4.59), which, while it might be possible to accommodate them in the Deverel-Rimbury tradition, might equally be seen as belonging to more angular vessels of the later Bronze Age, although it should be added that the very latest Bronze Age ceramics do not appear to be represented.

The contexts in which these sherds occur are mainly the uppermost layers of features, and it would seem, from the low frequency of sherds, that activity in this area was slight at this period, being otherwise represented only by the insertion of human burials into 'pond barrow' 4853 and of an animal burial into ring ditch 611. The only possible concentration of material from the 1983-5 excavations appears to be around barrow 13, from the ditch of which a considerable quantity of sherds in fabrics F:1 and F:2 was recovered (Table 4.29).

Unclassifiable pottery

A number of fabrics do not include diagnostic material and are designated as indeterminate prehistoric ('indet.') in the tables. In addition to this material there are a number of featured sherds for which a clear identification is not possible. These are described and illustrated in the relevant sections of Chapters 3 and 4 and briefly discussed here, by subsite.

The Oval Barrow

P4 and P5 (Fig. 3.4) from layer 1 of the inner ditch, both in fabric Q:1, almost certainly belong to a Bronze Age vessel, probably dating to the early Bronze Age. Round-toothed comb impressions, and decorative motifs involving triangular patterns are a feature of Collared Urn decoration.

Ring ditch 611

P9 (Fig. 4.4) from layers 2, 6, 10, and 12, in fabric Q:2, was recovered mainly from the earlier, hengiform ring ditch, phase of the monument. It is a plain vessel of a fairly simple, slightly shouldered form, with a simple pointed rim. The closest parallels for its form and lack of decoration would appear to lie in plain Grooved Ware, such as occurs at Durrington Walls, Wiltshire (Wainwright and Longworth, 1971, fig. 60), and Grimes Graves, Norfolk (Longworth *et al.* 1988, figs 4–6), but the fabric is quite unlike that of the decorated Grooved Ware from the site. The quartz filler is, however, not abundant and may at least in part consist of natural inclusions in the clay.

The radiocarbon determinations on antler from the lowest layers of the monument, 2600–2000 cal BC (95% confidence) (3860±80 BP; BM-2712) and 2900–2200 cal BC (95% confidence)(3950±80 BP; BM-2713), support this identification of P9 as Grooved Ware, and indicate that its deposition could be contemporary with the pits containing decorated Grooved Ware.

P10 (Fig. 4.5), from the central cremation of the later phase of the monument, in fabric S:-, is almost certainly of Bronze Age date, although as it has been truncated at or around mid-height, it is impossible to be certain of its stylistic affinities. The small protruding foot and plain lower body could belong to a Collared Urn, although the fabric, as it lacks grog, is not similar to the fabrics displayed by the identifiable Collared Urns from the site.

P13 (Fig. 4.6) from layer 2, in fabric FGS:1, has a rim of uncertain form. If it is collared it is extremely unlikely to be Grooved Ware, but it seems marginally more probable that the rim has broken along a deep groove on the exterior, as there is such a groove on the interior, and in that case the form would not be inconsistent with Grooved Ware. The presence of a possibly applied cordon on an unillustrated sherd is also compatible with an identification as Grooved Ware. However, it must also be borne in mind that the sherds of P13 were recovered from higher levels than those of P9 and the two could only be contemporary if P13 was redeposited.

Barrow 12

P58 (Fig. 4.55) from layer 2 of the outer ditch, in fabric S:-, is of uncertain date and stylistic affinities, since so little of the vessel has survived. In this case the context of the pottery cannot give any pointer towards its likely date, as sherds from the ditch ranged from (redeposited) Neolithic to later prehistoric.

Barrow 13

The probably Deverel-Rimbury pottery from layers 2 and 3 of the ditch (401) also includes sherds in fabrics SSh(V):1, Sh:2 and FGS:3 (Table 4.29). Illustrated examples include P60 in fabric SSh(V):1 and P61 in fabric Sh:2 (Fig. 4.59). Although these vessels are in very different fabrics to F:1 and F:2 they could all belong to Bronze Age vessels of similar date. The protruding foot of P60 is not an unusual feature of Bronze Age ceramics, and occurs, for example, on Food Vessels and Collared Urns, but is admittedly very rare in the Deverel-Rimbury tradition.

A NOTE ON THE PETROLOGY OF SOME OF THE PREHISTORIC POTTERY

by David Williams

Introduction

A small number of prehistoric sherds from the 1983 and 1984 excavations were submitted for a detailed fabric examination in thin-section under the petrological microscope. The main objective of the analysis was to confirm the validity of a provisional identification of inclusions in the hand specimen and allocation to fabric groups. The site is situated on Valley Gravel, close to Kimmeridge Clay and Lower Greensand.

Petrology

On the basis of the range of non-plastic inclusions present in the sherds sampled, a number of fabric divisions have been made. The original fabric numbering of the samples has been retained.

Flint

Fabric F'B':1 (from layer 1 of pit 931 in the complex of intercutting pits in the extreme S of the excavated area).

Frequent angular pieces of flint/chert up to about 3 mm across, with a scatter of silt-sized quartz grains and flecks of mica. In the hand specimen some of the flint appears to be slightly ochreous. Some flint is present in local deposits, and flint was certainly imported to the site in substantial quantities for knapping and perhaps as finished artefacts (P Bradley, this Chapter), so this sherd may well represent a local product.

Grog

Fabric G'A':1 (from layer 1 in section D of 2061, the outer ditch of the oval barrow)

A fairly clean clay matrix containing angular inclusions of grog (ie crushed-up pottery), a scatter of sparse quartz grains, flecks of mica, some iron ore, clay pellets and ?mudstone. This sherd appears to have been made from poorly-prepared clay, with evidence of many air pockets and linear cracking of the clay matrix clearly visible in thin-section. There was no sign of glauconite in the section. Due to the nature and widespread use of grog tempering in late Neolithic and Bronze Age pottery, it is difficult to suggest an origin for these sherds, other than a fairly local one, on that basis alone (Clarke 1970; Peacock 1970; Darvill 1982).

Shell

Three sherds were sectioned:

Fabric SShA':1 (from Neolithic pit 2144, cut by the outer ditch of the oval barrow)

Fabric Sh(V)'C':1 (from layer 1 in section P of 2061, the outer ditch of the oval barrow)

Fabric SSh(V)'A':1 (from layer 1 in section G of 2061, the outer ditch of the oval barrow)

In thin-section the third sherd can be seen to contain frequent inclusions of shell. In a few cases it is possible to see some recrystallization of calcite in the shell suggesting that at least some of it is from a fossiliferous rock. Also in the section are a number of elongate voids commensurate with the shapes of the pieces of shell present. These voids no doubt once held shell which has since been lost in the firing of the pottery or due to adverse soil conditions at the site. Also present in the fabric are some grains of quartz, flecks of mica, a little iron ore and a few fine-textured argillaceous pieces — ?mudstone. The other two sherds lack visible shell but contain frequent voids of a similar shape to those in the sherd from section G of the barrow ditch, which suggest that they too once held inclusions of shell. Also present were the same range of additional inclusions described above.

There was no sign of glauconite / limonite in any of the three sections. The presence of fossil shell in one sherd probably points to the local Jurassic clays as the origin for the raw materials for all three.

WORKED FLINT
by Philippa Bradley

Introduction

A total of 8265 pieces of worked flint was recovered, 6459 from excavation and 1806 from fieldwalking (Tables 2.1, 7.11). In addition approximately 100 pieces of burnt unworked flint were recovered from various contexts (Table 7.12). Worked flint was retrieved from burials, a series of late Neolithic pits, ring ditches and later features (Fig. 7.2). It ranges in date from Mesolithic to Bronze Age. Thirty-five pieces of flint survived from previous excavations at Barrow Hills (Table 5.3). The majority of this material was re-examined, the exception being the flint from Parrington's 1976 excavation of barrow 2, which is summarised in Chapter 5.

The material is described and selected pieces are illustrated in Chapters 2–6. Some of the flint illustrations were executed during an earlier phase of analysis. Selected metrical and technological data are presented in Tables 7.13–18 and Figure 7.4. Further details may be found in the archive.

Sample Bias

The majority of the assemblage was hand-retrieved and bagged by layer. Occasional pieces were recorded three-dimensionally as small finds, chiefly grave goods and the more obviously retouched pieces. Chips were recovered from the Grooved Ware pits but rarely from other contexts (Tables 4.18, 7.11), reflecting sampling strategies: samples from four Grooved Ware pits (913, 917, 3196 and 3831) were processed on site by water flotation through a 0.5 mm mesh, largely to recover environmental remains, while other kinds of context were sampled less extensively (Table 7.33). The quantity of chips recovered seems to reflect the number of samples processed from each pit rather than any depositional patterning. Thus there are some biases in the assemblage, certain elements of the reduction sequence being under-represented.

Method

The assemblage was quantified and characterised typologically. Attribute analysis was performed on samples of complete unretouched flakes and certain other artefact types from selected contexts. Attributes recorded included butt type, extent of dorsal cortex, termination type, butt abrasion, degree of cortication, and raw material type. Length, breadth and thickness were also recorded, using standard methods of metrical analysis (Saville 1980). Further details of the attribute analysis can be found in the archive. Scraping angles were measured following the method outlined by Movius *et al.* (1968). Complete chips from 913, a Grooved Ware pit, were analysed following Newcomer and Karlin (1987). Refitting exercises were carried out and three refitting sequences were identified.

Definition of Terms Used

Unretouched component

Irregular waste shattered fragments produced during the reduction process. This material is frequently non-bulbar.

Unretouched flakes were divided on visual inspection into four categories :

Flake any removal from a core.

Blade a proportionately narrow, parallel-sided flake. Frequently with parallel arrises on its dorsal face.

Bladelet a small example of the above.

Blade-like flake a flake which possess some of the characteristics of a true blade, usually almost parallel-sided.

Special types of flake, for example microburins, flakes from polished implements and thinning flakes, were recorded separately.

Chip a small flake or fragment (maximum dimension 10 mm).

Table 7.11. Composition of the excavated flint assemblage

Irregular waste	Cores	Core rejuvenation Flakes	Flakes and blades	Chips	Hammer-stones	Retouched	Total	Burnt worked	Broken
149	110	56	4960	870	2	312	6459	786	4356
2.3%	1.8%	0.9%	76.8%	13.5%	0.0%	4.8%		12.2%	67%

Rejuvenation flake (subdivided into face and tablet) flakes removing a core face or platform respectively.

Cores were classified on the basis of type of removal and number of platforms. Whilst not following the widely adopted method of core classification (Clark and Higgs 1960), the following classification allows reduction strategies to be examined more informatively.

1. Single-platform blade core
2. Opposed platform blade core
3. Other blade core
4. Tested nodule
5. Single-platform flake core
6. Multi-platform flake core
7. Keeled, non-discoidal flake core
8. Levallois / other discoidal flake core
9. Core on a flake
10. Fragmentary / unclassifiable core

All complete cores were weighed.

Butt type (after Tixier *et al.* 1980, fig. 47)

1. Cortical — completely covered by cortex
2. Plain — formed by one removal
3. With more than one removal — more than one truncated flake scar on striking platform
4. Faceted — a series of negative bulbs along the dorsal edge, forming part of flake scars truncated at the ventral edge by detachment of the flake — usually indicative of deliberate core preparation
5. Linear — long slender butt
6. Punctiform — negligible butt
7. Other — any other butt type

Linear and punctiform butts may be produced using soft hammer and punch techniques.

Retouched pieces were classified according to standard morphological descriptions (eg Bamford 1985, 72–7; Healy 1988, 48–9).

Raw material

The majority of the flint is fairly uniform in appearance. It is dark brown in colour with frequent cherty inclusions. Cortex where present is thick and white or grey, with brown staining on some pieces. Thermal fractures are not common. Cortication is generally medium to heavy. An encrustation of calcium carbonate was noted on much of the flint. This may be the result of deposition within calcareous gravels. A source for this material may be the Upper Chalk of the Berkshire Downs to the S or the Chilterns to the E. Alternatively some may have come from the Clay-with-Flints capping the Berkshire Downs and the Chilterns.

A particularly distinctive type of flint occurred in pit 3196 and several other contexts across the site. This material possesses fairly good flaking properties, and is brown in colour and moderately corticated. Some cherty inclusions were noted. It has a thin, dark green, almost black cortex which is occasionally heavily weathered to a pale green colour. Directly underneath the cortex a thin orange band occurs. This material has been identified as Bullhead flint (D Roe pers. comm.). Bullhead flint occurs in Kent and Sussex in the Bullhead Bed (Rayner 1981, 357; Shepherd 1972, 114). The nearest source for this material has not been identified although it has been found in the Kennet river gravels to the S (Healy *et al.* 1992, 48).

A small proportion of the assemblage was made on poorer quality flint which was generally orange-brown in colour and had a thin, abraded cortex. A derived source is likely. Flint does occur in the river gravels and the Plateau Drift around the Thames (Pringle 1926; Arkell 1947) but is of doubtful flaking quality. Better quality flint occurs in the river gravels around Dorchester-on-Thames (Gibbard 1985).

Polished flint and stone axes were also reworked as cores (Fig. 3.8, F6; Fig. 4.4, S1; Fig. 4.34, F38; Fig. 4.37, S2; Fig. 4.41, F48 and Fig. 4.46, F54). Three reworked polished flint axe fragments and flakes from at least one other were found in various contexts (linear mortuary structure 5352 and Grooved Ware and other pits). A reworked group VI fragment was also recovered from phase 1 of ring ditch 611 (F Roe, this Chapter). The flint axes were made from a creamy-coloured flint with some cherty inclusions.

The majority of the flint was therefore brought to the site from outside the immediate area. However, the possible sources for the most of the assemblage are only some 20 km away. The raw material for the polished axes may have come from slightly further afield (possibly the flint mines at Peppard Common; Peake 1913). The Bullhead flint may have come from the Bullhead Beds to the SE. However, it may also occur in more locally in Tertiary deposits. Detailed fieldwork in the region may locate sources for this material.

Technology

Aspects of technology have been discussed in the artefact summaries in Chapters 3, 4 and 5 but salient points are discussed here. In general a decline in flintworking craftsmanship through time can be seen (cf Pitts and Jacobi 1979; Ford *et al.* 1984), although the later elements cannot be precisely quantified.

Relatively little flintwork of demonstrably early Neolithic date was recovered from contemporary features. However, there is evidence for redeposition of early flintwork within later features (see below). Blades and blade-like flakes are well represented in the fieldwalking assemblage. Blade cores were also recovered from the fieldwalking. Redeposited refitting blades and cores were found in the inner ditch of barrow 12, Beaker burial 950 and later Neolithic pit burial 942. Occasional flakes from later or unstratified contexts have parallel blade scars on their dorsal faces. The refitting flintwork from barrow 12 (Figs. 4.55, 7.3), other redeposited early material, for example from 942 and 950, and the blade-like flakes from the Neolithic flat graves (Figs 3.9–10) all show a controlled knapping strategy, platforms being carefully prepared and maintained. Feather terminations predominate and ridges were frequently followed to aid subsequent

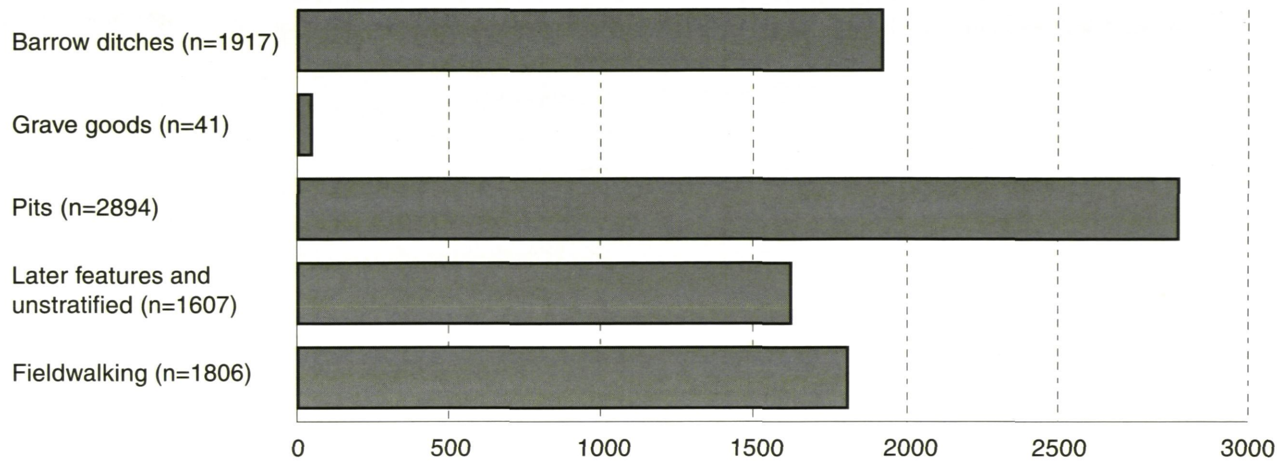


Figure 7.2 Frequency of struck flint by context type

removals. Cores were extensively worked maximising the raw materials available. Blade cores were generally single-platform but opposed platform types were also recorded. Cores were rejuvenated by removing intractable working platforms, face or edge rejuvenation flakes are slightly more common than tablets.

Technological similarities were noted between some of the flint from the lower layers of the oval barrow ditches and the causewayed enclosure. The polished knife from the oval barrow is a fine example of middle Neolithic flintworking. It is carefully produced on a long blade, a characteristic of this type of artefact (Pollard 1994, 44).

Suitably large samples of flint from the Grooved Ware pits, nearby ring ditch 801, and barrow 12 facilitated metrical analysis (Fig. 7.4; Tables 7.13–16). In general the material was quite carefully produced. Particular types of blank were selected for certain artefacts such as serrated and utilized flakes and scrapers. Keeled cores occur slightly more frequently in the Grooved Ware pits than in the other assemblages, a phenomenon also noted in other late Neolithic assemblages (Healy 1985). Cores from the Grooved Ware pits seem to have been less extensively worked than examples from the intercutting pits and are more than double the average weight of the excavated cores as a group (Ch. 4). The average weight for the three complete Bullhead cores from pit 3196 is 83.3 g. Only one of these cores was extensively worked (Fig. 4.34, F36).

All elements of the reduction sequence were recorded, although some seem to be under-represented. The lack of wholly cortical flakes and the relatively low incidence of cortical butts at Barrow Hills would suggest that some initial preparation was undertaken away from the site (Tables 7.13–7.17). The Bullhead flint may be an exception as it seems to have been brought to the site in the form of fairly small, unprepared nodules.

An initial crude approach to determining the stage or stages of the reduction sequence at which flint was transported could be to compare indices such as the core:flake ratio, the frequency of non-cortical flakes, overall flake size and the frequency of retouched forms with those for industries from the Wessex chalk, where flint seemed to have been worked close to where it was extracted or collected (Table 7.20). Percentages of retouched forms indistinguishable from those on the chalk sites make it unlikely that finished implements were imported on any scale. Core:flake ratios and percentages of non-cortical flakes do show contrasts, but as much between the Barrow Hills assemblages as between them and the Wessex ones. While the 'ordinary' assemblages (redeposited material in ring ditch 801 and the ditches of barrow 12 and, for core:flake ratios, the fieldwalking material) differ little from the range for the Wessex ones, those from the Grooved Ware pits, however, are distinguished by low proportions of cores and, in 917, 3831 and 913, high proportions of non-cortical flakes. This is not purely a product of sieving, which would enhance the proportions of small and hence predominantly non-cortical flakes. Pit 3196, the most intensively sampled and sieved (Table 7.33), has an unexceptional percentage of non-cortical flakes, and the percentages from the other pits remain high even when flakes less than 20 mm long are excluded. Furthermore, the combination of a high frequency of non-cortical flakes with large, relatively little-worked cores suggests that not all the cores from which the flakes were produced were deposited in the pits, enhancing the impression that their contents were selected.

Some artefacts from these pits had been used whilst others were deposited in a fresh, unused state. The possibility of deliberate breaking or 'killing' of artefacts has been raised by the two snapped scrapers from the Grooved Ware pit 3196 and ring ditch 801. Other artefacts from the Grooved Ware pits were also broken when deposited. This again implies selection of material from the everyday sphere of activity and perhaps that some artefacts were made for deposition. The limited success of refitting exercises on material from the Grooved Ware pits, particularly 3196, must again point to selection of material.

Early Bronze Age flintwork is largely represented by grave goods (see below). Characteristic invasive retouch was noted on many of the early Bronze Age

Table 7.12. Burnt unworked flint

Context	No. of fragments
401	1
611	1
900	1
911	3
913	6
917	17
935	2
2005	1
2043	1
2082	3
3196	9
3831	10
Later features and unstratified	17
Fieldwalking	31
Total	103

artefacts, for example 'thumbnail' scrapers (eg Fig. 4.8, F18–19), and knives (eg Fig. 4.61, F74, F77; Fig. 4.69, F79. Other than the grave goods and these distinctively retouched pieces, early Bronze Age 'industries' are very difficult to identify. The quantity of middle to late Bronze Age flintwork is rather difficult to assess, given the general lack of focus for activity of this date, although some of the hard hammer-struck flakes, cruder cores and scrapers from post-prehistoric and unstratified contexts may be of this date.

Chronological overview

Mesolithic

Despite the small quantity of Mesolithic material recovered during the excavations (Ch. 3), Mesolithic activity has been identified from surface survey in the vicinity of Barrow Hills (Holgate 1986). A subtriangular backed bladelet was found at the Abingdon causewayed enclosure and a radiocarbon determination of 5250–4600 cal BC (95% confidence)(6020±110 BP; BM-349) may reflect contemporary activity (Avery 1982, 40), although the reliability of some of the Abingdon determinations has recently been questioned (R Bradley 1986a).

Early/Middle Neolithic

Relatively little flint was recovered from earlier Neolithic features. Some of the flint from the lower layers of the oval barrow ditches is technologically similar to the nearby causewayed enclosure assemblage. Other earlier Neolithic flint was found in flat graves 5354 and 5355 and the linear mortuary structure 5352 (Figs 3.8–10, F6–10). Nine unretouched flakes from pit 2144, which was cut by the outer ditch of the oval barrow, were similar to flint from the barrow itself. The flint from pit 910 is technologically similar and may also be of this date. Flint artefacts are also associated with the central inhumations in the oval barrow (Fig. 3.3, F2 and F3).

There is in addition considerable evidence for redeposition of earlier material within later features (see 'Redeposition' below). It would appear from the widespread redeposition of earlier flintwork, for example in 602, 942 and 950, that there was considerable activity in the area prior to the construction of the barrows. The appearance of some of the material would suggest that it had been lying on the surface for some time before incorporation into the features from which it was recovered. This activity may be of a domestic nature with funerary and communal monuments being situated to the N. Earlier Neolithic activity has been found outside other causewayed enclosures such as Robin Hood's Ball, Wiltshire (Richards 1990, 61–65).

Final Neolithic/Beaker

Grooved Ware pits. A series of late Neolithic Grooved Ware pits produced a substantial quantity of flint (2483 pieces, or 38% of the excavated assemblage). The pits lay in two discrete groups in the S portion of the site (Fig. 4.30) with two outliers, 2179 and 2180, outside the oval barrow (Fig. 4.24) and another, 2082, to the S of barrow 12, a little way from the main group of pits (Fig. 4.47).

Pit 2180 had been truncated by ploughing and some of the other features may have been similarly affected. However, even among the pits which had definitely not been truncated, overall quantity is varied (Table 4.18), suggesting some patterning in deposition. Pit 911 produced flint very similar in character to the Grooved Ware pits and may be associated with this phase of activity.

The retouched pieces are fairly typical of Grooved Ware assemblages (Wainwright and Longworth 1971, 254–61). It is of note that only one chisel arrowhead was recovered from the Grooved Ware pits (Fig. 4.46, F52, from pit 2082) although a total of 14 chisel and 9 oblique arrowheads was recovered from the site. It is perhaps of some note that the example from pit 2082 is quite small and a relatively 'non-fancy' type. Far more elaborately and neatly worked transverse arrowheads were recovered from later features and fieldwalking.

Gloss on at least two serrated pieces may indicate the cutting and/or preparation of silica-rich plant materials (Keeley, 1980; Unger-Hamilton 1988). Blade-like blanks seem to have been selected for these implements, which may have facilitated hafting. Some of the retouched flakes may have been used for similar cutting purposes to the serrated pieces, although very few exhibited gloss. This may suggest that retouched flakes were used for cutting other materials. Frequently these flakes exhibited utilization damage rather than formal retouch. Unretouched flakes may also have been used for cutting, and usewear was noted on several examples from pits 3831, 3196 and 917. Other activities represented include hide preparation (scrapers, an awl)

Table 7.13. Length ranges of complete, unretouched flakes from selected contexts, sorted by extent of dorsal cortex

		Length (mm)								Totals	
Context	Cortex	- 10	20	30	40	50	60	70	-	No.	%
Ring ditch 801, layer 4	0%	1	13	19	8	3	1	-	-	45	41
	1%-25%	-	7	17	10	7	2	-	-	43	38
	26%-50%	-	3	2	1	-	-	-	1	7	6
	51%-75%	-	1	1	4	1	-	1	-	8	7
	76%-99%	-	-	3	-	1	-	-	-	4	4
	100%	-	1	1	1	-	-	-	-	3	3
Totals	No.	1	25	43	24	12	3	1	1	110	
	%	1	22	39	22	11	3	1	1		
Pit 3916	0%	-	19	21	7	4	3	1	-	55	43
	1%-25%	-	7	18	5	7	6	2	-	45	35
	26%-50%	-	1	2	4	2	1	-	2	12	9
	51%-75%	-	-	1	1	2	-	1	-	5	4
	76%-99%	-	1	2	2	1	1	-	-	7	5
	100%	-	-	2	2	-	-	-	-	4	3
Totals	No.	-	28	46	21	16	11	4	2	128	
	%-	-	22	36	16	12	9	3	2		
Pit 917	0%	1	22	17	9	2	-	-	-	51	67
	1%-25%	-	1	4	7	2	3	1	-	18	24
	26%-50%	-	-	-	-	1	-	1	-	2	3
	51%-75%	-	-	1	-	1	-	-	-	2	3
	76%-99%	-	1	-	-	1	-	-	-	2	3
	100%	-		-	-	-	-	-	-	-	-
Totals	No.	1	24	22	16	7	3	2	-	75	
	%	1	32	30	21	9	4	3	-		
Pit 3831	0%	-	24	23	4	3	-	3	1	58	68
	1%-25%	-	2	4	6	3	2	2	-	19	22
	26%-50%	-	-	-	-	1	-	-	-	1	1
	51%-75%-	-	-	1	1	-	-	-	-	2	2
	76%-99%	-	2	1	1	2	-	-	-	6	7
	100%	-	-	-	-	-	-	-	-	-	-
Totals	No.	-	28	29	12	9	5	2	1	86	
	%	-	32	34	14	11	6	2	1		
Pit 913	0 %	3	41	18	8	4	-	2	-	76	58
	1%-25%	-	8	9	7	3	4	-	-	31	24
	26%-50%	-	1	1	3	-	-	-	-	5	4
	51%-75%	-	1	1	2	1	-	-	-	5	4
	76%-99%	-	1	3	5	3	-	-	-	12	9
	100%	-	1	-	-	-	-	-	-	1	1
Totals	No.	3	53	32	25	11	4	2	-	130	
	%	2	41	25	20	9	3	2	-		
Barrow 12, ditches 601–2	0%	1	4	17	16	8	4	1	1	52	41
	1%-25%	-	5	11	13	14	4	2	-	49	38
	26%-50%	-	-	2	4	2	1	-	1	10	8
	51%-75%	-	-	2	3	-	-	-	-	5	4
	76%-99%	-	1	1	3	3	1	-	-	9	7
	100%	-	-	1	1	-	1	1	-	3	2
Totals	No.	1	10	34	40	27	11	4	2	128	
	%	1	8	26	31	21	9	3	2		

Table 7.14. Breadth ranges of complete, unretouched flakes from selected contexts, sorted by extent of dorsal cortex

		Breadth (mm)								Totals	
Context	Cortex	-	10	20	30	40	50	60	70	- No.	%
Ring ditch 801, layer 4	0%	-	18	20	4	2	1	-	-	45	41
	1%-25%	-	8	22	9	3	-	1	-	43	39
	26%-50%	-	3	-	2	2	-	-	-	7	6
	51%-75%	-	2	3	1	1	1	-	-	8	7
	76%-99%	-	-	3	1	-	-	-	-	4	4
	100%	-	-	3	-	-	-	-	-	3	3
Totals	No.	-	31	51	17	8	2	1	-	110	
	%	-	28	46	16	7	2	1	-		
Pit 3196	0%	1	27	14	10	1	2	-	-	55	43
	1%-25%	1	10	18	8	4	1	3	-	45	35
	26%-50%	-	2	3	3	1	2	1	-	12	9
	51%-75%	-	-	2	1	2	-	-	-	5	4
	76%-99%	-	1	3	1	-	2	-	-	7	6
	100%	-	3	-	-	1	-	-	-	4	3
Totals	No.	2	43	40	23	9	7	4	-	128	
	%	2	33	31	18	7	6	3	-		
Pit 917	0%	2	25	15	7	2	-	-	-	51	67
	1%-25%	-	3	5	7	1	1	1	-	18	24
	26%-50%	-	-	-	1	1	-	-	-	2	3
	51%-75%	-	1	1	1	-	-	-	-	2	3
	76%-99%	-	-	1	1	-	-	-	-	2	3
	100%	-	-	-	-	-	-	-	-	-	
Totals	No.	2	28	22	17	4	1	1	-	75	
	%	3	38	29	23	5	1	1	-		
Pit 3831	0%	10	24	17	4	3	-	-	-	58	68
	1%-25%	2	5	3	6	2	1	-	-	19	22
	26%-50%	-	-	-	1	-	-	-	-	1	1
	51%-75%	-	-	2	-	-	-	-	-	2	2
	76%-99%	-	1	4	1	-	-	-	-	6	7
	100%	-	-	-	-	-	-	-	-	-	
Totals	No.	12	30	26	12	5	1	-	-	86	
	%	14	35	30	14	6	1	-	-		
Pit 913	0%	5	40	20	6	2	2	1	-	76	58
	1%-25%	-	10	8	9	3	1	-	-	31	24
	26%-50%	-	4	1	-	-	-	-	-	5	4
	51%-75%	-	1	2	2	-	-	-	-	5	4
	76%-99%	-	2	4	2	4	-	-	-	12	9
	100%	-	1	-	-	-	-	-	-	1	1
Totals	No.	5	58	35	19	9	3	1	-	130	
	%	4	45	27	15	7	2	1	-		
Barrow 12, ditches 601-2	0%	1	26	14	9	2	-	-	-	52	41
	1%-25%	1	8	23	13	3	1	-	-	49	38
	26%-50%	-	1	5	2	2	-	-	-	10	8
	51%-75%	-	-	4	1	-	-	-	-	5	4
	76%-99%	-	2	6	-	1	-	-	-	9	7
	100%	-	-	2	-	-	1	-	-	3	2
Totals	No.	2	37	54	25	8	2	-	-	128	
	%	2	29	42	19	6	2	-	-		

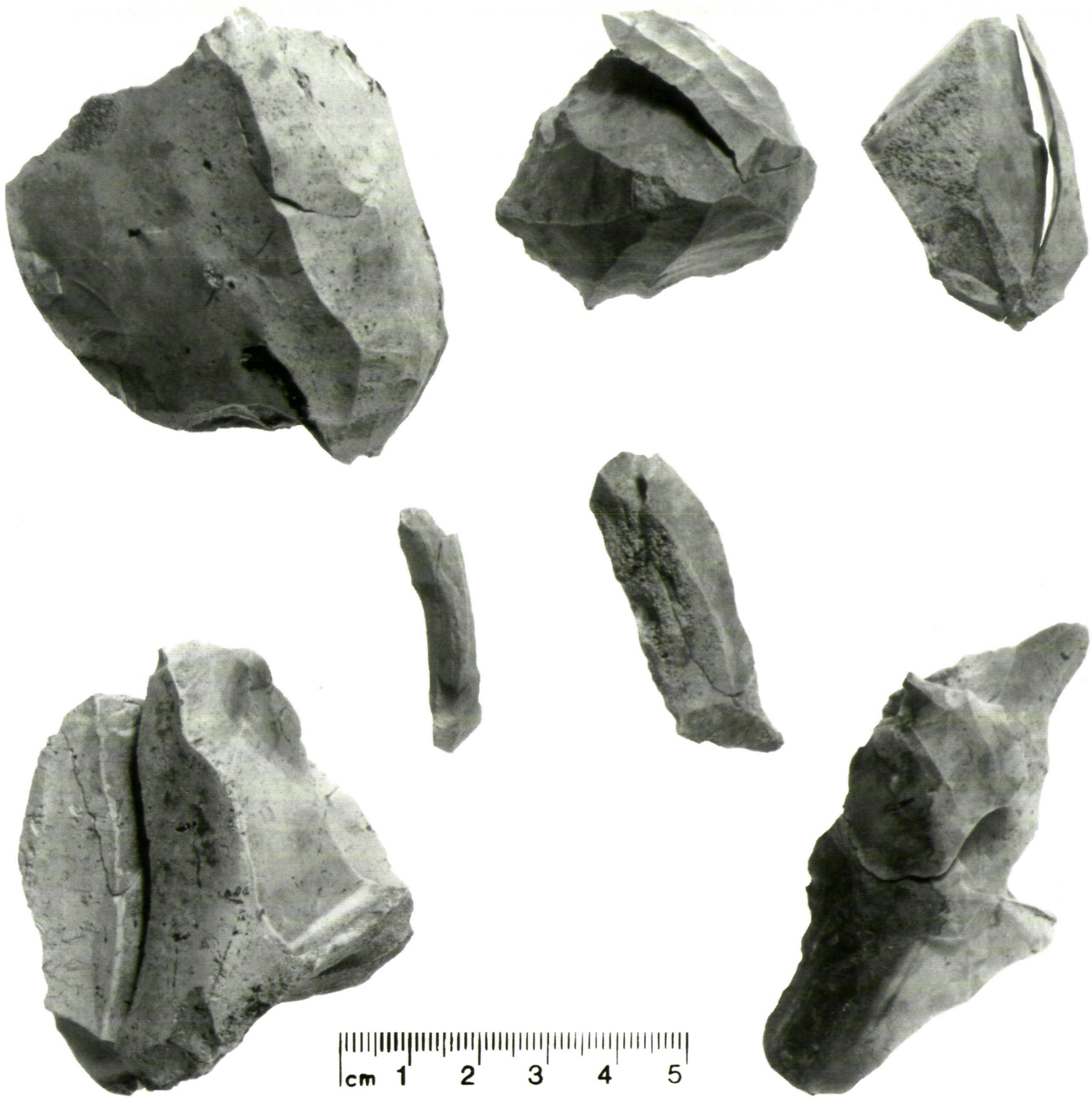


Figure 7.3 Refitting flint from ditch 602 of barrow 12 and Grooved Ware pit 3196. Top row: blade cores each with a refitting blade from 602 (Fig. 4.56, F58, F59, F60). Centre: two pairs of refitting blade-like flakes from 602. Bottom row: refitting flakes from pit 3196, 'old' nodule and bullhead flint. © Ashmolean Museum, Oxford

and knapping. The absence of retouch or faceting chips among the material analysed corresponds to the low incidence of retouched pieces in these features and the absence of faceting.

There appears to be some structuring of the deposits within the Grooved Ware pits. Layers 1 and 3 of pit 3196, for example, contained a large proportion of the material from the feature, while layer 2 was almost devoid of flint. Most of the retouched flint was recovered from layer 3, including an end and side scraper which may have been deliberately broken (Fig. 4.34, F35). This type of breakage may be consistent with the damage caused by the implement being hafted (Gaffney and Tingle 1989, 46, fig. 5.5: 6; 48), although the breakage on this example is across the implement and the scraping edge does not appear to have been used. A scraper from ring ditch 801 seems to have been snapped in half and then in half again (Fig. 4.11, F21), perhaps suggesting some deliberate action. In the Grooved Ware pits other artefacts, including some of the bone tools, were deposited broken. Flint and stone axes have been reworked (Fig. 4.46, F54; Fig. 4.37, S2). The flint was generally very fresh in appearance and may have been deposited soon after knapping.

A complex series of deposits would appear to have been made in these pits, with deliberate backfilling.

Recutting was evident in 3196, 913 and 917, and some layers contained large quantities of charcoal. Much of the worked flint was burnt (Table 4.18) and 45 pieces of burnt unworked flint were recovered from these pits. This represents 43.7% of the total burnt unworked flint recovered from both excavation and fieldwalking (Table 7.12), and its inclusion may indicate selection of material for deposition. It is likely that the flint deposited in the pits represents domestic debris (knapping debris, fairly high numbers of scrapers and the burnt material). However, the context and structuring of the deposits seems to have been anything but domestic (cf Thomas 1991b, 59–64).

Typologically and technologically the flint from these pits compares well with other Grooved Ware assemblages in the Middle and Upper Thames, for example those from Cassington and Stanton Harcourt (Case 1982a, 103, 125–7; Holgate forthcoming).

Refitting. Refitting exercises were carried out on material from a number of contexts. The distinctive Bullhead flint from 3196 and several other contexts was chosen for one refitting exercise. Table 7.19 summarises the incidence and composition of this material. Only two flakes were found to refit (Fig. 7.3). The keeled core (Fig. 4.34, F41) has had few removals, and must originally have been only marginally larger. The opposed platform core (Fig. 4.34, F36) has been thoroughly reduced, again a small nodule seems to have been used. The core fragment, however, may have come from larger nodule. It is likely that the rest of the material belongs to the same or related reduction sequences as the raw material is virtually indistinguishable.

A sequence of three flakes from layer 3 of pit 3196 also refitted (Fig. 7.3). This material exhibited a layer of heavy cortication and is probably from the Upper Chalk. No other refits were found, although there were several near refits; given sufficient time it is probable that more would be found.

Redistribution. It has been demonstrated that the Bullhead flint was probably brought to the site in the form of several fairly small nodules. Approximately 87% of the Bullhead flint was recovered from Grooved Ware contexts, suggesting deliberate deposition of this material, perhaps because of its attractive appearance.

The flint seems to have been deposited originally in layer 3 of pit 3196. Two flakes also occur in the lowest layer of pit 2082, suggesting deposition at a similar time. The main focus for this activity is layer 3 of 3196 which contained 184 pieces (*c.* 90% of the total from Grooved Ware pits; Table 7.19). The pottery appears to have been deposited within a single episode (Cleal, this Chapter). The flint would also support this suggestion: the material from the Grooved Ware pits is very fresh, while the Bullhead flint retrieved from other contexts is less fresh, perhaps indicating that it had been lying on the surface for some time prior to final deposition.

Pit 3196 stands out from the other Grooved Ware pits at Barrow Hills by its far greater quantity of struck flint and its concentration of Bullhead flint, which may have been chosen for its attractive appearance. It may not be a coincidence that Bullhead flint was also found in Grooved Ware pits (544 and 849) at Barton Court Farm and in the inner ditch at the Abingdon causewayed enclosure (pers. obs.); both of which may be regarded as contexts of deliberate deposition. Bullhead flint has been found in a number of other Grooved Ware pits in the county, for example at Blewbury (A Barclay pers. comm.). Flakes from polished flint axes were also found in pit 3196, and a complete group I stone axe came from pit 917. The quantity and range of retouched pieces from 3196 are the most extensive. Scrapers are more common in 3196, and the scraper which may have been deliberately snapped (Fig. 4.34, F35) suggests some special treatment prior to deposition.

The flint from the segmented ring ditch and from small ring ditch 801, immediately beside pit 3196 (Fig. 4.11) is typologically and technologically similar to the material from the Grooved Ware pits (Fig. 7.4). The early Bronze Age date of the central cremation (802) in 801 indicates that the material was redeposited. It is of interest that scrapers which seem to have been deliberately snapped were found in both 801 and 3196 (Figs 4.11, F21, 4.34, F35). Keeled, non-discoidal flake cores were recovered from both the segmented ring ditch and 801, perhaps enforcing the Grooved Ware association.

Other than the Grooved Ware pits, later Neolithic activity is represented by the segmented ring ditch, the first phase of ring ditch 611, redeposited flintwork in layer 4 of ring ditch 801 and the intercutting pits. The intercutting pits produced quantities of later Neolithic and early Bronze Age flint but were largely devoid of other artefacts. The material seems to differ markedly from the Grooved Ware assemblages: the retouched proportion is much higher, there is a greater incidence of broken pieces and the total number of pieces per feature is relatively low, perhaps suggesting that this is domestic debris dumped without any thought other than purely rubbish disposal (Ch. 4). There would appear to be little or no selection of artefacts within these features which contrasts markedly with the Grooved Ware assemblages. The flint from the intercutting pits and pit scatter can be compared with material from Reading Business Park where similar types of features produced lithic-dominated artefact assemblages (Moore and Jennings 1992, 8). Stray finds of this date are widespread. The period seems to be characterised by greater structuring of flint artefacts within some features, although the artefacts are often of a domestic character.

Beaker flintwork is largely represented by deliberate deposits in funerary contexts. There are also some 'thumbnail' scrapers and barbed and tanged arrowheads from later and unstratified contexts which probably relate to this phase of activity. Eight unretouched flakes and an invasively retouched scraper (Fig. 4.25, F29) from pit 2181, to the SW of the oval barrow, are probably of Beaker date. The flakes were all small and were hard hammer-struck. Hinge fractures were common. Beaker activity across the site is largely funerary with slight evidence for other activity between the monuments.

Table 7.15. Thickness ranges of complete, unretouched flakes from selected contexts, sorted by extent of dorsal cortex

Context	Cortex	Thickness (mm) -2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-	Totals No	%
Ring ditch 801, layer 4	0%	1	16	13	8	4	2	-	-	-	1	-	45	41
	1%-25%	1	8	11	11	8	2	1	1	-	-	-	43	39
	26%-50%	-	2	2	2	-	-	1	-	-	-	-	7	6
	51%-75%	-	2	-	1	2	2	-	-	-	1	-	8	7
	76%-99%	-	-	1	2	1	-	-	-	-	-	-	4	4
	100%	-	-	-	2	-	-	1	-	-	-	-	3	3
Totals	No.	2	28	27	26	15	6	3	1	-	2	-	110	
	%	2	25	24	23	14	6	3	1	-	2	-		
Pit 3196	0%	3	27	10	7	5	1	2	-	-	-	-	55	43
	1%-25%	1	9	12	10	3	1	3	4	2	-	-	45	35
	26%-50%	-	2	1	2	-	3	1	1	-	-	2	12	9
	51%-75%	-	-	-	2	1	1	1	-	-	-	-	5	4
	76%-99%	-	1	3	3	-	-	-	-	-	-	-	7	6
	100%	-	1	1	1	-	-	1	-	-	-	-	4	3
Totals	No.	4	40	27	25	9	6	8	5	2	-	2	128	
	%	3	31	21	19	7	5	6	4	2	-	2		
Pit 917	0%	4	25	11	7	3	-	1	-	-	-	-	51	67
	1%-25%	-	4	2	4	2	2	3	-	-	1	-	18	24
	26%-50%	-	-	-	-	-	-	-	1	1	-	-	2	3
	51%-75%	-	-	1	-	-	1	-	-	-	-	-	2	3
	76%-99%	-	-	1	-	-	1	-	-	-	-	-	2	3
	100%	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	No.	4	29	15	11	5	4	4	1	1	1	-	75	
	%	5	40	20	15	7	5	5	1	1	1	-		
Pit 3831	0%	1	35	10	7	4	-	-	-	1	-	-	58	67
	1%-25%	-	4	5	4	2	1	-	1	-	1	1	19	22
	26%-50%	-	-	-	-	-	1	-	-	-	-	-	1	1
	51%-75%	-	-	-	1	1	-	-	-	-	-	-	2	2
	76%-99%	-	4	-	-	2	-	-	-	-	-	-	6	7
	100%	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	No.	1	43	15	12	9	2	-	1	1	1	1	86	
	%	1	50	18	14	11	2	-	1	1	1	1		
Pit 913	0%	4	40	15	9	6	-	1	1	-	-	-	76	58
	1%-25%	2	8	10	4	2	1	1	2	1	-	-	31	24
	26%-50%	-	1	2	2	-	-	-	-	-	-	-	5	4
	51%-75%	-	2	-	-	1	1	1	-	-	-	-	5	4
	76%-99%	-	-	3	5	2	-	2	-	-	-	-	12	9
	100%	-	-	1	-	-	-	-	-	-	-	-	1	1
Totals	No.	6	51	31	20	11	2	5	3	1	-	-	130	
	%	5	39	23	15	9	2	4	2	1	-	-		
Barrow 12, ditches 601-2	0%	-	24	8	9	5	4	2	-	-	-	-	52	41
	1%-25%	-	8	12	11	9	4	3	-	-	-		49	38
	26%-50%	-	2	1	2	-	2	1	-	1	1	-	10	8
	51%-75%	-	-	-	3	1	-	1	-	-	-	-	5	4
	76%-99%	-	2	-	3	1	2	1	-	-	-	-	9	7
	100%	-	1	1	-	-	-	1	-	-	-	-	3	2
Totals	No.	-	37	22	28	16	12	9	2	1	1	-	128	
	%	-	28	17	22	13	9	7	2	1	1	-		

Bronze Age

Very little flint was demonstrably Bronze Age. Few diagnostic Bronze Age artefacts were recovered, although there is some evidence for activity around the barrows. A fabricator and a fragment of another were found in fieldwalking (Fig. 2.5), a further example was found in topsoil sampling across the Victorian tree plantation (Fig. 6.1, F101). The complete fabricator from the fieldwalking survey was made on an old, already corticated blank, perhaps suggesting that flint lying on the surface was reused. Crude, step-flaked scrapers from pit 2124 (Fig. 4.31, F31), SFB 17/18 (3441), pit 4648 and unstratified contexts may indicate a middle to late Bronze Age date for a least some material. One or two of the barbed and tanged arrowheads from the fieldwalking survey are very crude and may be late. Undoubtedly some of the unretouched flakes from unstratified and later contexts also belong to this phase of activity. Many of the unretouched flakes from these contexts were short with frequent hinge fractures and tended to be hard hammer-struck. Such flintwork is scarce and suggests slight activity other than funerary.

Arrowheads

The arrowheads tend to conform to established ceramic associations (Green 1980; see Table 7.21 for radiocarbon determinations and other artefact associations). The only chisel arrowhead from a Grooved Ware context, pit 2082, (Fig. 4.46, F52) was associated with one featureless sherd in a Grooved Ware fabric (Table 4.17). Two further chisel arrowheads were found with indeterminate Grooved Ware and Beaker in later Bronze Age layers 1 and 2 of pond barrow 4583, emphasising the extent of redeposition. Oblique arrowheads are traditionally associated with the Clacton and Durrington Walls substyles of Grooved Ware (Green 1980, table V.1), as distinct from the Woodlands substyle which is rare on the site. A child inhumation, 5274, to the N of pond barrow 4866 was accompanied by a chisel arrowhead (Fig. 4.61, F76). A radiocarbon determination of 2040–1610 cal BC (95% confidence)(3480±80 BP; OxA-1903) was obtained from human bone. The arrowhead was found below the knees with an invasively retouched knife (Fig. 4.61, F77), three flakes and another invasively retouched knife (Fig. 4.61, F72–5) were found near the right hand. The association would seem to be secure. It is likely that this is a late survival for this type of arrowhead (cf Green 1980, 111). The five Green Low arrowheads (Fig. 4.78, F83–87) were associated with a Final Southern Beaker. Other barbed and tanged arrowheads have diverse Beaker associations.

Redeposition

The amount of flint retrieved from monument ditches varied considerably (Tables 3.2, 4.2, 4.4, 4.6, 4.9, 4.26, 4.30, 4.32, 4.34–5), and independently of the extent to which the ditches were excavated. As the plans show, smaller ring ditches and pond barrow-like features were wholly or extensively emptied, as were the ditches of the oval barrow, while the larger round barrow ditches were dug to a far more variable extent.

The primary fills of all of the major monuments were relatively clean (Fig. 7.5), which is to be expected given the rapid accumulation of primary silts. The small samples of material from the primary silts preclude any firm dating but contemporaneity with the monuments is indicated.

Evidence for redeposition was fairly widespread. Perhaps the most obvious example is a group of material from the inner ditch of barrow 12. Approximately 44% of the flakes from 602 were blades or blade-like flakes, contrasting with only 19% for the outer ditch. A series of cores, unretouched flakes and blades in 602 produced several refits although no long reduction sequences could be established (Fig. 4.55, F58, F59 and F60; Fig. 7.3). Blade cores were dominant in layer 1, and two other blade cores were recovered from the ploughsoil over the barrow. The incidence and composition of the refitting material from this feature is summarised in Table 4.28. Two pairs of refitting blades and three cores each with a refitting blade were found (Fig. 7.3). This material was generally soft hammer-struck and careful, controlled flaking is evident, frequently ridges are followed to produce subsequent blades.

All of this material occurred in one layer of one section (G/1), although precise locations of the pieces within the layer are not known. Given the restricted distribution of the material and its very fresh condition, it is possible that an earlier feature was destroyed by the digging of the barrow ditch.

Later Neolithic flintwork was redeposited in layer 4 of ring ditch 801. The close proximity of this feature to Grooved Ware pit 3196 may suggest that this material had either eroded into the ditch from this pit, or that a pit was destroyed when the ring ditch was constructed. The material is generally concentrated in the eastern part of the ring ditch (Ch. 4). The similarity of the two assemblages is demonstrated by the metrical analysis (Fig. 7.4; Tables 7.13–7.15) and the range of artefacts present (Tables 4.6–7).

The upper silts of monuments closest to the causewayed enclosure, for example, the oval barrow and ring ditch 801, contained fairly significant quantities of flint. More flint was recovered from around these monuments in the fieldwalking survey (Figs 2.3–5). Further E material was less concentrated in upper silts of monument ditches and fewer pieces were found in the fieldwalking survey. This may support the idea of a linear development of the barrow cemetery from W to E.

Some mixing of material in upper silts of the major monuments was noted. Given that the ditches were still shallow depressions in the Saxon period, the inclusion of later material in most of them is not surprising. Earlier Neolithic material in the upper layers of 602 may have come from a feature which was destroyed by the barrow ditch. 'Thumbnail' scrapers generally associated with Beaker and step-flaked scrapers thought to be middle to late Bronze Age were noted in some monument ditches, for example, the segmented ring ditch and ring ditch 801 (Figs 4.8, F18, F19; 4.11, F22).

Table 7.16. Breath:length ratio ranges of complete, unretouched flakes >20 mm long from selected contexts, sorted by extent of dorsal cortex

Context	Cortex	Breadth:length -	1:5	2:5	3:5	4:5	5:5	6:5	7:5	8:5	9:5	10:5	-	Totals No.	%
Ring ditch 801, layer 4	0%	-	1	4	12	2	8	3	-	1	-		-	31	37
	1%-25%	-	-	5	11	10	6	2	-	2	-		-	36	43
	26%-50%	-	-	1	-	1	-	-	2	-	-		-	4	5
	51%-75%	-	-	3	2	1	1	-	-	-	-		-	7	8
	76%-99%	-	-	1	-	1	1	-	-	1	-		-	4	5
	100%	-	-	-	1	-	-	1	-	-	-		-	2	2
Totals	No.	-	1	11	27	16	16	7	2	4	-		-	84	
	%	-	1	13	32	19	19	8	3	5	-		-		
Pit 3196	0%	-	1	5	12	9	4	2	2	1	-		-	36	36
	1%-25%	-	2	5	7	11	10	2	-	1	-		-	38	38
	26%-50%	-	-	3	2	3	2	-	1	-	-		-	11	11
	51%-75%	-	-	-	2	1	2	-	-	-	-		-	5	5
	76%-99%	-	-	1	2	1	1	-	-	1	-		-	6	6
	100%	-	-	1	2	-	-	1	-	-	-		-	4	4
Totals	No.	-	3	15	27	25	19	5	3	3	-		-	100	
	%	-	3	15	27	25	19	5	3	3	-				
Pit 917	0%	-	1	3	6	7	6	3	2	-	-		-	28	56
	1%-25%	-	-	3	6	2	3	1	2	-	-		-	17	34
	26%-50%	-	-	1	-	-	1	-	-	-	-		-	2	4
	51%-75%	-	-	-	2	-	-	-	-	-	-		-	2	4
	76%-99%	-	-	-	1	-	-	-	-	-	-		-	1	2
	100%	-	-	-	-	-	-	-	-	-	-		-	-	-
Totals	No.	-	1	7	15	9	10	4	4	-	-		-	50	
	%	-	2	14	30	18	20	8	8	-	-		-		
Pit 3831	0%	-	4	9	6	9	3	3	-	-	-		-	34	59
	1%-25%	-	-	7	3	4	2	1	-	-	-		-	17	29
	26%-50%	-	-	-	-	1	-	-	-	-	-		-	1	2
	51%-75%	-	-	-	1	-	1	-	-	-	-		-	2	3
	76%-99%	-	-	1	2	1	-	-	-	-	-		-	4	7
	100%	-	-	-	-	-	-	-	-	-	-		-	-	-
Totals	No.	-	4	17	12	15	6	4	-	-	-		-	58	
	%	-	7	29	21	26	10	7	-	-	-		-		
Pit 913	0%	-	3	1	9	9	7	1	2	-	-		-	32	44
	1%-25%	-	-	2	8	9	1	3	-	-	-		-	23	31
	26%-50%	-	-	3	1	-	-	-	-	-	-		-	4	5
	51%-75%	-	-	-	-	3	1	-	-	-	-		-	4	5
	76%-99%	-	-	2	3	3	1	1	-	1	-		-	11	15
	100%	-	-	-	-	-	-	-	-	-	-		-	0	-
Totals	No.	-	3	8	21	24	10	5	2	1	-		-	74	
	%	-	4	11	28	32	14	7	3	1	-		-		
Barrow 12, ditches 601-2	0%	-	6	12	15	6	8	-	-	-	-		-	47	40
	1%-25%	-	4	10	15	8	4	-	-	2	-		1	44	37
	26%-50%	-	-	4	1	4	-	1	-	-	-		-	10	9
	51%-75%	-	-	-	1	2	1	-	-	1	-		-	5	4
	76%-99%	-	-	3	3	1	1	-	-	-	-		-	8	7
	100%	-	-	-	-	1	2	-	-	-	-		-	3	3
Totals	No.	-	10	29	35	22	16	1	-	3	-		1	117	
	%	-	9	24	29	19	14	1	-	3	-		1		

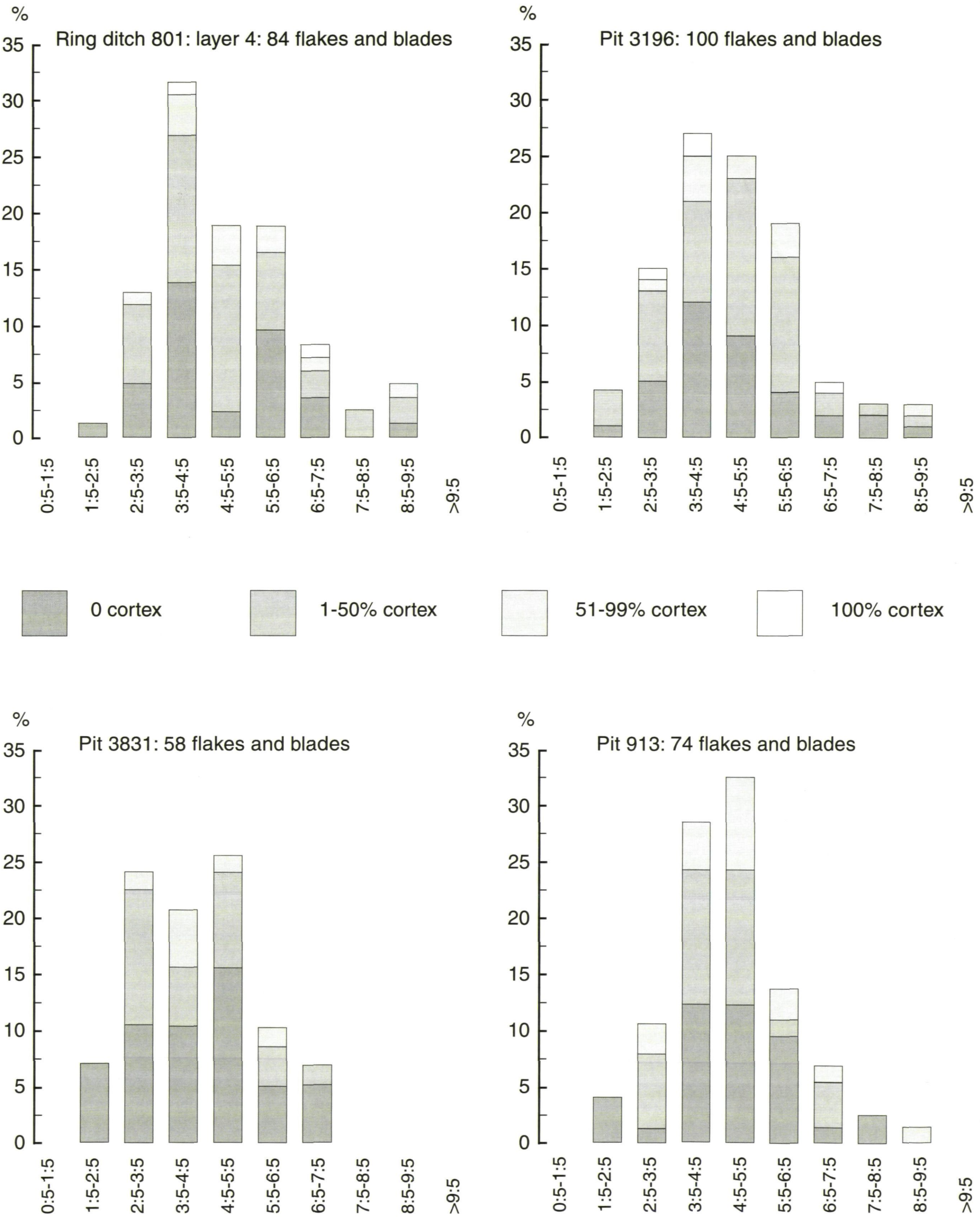


Figure 7.4 Breadth: length ratio ranges of complete, unretouched flakes and blades over 20mm long from selected contexts

Table 7.17. Butt types and frequency of platform edge abrasion in complete, unretouched flakes from selected contexts

Context	Butt type Cortical	Plain	>1 removal	Faceted	Linear	Punctiform	Other	Totals	Abraded
Ring ditch 801,	5	51	13	-	14	27	-	110	47
	5%	46%	12%	-	12%	25%	-		43%
Pit 3196	16	29	8	1	14	59	1	128	45
	13%	22%	6%	1%	11%	46%	1%		35%
Pit 917	1	33	10	-	14	17	-	75	16
	1%	44%	13%	-	19%	23%	-		21%
Pit 3831	2	32	8	-	14	30	-	86	15
	2%	38%	9%	-	16%	35%	-		17%
Pit 913	13	35	13	1	21	46	1	130	36
	10%	27%	10%	1%	16%	35%	1%		27%
Barrow 12,	10	56	11	1	15	35	-	128	39
ditches 601-2	8%	44%	8%	1%	12%	27%	-		31%

Grave goods

Burials dating from the Neolithic to the Bronze Age were accompanied by flint artefacts. These range from the mundane to the spectacular. Flint artefacts seem to have been included in burial assemblages for a variety of reasons. Grave goods form only a small proportion of the total flint assemblage from the site (Fig. 7.2).

Grave goods have been identified primarily by their position within the grave and, to some extent, artefact type. Flint artefacts in burial assemblages may represent :

1. personal possessions of the deceased
2. items made especially for deposition
3. items used in mortuary rites
4. instruments of death
5. redeposited or intrusive items (cf Humble 1990).

Dr Andrew Brown's usewear analysis indicates that some of the artefacts from graves 203 and 4660 were used for scraping, cutting and whittling purposes. Some of these artefacts may belong to a personal toolkit, perhaps the scraper F82, associated with the leather-working tools in grave 203 (Figs 4.78–9). Other artefacts may have been used in the mortuary rites.

Functional analysis by Roger Grace of a group of flint artefacts from a Beaker burial at Irthlingborough, Northamptonshire, has shown a complex history of artefact use (Humble 1990). Here eight flint artefacts were thought to have been used in mortuary rites (mostly unretouched flakes), two artefacts (a bifacial triangular point and a dagger) were thought to be symbolic or personal items and the three smallest flints were interpreted as redeposited or incidental (Humble 1990, 8). Analysis of late Neolithic/early Bronze Age grave goods has shown that used flint artefacts occur more frequently than unused pieces (Gibbs 1989, 109). Unused flint artefacts were, however, more commonly associated with male burials (Gibbs 1989, 109). This may suggest that flint artefacts were more often made specially for inclusion with male burials.

The polished knife (Fig. 3.3, F2) from the oval barrow may have been made especially for deposition. A utilized blade-like flake from this burial may have been a personal possession or perhaps used in the mortuary rites. Other artefacts were deposited in a fresh and unused state and may have been made for deposition with the dead, for example, the unretouched flakes accompanying the Neolithic inhumations (Figs. 3.9–10, F7–10).

Barbed and tanged arrowheads from graves 4660 and 203 (Figs 4.23, F28; 4.79, F99), on the basis of damage and their positions in the grave, are thought to have caused the deaths of the individuals.

Redeposited material in burials is common, for example unretouched flakes in graves 2127 and 919. Flint interpreted as redeposited in graves tended to comprise small unretouched flakes. The position of this material within the grave also cast doubt on the deliberate nature of the deposit.

Table 7.18. Termination types in complete, unretouched flakes from selected contexts

Context	Feather	Hinge	Step	Plunging	Other	Totals
Ring ditch 801,	49	51	4	-	6	110
layer 4	45%	44%	4%	-	6%	
Pit 3196	79	44	-	-	5	128
	62%	34%	-	-	4%	
Pit 917	33	39	1	1	1	75
	44%	53%	1%	1%	1%	
Pit 3831	60	18	3	1	4	86
	69%	21%	4%	1%	5%	
Pit 913	72	50	8	-	-	130
	55%	39%	6%	-	-	
Barrow 12,	71	41	10	1	5	128
ditches 601-2	55%	32%	8%	1%	4%	

There is a contrast between elaborately worked and simple grave goods. This does not seem to be chronological; unretouched flakes were found with Neolithic inhumations, a Beaker burial and an early Bronze Age burial, although the latter burials were accompanied by other artefacts. Age, gender and status may account for these differences.

Similar edge-polished and all-over polished knives to the one accompanying the central burial in the oval barrow are frequently associated with Neolithic single burials in northern England (Kinnes 1979). No precise parallels were found but several bear striking similarities to the Barrow Hills example. A knife from Liff's Low, Derbyshire is of a similar size and has one serrated and one polished edge. The lower surface of this artefact has been ground (Clarke *et al.* 1985, ill. 7.17). The knife from Ayton East Field, Yorkshire, has been ground and polished all over the dorsal face, the ventral face exhibits fine pressure flaking (Kinnes 1979, fig. 18.6). A similar type from Aldro 94, Yorkshire, has been retouched at its proximal and distal ends, both lateral edges have been polished (Kinnes 1979, fig. 18.4).

A related type was found at Linch Hill Corner, Oxfordshire associated with a jet belt slider in the primary burial in a round barrow (Grimes 1960, 157, fig. 64). At Mount Farm, Dorchester-on-Thames, the primary inhumation of the oval barrow was accompanied by an unpolished knife made on a blade of similar proportions to the Barrow Hills example (Case 1986). Another similarly proportioned, polished knife accompanied the primary crouched inhumation at Five Knolls, Bedfordshire (Dunning and Wheeler 1931; Thomas 1962, 29, fig. 2). It is of note that the inhumations from Linch Hill Corner and Five Knolls were female, as at Barrow Hills.

A similar polished and flaked knife has recently been found in the secondary silts of the outer ditch at Millbarrow, Wiltshire (Pollard 1994, 43, fig. 18). Pollard reviews the dating evidence and associations of this type of polished knife, and it can be seen that they form part of the 'Macehead Complex' and are thus linked to Peterborough Ware (Pollard 1994, 44; Manby 1974).

A fragmentary leaf-shaped arrowhead (Fig. 3.3, F3) was recovered from 2143, a Saxon SFB cutting the central burial area of the barrow. The excavator interpreted this artefact as a grave good accompanying 2127, the male inhumation (R Bradley 1992a). It is evenly corticated and therefore seems to have been broken when deposited. The arrowhead was found near to the head, although this may not have been its original position in the grave. It would seem unlikely that the arrowhead caused the death of the individual.

Linear mortuary structure 5352 produced a reworked polished flint axe (Fig. 3.8, F6). This artefact would not be out of place as a deliberate deposit in the backfill of the grave.

Flint was recovered from five cremations, (1063, 1064, 1067, 4405, 4662; Table 4.33). With the exception of the heavily burnt plano-convex knife from 4405 (Fig. 4.69, F79) and a burnt, rather squat flake from 1064/1, the material seems to have been redeposited. The plano-convex knife was probably a deliberate deposit included in the pyre at the time of cremation. Saville (1985, 130) has reviewed the evidence for the ceramic associations of plano-convex knives, establishing an Urn-Food Vessel association. Cremation 4405 has no ceramic associations, although its position in a line of early Bronze Age cremations, some accompanied by Collared Urns, is instructive. Collared Urns have a restricted distribution on the site (Fig. 9.11), and it would seem likely that 4405 belongs to the same episode of activity.

Material from pre-1983 excavations

Flint from the earlier barrow excavations was re-examined (Table 5.3). Unfortunately some of the material could not be located. Flint from the earlier excavations tended to be either grave goods or material from discrete features such as pits. Very little was retrieved from the barrow ditches, which probably reflects the excavation strategies of the time, as may the complete absence of chips and pieces of irregular waste.

Fieldwalked material

A total of 1806 pieces of flint were recovered from fieldwalking the area prior to excavation (Ch. 2). Of the total, 343 pieces were recovered from random collection in the area. Flint from the systematic field survey has been plotted (Figs 2.3–5). The general distribution correlates with that of flint from the excavated features.

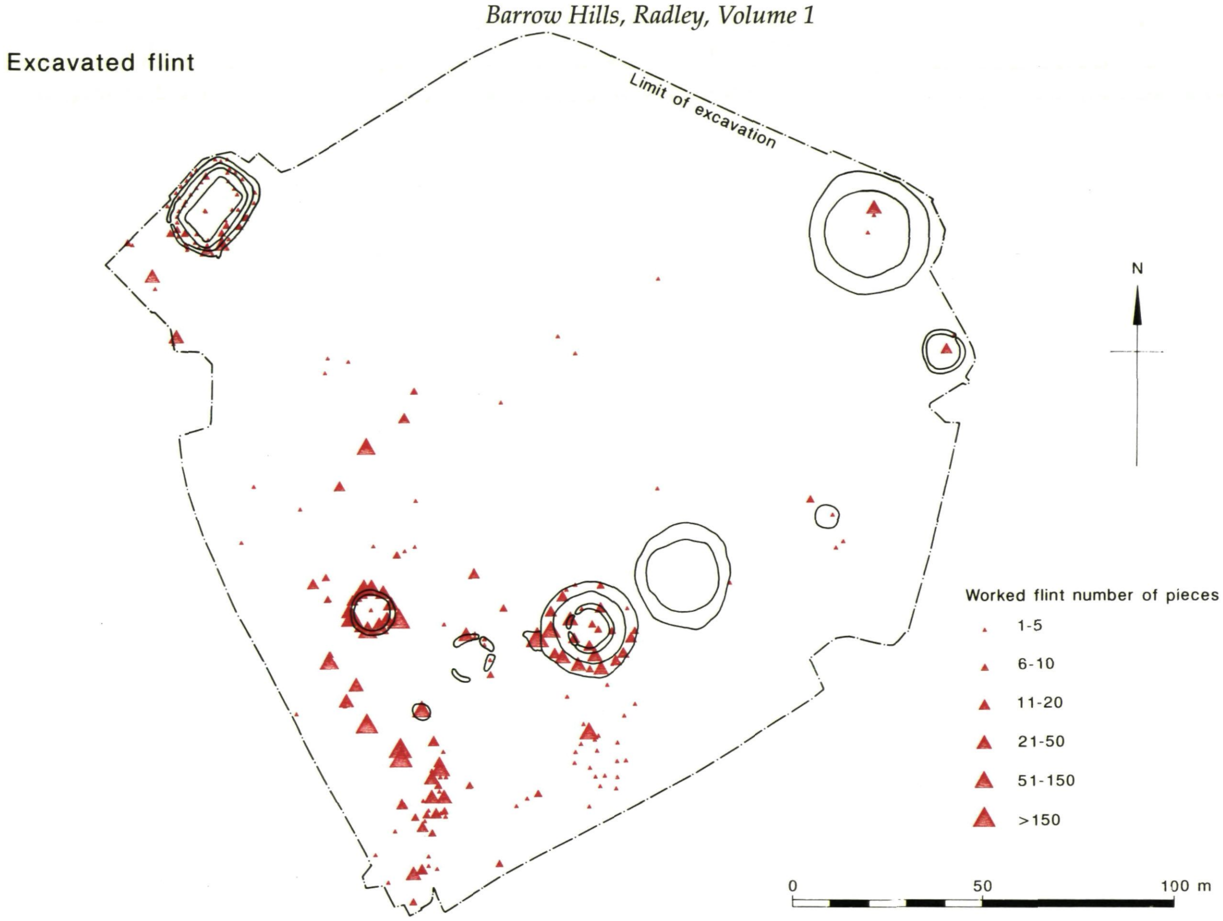
Table 7.19. Bullhead flint

Context	Flakes	Cores	Chips	Retouched	Totals
206/1	1	-	-	-	1
911/1	1	-	-	-	1
913/2	1	-	-	-	1
913/1	-	-	-	1	1
931/1	1	-	-	-	1
601/5	1	-	-	-	1
601/4	-	-	-	1	1
601/3	3	-	-	-	3
601/-	1	-	-	-	1
602/2	-	-	-	1	1
801/4	3	-	-	-	3
2060/-	1	-	-	-	1
2061/II/2	1	-	-	-	1
2080/-	1	-	-	-	1
2082/3	2	-	-	-	2
2082/2	1	-	-	-	1
2082/1	1	-	-	-	1
3196/3	151	2	30	1	184
3196/1	8	1	3	-	12
Later contexts and unstratified	14	-	1	-	15
Totals	193	3	34	4	233

Table 7.20. Aspects of the composition of flint assemblages from Barrow Hills compared with others from the Wessex chalk. n = information not available.

Context(s)	Date	Cores:flakes	Non-cortical flakes	Non-cortical flakes among flakes <20 mm long	Most frequent length range (mm)	Retouched %	Source
Maiden Castle phase 2	Earlier Neolithic	1:59	42%	n	41-50	3%	Edmonds and Bellamy 1991, tables 75, 77
Rowden pit 327[1]	Earlier Neolithic	1:71	28%	n	30-39	-	Harding 1991, tables 9, 10
Coneybury Anomaly[1]	Earlier Neolithic	1:57	35%	n	30-35	4%	Harding 1990, tables 115, 118, fig. 149
Pits in interior of Whitesheet Hill causewayed enclosure, Wiltshire[1]	Earlier Neolithic	1:68	57%	39%	10-20	1%	Healy forthcoming b
King Barrow Ridge[1]	Middle/later Neolithic	1:19	44%	n	20-30	5%	Harding 1990, tables 115, 118, fig. 149
Maiden Castle phase 3	Middle Neolithic to early Bronze Age	1:68	49%	n	31-40	2%	Edmonds and Bellamy 1991, tables 75, 77
Dean Bottom pit 23	Beaker	1:25	38%	n	20-29	4%	Harding 1992
Bishops Cannings Down	Middle Bronze Age	1:14	43%	n	20-29	5%	Harding 1992
Rowden 414 IVA[1]	Middle Bronze Age	1:93	39%	n	30-39	-	Harding 1991, tables 9, 10
Barrow Hills barrow 12 ditches[1]	Redeposited earlier Neolithic	1:21	41%	40%	30-40	5%	This volume, Tables 4.26, 7.13
Barrow Hills pit 3196[1]	Later Neolithic	1:121	43%	36%	20-30	3%	This volume, Tables 4.18, 7.13
Barrow Hills pit 917[1]	Later Neolithic	1:99	67%	56%	10-20	4%	This volume, Tables 4.18, 7.13
Barrow Hills pit 3831[1]	Later Neolithic	-	68%	59%	20-30	3%	This volume, Tables 4.18, 7.13
Barrow Hills pit 913[1]	Later Neolithic	1:100	58%	43%	10-20	3%	This volume, Tables 4.18, 7.13
Barrow Hills ring ditch 801, layer 4[1]	Redeposited later Neolithic	1:47	41%	37%	20-30	4%	This volume, Tables 4.6, 7.13
Barrow Hills fieldwalking	Predominantly later Neolithic	1:23	n	n	n	5%	This volume, Table 2.1

[1]Excluding chips



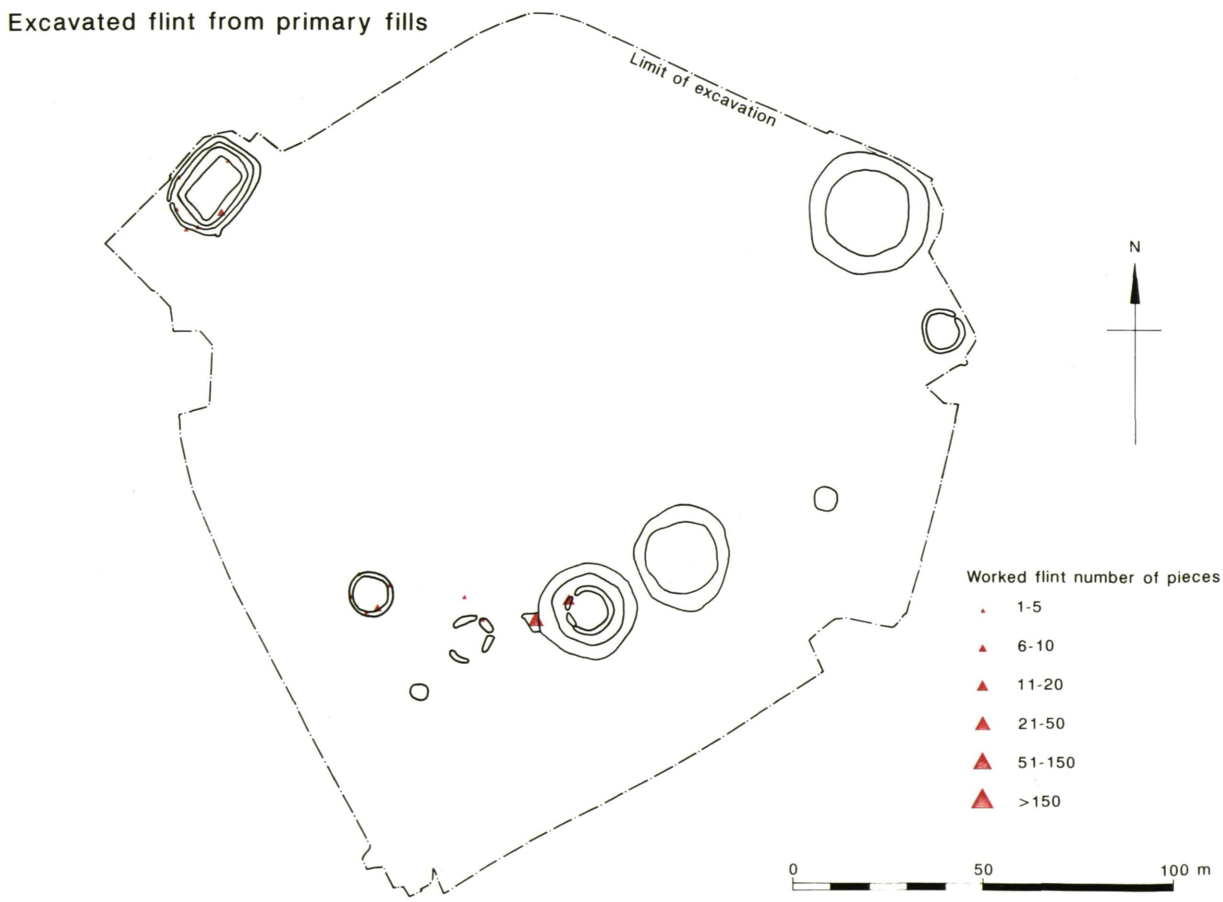


Figure 7.5 Plots of all excavated struck flint (above) and of struck flint from primary fills (below)

Table 7.21. Struck flint with associated radiocarbon dates

Context	Date and confidence rating (within 95% range)	Flint artefacts in direct stratigraphic association with dated samples	Other associations
5354	3650-3100 cal BC (95%) (4650±80 BP; OxA-1882)	Blade-like flake	-
5355	3380-3090 cal BC (92%) (4530±50 BP; BM-2710)	3 blade-like flakes	-
2128	2490-2190 cal BC (94%) (3860±50 BP; BM-2708)	Polished knife	-
611 layer 13	2600-2000 cal BC (95%) (3860±80 BP; BM-2712)	Small assemblage of 7 pieces of flint, including flakes and blade-like flakes (Tables 4.2-3)	-
611 layer 14	2900-2200 cal BC (95%) (3950±80 BP; BM-2713)	Small assemblage of 11 pieces of struck flint, including flakes, cores and blade-like flakes (Tables 4.2–3)	-
917 layer 2	2700-2200 cal BC (95%) (3940±60 BP; BM-2715)	Substantial assemblage of 251 pieces of struck flint, including flakes, cores, scrapers and serrated flakes (Tables 4.18–22) and 11 burnt unworked flints,	Woodlands substyle of Grooved Ware
3196 layer 3	2600-2000 cal BC (95%) (3830±90 BP; BM-2706)	Substantial assemblage of 1117 pieces of struck flint, including flakes, cores and scrapers and 9 burnt unworked flints (Tables 4.18–22)	Fragments of three Woodlands substyle Grooved Ware vessels, utilised antler and animal bone
942	2870-2800 cal BC (13%), 2780-2720 cal BC (5%), 2700-2450 cal BC (77%) (4020±60 BP; BM-2711)	Assemblage of 24 flakes, blades andblade-like flakes, possibly redeposited (Table 4.23–4)	-
919	2350-1750 cal BC (95%) (3930±80 BP; OxA-1874)	4 flakes, a blade and a chip	BW Beaker, copper wire ring, spiral copper wire ring, sheet-metal ring, bone disc, W/MR Beaker
950	2300-1970 cal BC (95%) (3720±50 BP; BM-2703)	Barbed and tanged arrowhead ? (other flint artefacts in the grave are probably redeposited)	? W/MR Beaker
203	1770-1520 cal BC (93%) (3360±50 BP; BM-2700)	Six barbed and tanged arrowheads, 2 scrapers, 2 piercers, 2 retouched flakes, 2 blade-like and 4 unretouched flakes - some with usewear. A barbed and tanged arrowhead with probable impact damage near spine may have been cause of death	S4 Beaker, bronze awl, bone awl and an antler spatula
4660	2190-1890 cal BC (95%) (3650±50 BP; BM-2704)	2 barbed and tanged arrowheads, a blade and a flake	European Beaker, copper knife dagger, winged-headed bone pin and an antler spatula
206	2200-1870 cal (95%) (3630+60 BP: BM-2520)	A flake was found underneath the Beaker	AOC Beaker
Barrow 4A	2650-2000 cal BC (95%) (3880±90 BP; OxA-4356)	3 barbed and tanged arrowheads	European Beaker, a pair of gold 'earrings'
607	2330-1950 cal BC (95%) (3720±60 BP; BM-2699)	A flake was found by the feet	Copper awl
5374	2040-1610 cal BC (95%) (3480±80 BP; OxA-1903)	Chisel arrowhead, 2 backed knives, 3 flakes and a blade (the latter may be redeposited)	-
4969	3650-3100 cal BC (95%) (3490±80 BP; OxA-1882)	Piercer	Antlers placed around coffin
Barrow 15	2300-1750 cal BC (95%) (3660±80 BP; OxA-4357)	Possibly a barbed and tanged arrowhead, other flint may be redeposited	-

On a purely visual distinction, 5.5% of the flakes were blades or blade-like flakes. This includes broken examples and may therefore be an over estimation. Single platform and opposed platform blade cores were also recovered. An earlier Neolithic element may be included, this would support the evidence from the excavated assemblage. Later Neolithic-early Bronze Age material is indicated by the transverse and barbed and tanged arrowheads recovered. A Levallois core from B13 (Fig. 2.4, F1) may relate to the manufacture of transverse arrowheads. Few diagnostic Bronze Age retouched pieces were recovered, although some unretouched flakes and irregularly flaked cores would seem to be of this date.

Flint was recovered from many later features and the ploughsoil and included diagnostic retouched forms dating from the Neolithic to the Bronze Age. Where possible the material from these later or insecure contexts was discussed alongside the assemblages from relevant monuments or pit groups, for example, the flint from the many Saxon SFBs near the intercutting pit group and the ploughsoils above many of the barrows. Whilst not all of this material reflected the activities represented in the features, a broad Neolithic and Bronze Age date range was suggested by many of the diagnostic retouched forms present.

STONE AXES
by Fiona Roe

The two axe fragments, of group I greenstone (Fig. 4.37, S2) from Grooved Ware pit 917 and of group VI Langdale tuff (Fig. 4.4, S1) from the first, Grooved Ware-associated phase of ring ditch 611, are of interest for the comparisons that can be made with other associations between stone axes and Grooved Ware.

Pits recur most frequently in listings of Grooved Ware associations, amounting to 33% of the total occurrences of Grooved Ware listed by Longworth (Wainwright and Longworth 1971, 250). In the associations listed here in Table 7.22, finds in pits account for 16 of the 28 occurrences of axes of imported stone in Grooved Ware contexts. These pits appear to contain domestic rubbish, often including ashy deposits, along with worked flint, and animal bones, especially those of pig. The axes are almost invariably fragmentary. Whatever the genesis of the pit fills, the stone axe materials can be used as a guide to the wider contacts that were operating at the time.

Stone axes appear to have generally been preferred to flint ones by the makers of Grooved Ware (R Bradley, 1984b, 50, table 3.5). In southern England, where group I is the dominant imported axe material (Cummins 1979, 8, fig. 3), stone axe fragments from Grooved Ware pits are quite frequently made of group I greenstone or other greenstone of probable south-western origin, and fourteen such finds are listed in Table 7.22.

In Oxfordshire there have been finds, without specific pottery associations, of a group I axe fragment at the Rollright Stones (Roe 1988, 85), and another at Dorchester-on-Thames site XIV (Whittle *et al.* 1992, 166). Altogether 8 group I or near I axes are now known from Oxfordshire, amounting to 16% of the total number of thin-sectioned axes from the county.

Group VI was the most widely-used axe material overall (Clough 1988, 3), and 32% of thin-sectioned Oxfordshire axes are known to be made of this tuff. It has, however, been recorded less frequently in conjunction with Grooved Ware. Finds from the nearby causewayed enclosure at Abingdon include group VI axe fragments, most of them from uncertain contexts, while there are two Grooved Ware sherds from unknown levels in the inner ditch (Avery 1982, 30, 40). It has been suggested that group VI belongs more typically with Peterborough assemblages, at any rate in Wessex (Thorpe and Richards 1984, 77).

Other stone axe materials have been recorded from Grooved Ware contexts, though each in smaller quantities. Group VII is known from three sites, and group VIII from the Wyke Down henge in Dorset, while there is another find from Radley, where a group XVIII axe fragment was associated with Grooved Ware in a pit at Thrupp House Farm. Further finds of Grooved Ware and stone axes have occurred in pits at Cassington (Case 1982a, 121), though here the axe fragments, identified as near group VII and group VIII (Oxon 12, 22) did not occur in the same pits as the Grooved Ware. At Sutton Courtenay there is another greenstone axe fragment from pit N (Oxon 5; Leeds 1934, 264).

There are radiocarbon dates from both the features that have produced stone axes at Barrow Hills, though not from the same layers (Table 7.23). The group I axe from pit 917 came from layer 1, in which there was a small amount of Grooved Ware, while most of the Grooved Ware and the other cultural material from the pit, including the animal bone which provided the sample for the radiocarbon date, came from layer 2. The axe could therefore postdate the determination, but, if it had been lying around as a broken fragment before being incorporated in the upper pit fill, it could be earlier than the finds stratified with and beneath it. The date can therefore only provide an approximation to its period of use.

The same circumstances could apply to the group VI axe from ring ditch 611. It came from layer 12, but could predate the radiocarbon dates for layers 13 and 14, especially as it is fragmentary. Unlike pottery, a piece of Langdale tuff would have survived well if left lying around on the surface. A comparison can be made with the stratigraphy at Mount Pleasant, Dorset, where the radiocarbon dates for the construction of the palisade enclosure may relate to the mainly Beaker pottery that was found there, while two greenstone axe fragments from near the top of the palisade trench could relate to earlier activities on the site, having been incorporated later in the upper filling (Wainwright 1979, 48).

Both group I and group VI had relatively long periods of exploitation (Smith, 1979, 14), so that each axe fragment from Barrow Hills can only represent a brief episode during the use of the material concerned. There are relatively few radiocarbon dates that relate to stone axes from Grooved Ware sites, but those listed in Table 7.23 provide an approximation of the period during the third millennium cal BC when this episode could have taken place.

Table 7.22. *Axes of imported stone with Grooved Ware associations (1)*

Site	Petrology	Grooved Ware substyles	Context	Other finds	References
GROUP 1 (SOUTH WEST)					
Dorset					
Gussage St Michael, Down Farm, Firtree Field, pit 11A	1785/Do 157	Not assigned	Pit	Worked flint, 'boar's tusks', fossil chalk, red deer antlers, bones of pig, cattle, red deer	Barrett *et al.* 1991a, 79–80; Cleal 1991, 191
Poundbury, Pit SWF 1	1285/Do 96	Durrington Walls	Pit	No other finds	Green 1987, 103, fig. 74:1
Essex					
Clacton-on Sea, Jaywick Sands, cooking hole 10	892/E 24	Clacton, Rinyo	Pit	Worked flint, fragments of 2 flint axes	Longworth *et al.* 1971, 275
Oxfordshire					
Barrow Hills, pit 917, layer 1	Oxon 76	Not assigned	Pit	Worked flint, animal bones, including 45% pig	This report
Wiltshire					
Woodhenge, Durrington	837/Wi 209	Clacton, Durrington Walls and Woodlands	Henge	Worked flint, chalk objects, bone awls and pins, antler picks, animal bones etc.	Cunnington 1929, 77
NEAR GROUP I (SOUTH-WEST)					
Dorset					
Gussage St Michael, Down Farm, Firtree Field, pit 5	1780/Do 152	Not assigned	Pit	Worked flint, greywacke axe frag, 'boar's tusks', ?haematite fragment, banded flint pebble, bones of pig, cattle	Barrett *et al.* 1991a, 79–80; Cleal 1991, 191
As above, pit 29	1783/Do 155	Woodlands	Pit	Worked flint, Group III axe fragment, 'boar's tusks', sarsen fragments, marcasite fragment, chalk fossil, bones of pig, cattle, red deer.	As above

Table 7.22. *Axes of imported stone with Grooved Ware associations (2)*

Site	Petrology	Grooved Ware substyles	Context	Other finds	References
GROUP III (SOUTH-WEST)					
Dorset					
As above, pit 29	1784/Do 156	As above	Pit	As above, with axe fragment, near Group I	As above
GREENSTONE (SOUTH-WEST)					
Devon					
Topsham, pit 173	1647/Dev 139	One sherd, unspecified	Pit	Worked flint, Fengate Ware	Jarvis and Maxfield, 1975, 247, fig. 17
Dorset					
Mount Pleasant, West Stafford, palisade trench, cutting XIII, layer 4	1581/Do 117	As at Durrington Walls	Henge	Worked flint, another greenstone axe, carved chalk objects, antler picks, animal bones, other pottery styles	Wainwright 1979, 165
Mount Pleasant, West Stafford, palisade trench, cutting XII, layer 3	1582/Do 118	As above	Henge	As above	As above
Oxfordshire					
Sutton Courtenay, pit P XXVIII	1187/Oxon 32	Durrington Walls	Pit	Worked flint, hammerstones, bone point	Leeds 1934, 264, pl.
Wiltshire					
Durrington Walls, S Circle, phase 2, PH 87	1379/Wi 350	Durrington Walls, Clacton and Woodlands from site	Henge	Worked flint, animal bones, antler picks etc., other pottery styles	Wainwright and Longworth 1971, 37, 352
Woodhenge, Durrington	838/Wi 210	Clacton, Durrington Walls and Woodlands	Henge	Worked flint, chalk objects, bone awls and pins, antler picks, animal bones etc.	Cunnington, 1929, 77

Table 7.22. Axes of imported stone with Grooved Ware associations (3)

Site	Petrology	Grooved Ware substyles	Context	Other finds	References
GREYWACKE (SOUTH-WEST?)					
Dorset					
Gussage St Michael, Down Farm, Firtree Field, pit 5	1781/Do 153	Not assigned	Pit	Worked flint, axe fragment near Group I, 'boar's tusks', ?haematite fragment, banded flint pebble, bones of pig and cattle	Barrett *et al.* 1991a, 79–80; Cleal 1991, 191
GROUP VI (CUMBRIA)					
Oxfordshire					
Barrow Hills, ring ditch 611, layer 12	Oxon 77	Not assigned	Hengiform ring ditch	Worked flint, antlers, animal bone, charcoal	This report
Yorkshire, Humberside					
Boynton, Carnaby Top site 18	Macro	Not specified	Pit	Worked flint	Manby 1974, 33; 1979, 79
Boynton, North Carnaby Temple, Field 3, site 9, pit 1	Y 593	Durrington Walls	Pit	Worked flint, pot boilers	Manby 1974, 62, fig. 26:2; 1979, 79
Rudston, East Reservoir Field, site 5	Y 590	Woodlands	Small area of dark soil	Worked flint, pot boilers, haematite	Manby 1974, 22; 1979, 80
Rudston West Reservoir, 2nd Field	?	A few sherds	Oval patch of dark soil	Worked flint, two flint hammerstones, Peterborough and Beaker sherds	Manby 1975, 39; 1979, 80
GROUP VII (NORTH WALES)					
Dorset					
Gussage St Michael, Down Farm, Firtree Field, pit 7	1782/Do 154	Not assigned	Pit	Worked flint, two hammerstones, 'boar's tusks', sarsen fragment, bones of pig, cattle	Barrett *et al.* 1991a, 79–80; Cleal 1991, 191

Table 7.22. Axes of imported stone with Grooved Ware associations (4)

Site	Petrology	Grooved Ware substyles	Context	Other finds	References
GROUP VII (NORTH WALES; ctd)					
Lincolnshire					
Barholm, near Stamford, pit 24	Li 378, 379 or 380	Clacton	Pit	Worked flint, perforated bone object, animal bone (mainly cattle with some pig)	Simpson *et al.* 1993, 13–25
As above, hollow 8	as above	Clacton	'Working hollow'	Worked flint, 3 ?Beaker sherds, animal bone (mainly pig and cattle)	As above, fig. 10
Wiltshire					
Avebury, West Kennet Avenue, hole 1	12/Wi 14	'Featureless'	Hole on occupation site	95 pieces of worked flint, 21 nodules, sarsen, charcoal	Smith 1965, 214
Woodlands, Amesbury, pit 2	317/Wi 98	Durrington Walls	Pit	Worked flint, flint axe, 2 antler picks, bone pin, stone fragments, marine shells	Stone and Young 1948
GROUP VIII (WALES)					
Dorset					
Gussage St Michael, Wyke Down, pit R	1825/Do 163	Clacton, Durrington Walls from site	Pit in pit circle henge	Worked flint, part of flint axe, bones of cattle from final phase deposits	Barrett *et al.* 1991a, 101
GROUP XVIII (WHIN SILL)					
Oxfordshire					
Radley, Thrupp House Farm, site C	Oxon 71	Durrington Walls	Pit	Flint flakes, antler fragments, carbonised material, horncore	Thomas and Wallis, 1982, 182
GABBRO					
Cambridgeshire					
Fengate, Storey's Bar Way, Area 1, feature W1, layer 1	Camb 167	Not specified	Ring ditch		Pryor 1978, 151

Table 7.23. Radiocarbon dates for Grooved Ware sites with stone axes

Site	Context	Lab. no.	Sample	BP	Cal BC up to 68% confidence	Cal BC up to 95% confidence	References
Barholm, Lincolnshire	Pit 4	UB-457	Charcoal	4305±130	3300-2650 (68%)	3350-2550 (95%)	Simpson *et al.* 1993, 23
	Pit 13	UB-458	Charcoal	4255±135	3040-2850 (33%) 2830-2610 (34%)	3350-2490 (95%)	
Barrow Hills	Ring ditch 611, layer 13	BM-2712	Antler	3860±80	2470-2270 (55%)	2600-2000 (95%)	This volume
	Ring ditch 611, layer 14	BM-2713	Antler	3950±80	2580-2340 (68%)	2900-2200 (95%)	
	Pit 917, layer 2	BM-2715	Animal bone	3940±60	2510-2350 (54%)	2700-2200 (95%)	
Durrington Walls, Wiltshire	South Circle, posthole 92	BM-395	Antler	3900±90	2500-2280 (60%)	2700-2050 (94%)	Wainwright and Longworth 1971, 411
		BM-396	Charcoal	3950±90	2590-2310 (68%)	2900-2100 (95%)	
		BM-397	Animal bone	3850±90	2470-2200 (68%)	2600-2000 (95%)	
Firtree Field, Down Farm, Gussage St Michael, Dorset	Pit 11A	BM-2406	Antler	4140±60	2880-2850 (8%) 2830-2800 (8%) 2780-2610 (52%)	2900-2570 (93%)	Barrett *et al.* 1991a, 77
	Pit 32	BM-2407	Antler	4080±50	2870-2810 (20%) 2700-2570 (38%)	2880-2800 (17%) 2780-2490 (71%)	
Wyke Down Henge, Gussage St Michael, Dorset	Pit I, recut	BM-2396	Charcoal	4140±80	2880-2800 (18%) 2780-2610 (50%)	2910-2560 (90%)	Barrett *et al.* 1991a, 96
	Pit K, recut	BM-2397	Charcoal	4150±50	2880-2850 (7%) 2820-2800 (7%) 2780-2660 (46%) 2640-2620 (7%)	2890-2590 (95%)	
Mount Pleasant, West Stafford, Dorset	Construction of palisade enclosure	BM-662	Antler	3637±63	2140-2070 (24%) 2050-1930 (44%)	2200-1870 (95%)	Wainwright 1979, 50
		BM-665	Charcoal	3645±43	2130-2070 (29%) 2050-1960 (39%)	2140-1900 (95%)	

THE JET/SHALE BELT SLIDER
by Alistair Barclay and Jonathan Wallis

The belt slider from the central grave of the oval barrow (Fig. 3.3, J1) was found on the hip of the male skeleton. The grave could not be related stratigraphically to any of the phases of the monument. The excavator has argued that it probably belongs with phase 1 (R Bradley 1992a, 132); other places in the sequence are suggested in Chapters 3 and 10. A date of 2890–2570 cal BC (91% confidence) (4120±60 BP; BM-2707) for the skeleton itself is at variance with that of 2490–2190 cal BC (94% confidence)(3860±50 BP; BM-2708) for the stratigraphically contemporary or earlier female skeleton in the same grave, and one or both may have been affected by humic acid contamination of bone collagen (Ch. 9). Four dates on antler samples from the ditches (BM-2390 to -2393) indicate that the construction and use of the monument span at least the later fourth and early third millennia cal BC, although its undated first phase may have begun as early as the mid fourth millennium. Sliders have been thought to be of later Neolithic date.

Compared with sliders from Wessex and Yorkshire, the form of the Barrow Hills example is slightly unusual and lacks concave sides. The closest parallels derive from southern Scotland (McInnes 1968, 138-40). A rather square slider of McInnes' group I was found with the central female inhumation within a ring ditch at Linch Hill Corner, Stanton Harcourt (Grimes 1943–4, 36). Two sliders have been found in Berkshire, possibly in watery contexts, one from a bed of peat near Newbury; the other dredged from a river at Basildon. Another comes from the Handley Down 24 round barrow, Dorset (McInnes 1968, 144). A group II slider was found at the Beacharra chambered cairn, Argyll, where it was possibly associated with the blocking or closing down of the tomb (Scott 1964, 158). Another came from the later ditch fill of the Giants' Hills 1 long barrow in Lincolnshire (Phillips 1936, 71, fig. 15). Three Yorkshire round barrows, Aldro 177, Riggs 16 and Painsthorpe 118, have produced belt sliders. At Painsthorpe the slider was found in a similar position to the Barrow Hills example, near the left hip of a crouched inhumation (McKinnes 1968, 143). An adult male inhumation in the White-grounds long mound at Burythorpe, Yorkshire, accompanied by a group II slider and a waisted Seamer type flint axe (Clarke *et al.* 1985, ill. 3.35) was dated to 3500–2900 cal BC (95% confidence) (4520±90 BP; HAR-5587; Brewster 1984). Taken with the likely date of the Barrow Hills slider, this points to a middle rather than a later Neolithic date for at least some of these objects.

The distribution of belt sliders (McInnes 1968, fig. 28) shows two concentrations in England, one in east Yorkshire and one in Wessex and the Upper Thames region, although the sample is small.

BEADS
by Alistair Barclay and Jonathan Wallis

Beads were recovered from two cremation deposits. A single ceramic bead (Fig. 4.9, B1) was found with a copper alloy awl (M1) in cremation 802, at the centre of ring ditch 801, charcoal from the cremation being dated to 1970–1600 cal BC (94% confidence)(3450±70 BP; OxA-1888). Pit E, possibly the primary deposit in barrow 16, contained a simple 'necklace' of amber, jet/shale and faience beads (Fig. 5.12) together with a copper knife-dagger with bronze rivets and a bronze awl (Fig. 5.11, M14, M15).

The clay bead is of simple disc form and is similar to the clay beads recovered from barrow G64, Winterbourne Stoke, Wiltshire (Annable and Simpson 1964, 61).

The jet/shale beads were analysed by the Oxford University Research Laboratory for Archaeology and the History of Art in 1980. They were published as being jet (Bussell *et al.* 1982, 31), although at the time there was some controversy as to whether they were in fact a type of lignite. The amber beads from barrow 16 are included in Beck's and Shennan's study of prehistoric amber in Britain (1991, 167–8, fig. 11.9, 3). Only the two long cylindrical beads of their type 7C are chronologically diagnostic and can be broadly dated to the earlier Bronze Age (Beck and Shennan 1991, 63).

Beads and necklaces of jet, amber and faience are classically found in graves belonging to the Wessex culture of the final early Bronze Age. Within the Upper Thames region only two sites have produced beads of similar material and date, Ashville Trading Estate, Abingdon, 4 km to the SW, and Stanton Harcourt, 12 km to the NW. However, a possible third example comes from Sparsholt, Oxfordshire (formerly Berkshire) where at least one jet bead was associated with cremated bone and a Collared Urn (Longworth 1984, 263). At Ashville two closely-spaced ring ditches were associated with a series of early Bronze Age cremation deposits. In deposit 1043, the cremated remains of a young adult were found with an amber bead, a bone spacer, a jet/lignite axe pendant and a ring pendant (Balkwill 1978, 26–7). At Stanton Harcourt the largest barrow to be constructed near to the Devil's Quoits henge contained a Wessex culture burial in which the cremated remains of an adult male were accompanied by a rich grave assemblage which included three beads, one each of shale, amber and fossil sponge (Harden and Treweeks 1945, 29). The amber beads from Ashville and Stanton Harcourt are both of oblate form, unlike the Barrow Hills examples.

Apart from the bead from barrow 16, no early Bronze Age faience beads have been recorded in the Upper Thames region. The distributions of both amber and segmented faience beads show a strong concentration in Wessex (Foster 1979, 229, fig. 3; Stone and Thomas 1956, 61; Beck and Shennan 1991, fig. 61). Barrow Hills lies at the northern edge of this focus.

The cremation associated with the barrow 16 beads was that of a possibly female adult (Table 7.4), perhaps conforming to the supposition that beads and necklaces of jet/shale, amber and faience are female associations (Megaw and Simpson 1981, 218). It is not clear whether all the beads came from a single necklace. It could have been of rather simple form, like those found with primary cremations at Upton Lovell G1, Wilsford G3 and Amesbury G48 in Wiltshire (Annable and Simpson 1964, 108, 112).

WORKED BONE AND ANTLER

by Alistair Barclay, Dale Serjeantson and Jonathan Wallis with a contribution by Stuart Needham and some identifications by Bruce Levitan

Fifteen bone and antler artefacts (excluding antler picks and related forms) were recovered from the 1983–5 excavations. None were found during the earlier barrow investigations, although bone and antler objects of earlier Neolithic date were recovered from the causewayed enclosure (Avery 1982, 43).

Bone awls

Awls are defined as points made from longitudinal bone splinters in which the articular end is retained as a handle. Modification is minimal and usually involves grinding and polishing the break to produce a point. Sometimes but not always the medullary cavity is removed. Three possible awls were recovered, from Grooved Ware pit 3196 (Figs 4.34–5, WB6), Grooved Ware pit 913 (Fig.4.39, WB11), and Beaker grave 203 in ring ditch 201 (Fig. 4.79, WB12). A fourth may be represented by a fragmentary point from late Neolithic pit 911 (Fig. 4.31, WB5). WB6 was made on a white-tailed eagle ulna, WB11 on a limb bone splinter from a sheep-sized mammal, WB12 on a sheep / goat or roe deer metacarpal and WB5 on a longbone splinter, possibly of cattle or red deer.

In the Upper Thames region single bone awls have been found in Grooved Ware pits at Barton Court Farm, Abingdon (Wilson and Miles 1986, microfiche 3:A13, fig. 42, 544), Cassington (Case 1982a, fig. 71, 8) and Roughground Farm, Lechlade (Darvill 1993, fig. 12, 1). The Barton Court Farm and Cassington examples were made on sheep / goat bone. The raw material and high finish of WB6 suggest that it may have been a prestige object.

WB12 formed part of a Beaker grave assemblage. Awls (as defined above) are rare in Beaker burials. Clarke illustrates only three British examples, from Cawdor in Nairn, Alsop Moor in Derbyshire and Acklam Wold 124 in Yorkshire (1970, figs 663, 776, 780).

Simple bone pins

A small but complete pin and a fragment were found in Grooved Ware pit 913 (Fig. 4.39, WB9–10). Bone pins are made from splinters and are distinguished from awls by the removal of the articular end and by the fact that the pin shaft and not just the point is often finished by grinding and polishing.

Pins from late Neolithic contexts are rare in the Upper Thames region. One example from the Vicarage Field, Stanton Harcourt was found in a pit with worked flint (Case 1982b, 103). A further possible example came from a pit containing Grooved Ware at Roughground Farm, Lechlade (Darvill 1993, fig. 12, 2). These pins differ from those from the later Neolithic cremation cemeteries at Dorchester, Oxon (Atkinson *et al.* 1951b, fig. 31).

Ring-headed pin and tweezers

A ring-headed pin made from a splinter of red deer or cattle longbone, a pair of tweezers made from a sheep / goat metapodial, together with a bronze knife-dagger, all perhaps in an organic container, accompanied a possibly male adult cremation in grave pit 11 at the centre of barrow 1 (Figs 4.82–3, WB14–15). Charcoal from the cremation was dated to 2040–1680 cal BC (95% confidence)(3520±70 BP; OxA-1886).

Ring-headed pins are found in early Bronze Age burials, particularly those of the Wessex culture complex (Gerloff 1975) and are sometimes associated with Collared Urns (Longworth 1984, 63). Copper alloy examples have also been found, for example Amesbury barrow G24 (Gerloff 1975, 105).

Tweezers also occur in grave contexts of the earlier Bronze Age. The association with bone pins can be paralleled at Wilsford barrow G56 (Gerloff 1975, pl. 47) and Aldbourne barrow G13 (Kinnes and Longworth 1985, 128, cat. no. 284). Proudfoot (1963, 424–5) lists 12 examples of tweezers from barrows in Wessex. Ten were found with cremations and were associated with copper alloy knives or daggers, Food Vessels or Collared Urns. Skeletal remains and grave goods tend to suggest a male association (Proudfoot 1963, 42).

Antler spatulae

Two antler spatulae formed part of Beaker funerary assemblages, one in 'flat' grave 4660 (Fig. 4.23, WB3), the other in grave 203 in ring ditch 201 (Fig. 4.79, WB13). Both were made from red deer antler splinters. The internal surface of WB13 remained rough and was apparently never finished, which could suggest that it was made especially for inclusion in the grave.

Spatulae are usually made from antler although bone examples are also known (Smith and Simpson 1966, 134; Foxon 1990, 167). Spatulae tend to have been worked at both ends with one end sharpened like a chisel or point and the other rounded. Both examples from Barrow Hills are fragmentary and incomplete. WB13 has one rounded end but the other end is broken. Even in its broken state it is still one of the longer examples of its type (Foxon 1990, table 2). WB3 is very fragmentary and only one pointed end survives.

The date, distribution, form and function of these objects have been discussed by Smith and Simpson (1966, 134–9) and have more recently been summarised by Foxon (1990). Two further examples are known from the Upper Thames region, both from the Stanton Harcourt monument complex, one from a grave in Gravelly Guy field (Lambrick *et al.* in prep.), the other from Beaker flat grave 1/1 in field XV (Hamlin 1963, 21–3). These and the Barrow Hills burials were all of adult males and, with the exception of the ?disturbed burial from field XV at Stanton Harcourt, were rich in artefacts. Spatulae are nearly always associated with male graves and predominantly with long necked Beakers (Smith and Simpson 1966, 136). WB13 was associated with a long-necked Beaker in grave 203. More unusual is the association of WB3 with a European style Beaker; an association which is replicated at Chilbolton, Hampshire (Russel 1990, 153).

Radiocarbon determinations of 2190–1890 cal BC (95% confidence)(3650±50 BP; BM-2704) for grave 4660 and 1770–1520 cal BC (93% confidence)(3360±50 BP; BM-2700) for grave 203, together with that of 2210–2020 cal BC (90% confidence) (3709±35 BP; UB-3122) for the Gravelly Guy burial, suggest that the type had a long currency within the Beaker tradition.

These tools could have been used for leather working, potting, flint-working, netting or archery. Spatulae and awls have been found together and with other bone tools such as rods, suggesting that they formed part of a wider tool kit.

Antler points

Two modified and utilised red deer antler tines were found in Grooved Ware pits 3831 (Fig. 4.38, WB8) and 3196 (Fig. 4.34, WB7). They could have been made from the waste generated by the production of antler picks. The tips of both points were polished by use, although their function is unclear.

Boar tusk knife or point

A fragment of a knife or point was excavated from the second, early Bronze Age phase of ring ditch 611 (Fig. 4.6, WB1). It is made from a splinter of pig/boar canine (tusk). Boars' tusks modified as knives or points occur in later Neolithic burial contexts (Kinnes 1979, 65). A similar point produced from a splinter was found in the secondary filling of the West Kennet chambered tomb (Piggott 1962, 50).

Bone disc

The perforated bone disc from Beaker 'flat' grave 919 (Fig. 4.14, WB2) is made from the scapula of a large mammal, probably cattle, and is polished on one side. It could have functioned as a button, toggle or pendant. No parallels for this object are known from Beaker graves. A similar bone disc made from a scapula fragment came from a middle Bronze Age midden deposit in the top of a mine shaft at Grimes Graves, Norfolk (Mercer 1981, 72, fig. 42). This object is described as a possible protective plate for fabric, in which the disc acted as a fastener for a pin.

Winged-headed pin
by Stuart Needham

The pin from Beaker 'flat' grave 4660 (Fig. 4.23, WB4) is a totally novel form for Britain. This is not too surprising, as very few pins have been found in Beaker contexts. Some generally similar bone pins occur on the continent. Amongst those noted so far the most similar is an example from Werla bei Goslar, Lower Saxony. Only the upper part, 3.2 mm long, of the Werla piece was recovered (Redlich 1935). It was carved out of bone to give a thick shank extending gently towards its head from the sides of which spring two stumpy trapezoid 'wings'. The flat sides of the wings are not parallel to one another. As in the Radley example, the bone is recessed between the wings and the shaft head. The Werla pin was the only association for and lay at the breast of a female skeleton oriented N–S and facing E in a cut grave (Schroller 1935).

Less similar wing-headed pins come from Fort Harrouard, Eure, France (Mohen and Bailloud 1987, pl. 4.13) and Miernów barrow II grave 3, Kielce, S. Poland (Gedl 1983, 17–18, pl. 49.A2). These parallels allow the Radley pin to be regarded as part of the diverse family of hammer- and/or crutch-headed pins made from bone, antler and metal (eg. Strahm 1979). These pins, however, belong to Corded Ware and early Bronze Age times and hold no specific chronological connotations for the Radley example. A few crutch-headed pins in datable contexts in Britain (Gerloff 1975, 111) belong to the latter part of the early Bronze Age and are also morphologically distinct from the example under consideration here.

ANIMAL BONE

by Bruce Levitan and Dale Serjeantson

Introduction

The initial database records and report on the total of 1926 animal bones were completed in 1989 by Bruce Levitan, and the manuscript and database (in DBASE IV) form part of the site archive. The description and discussion of the bones in the original report have been rearranged to fit the format of this volume. The bones are described subsite by subsite in Chapters 3 and 4. These descriptions are mostly by Bruce Levitan, but some have been added by Dale Serjeantson from the original database records. Salient aspects of the collection are discussed here.

In a monument complex, unlike a domestic site, there may be little or no link between deposits in different contexts, each deposition event being a separate entity. It is probable that different deposits were completely discrete, and that parts of the same animal would not occur in the diffuse scatters that can be generated in domestic situations. The deposits here are likely to have been highly selective. For these reasons, this report does not discuss the remains in terms of exploitation of the individual species, but considers separate deposits as the units of analysis.

Weathering and chewing of bones was noted where it was felt to be useful. A subjective view is that weathering played a significant but variable part in bone loss, and that much of the bone showed signs of having been chewed, implying that the deposits were either unsealed or that the bone was disposed of after having been left around in the open for some time. This might also indicate that some deposits were not deliberate or necessarily ritual in nature. Butchery was also recorded in the original databases. Much of the material has suffered recent damage through poor packaging.

Measurements

The measurement data are very few (Table 7.25), but some size changes are suggested. The cattle astragalus of the Beaker period is smaller than the five Neolithic ones. This difference can be accounted for by factors such as sex, but it remains a tenuous confirmation of the diminution in size which has often been noted. There is also an apparently parallel trend in the red deer scapulae, the later Neolithic example being larger than the later Bronze Age one. In contrast, however, the only sheep and goat bones for which comparisons can be made are the humerus and the tibia, and they show different trends, the Beaker distal humerus being larger than the later Neolithic one, the early Bronze Age tibia being smaller. It must be said that all these results may equally be accounted for by normal variation within the range.

Ageing

There is little to be said on this topic, due to limited evidence. The pig bones are consistently mainly juvenile and younger: very few adults were noted in any period. Such a pattern is to be expected for a species that is reared for its meat and which is a rapid growing animal.

The cattle bones are more mixed, with adults certainly more evident than for pigs, but juveniles remain a major constituent, especially in the more obviously ceremonial deposits in the earliest and latest phases of ring ditch 611. The loss of cattle is a more serious economic sacrifice than the loss of pigs, so the use of juvenile and infant cattle would be cutting the loss as less time has been invested in its rearing. Conversely, a young beast has not yielded any milk or work, so has not 'repaid' the price of rearing. Thus the choice of age for the ceremonial deposits was probably made on the basis of a finely-judged balance between economic value, time investment in rearing, and a ceremonial value, the last not to be underestimated. Sheep and goat remains are generally too infrequent to provide information about age structure. Subjectively, it would appear that about half were adult and half juvenile or infant.

Butchery

Butchery was evident on some bones of all periods. There appears to be a superficial difference in types of cut mark between the Neolithic and Bronze Age bones. The earliest have crude cut marks, which are wide and have an obtuse V-shape in cross-section. Some of the Bronze Age deposits, however, have much more acutely V-shaped cut marks which are tentatively ascribed to the use of metal tools. The high proportion of butchery on the bones in the Grooved Ware pits implies that the pigs were butchered and eaten before their bones were deposited. By analogy with sites such as Durrington Walls, this may indicate ceremonial feasting.

Recognition of ritual deposits

Two, if not more, types of ritual deposition seem to be present during the use of Barrow Hills as a funerary location. The first is burial of complete animals, parts of animals, or individual bones with the human burials; and the second is the apparently deliberate burial of bones and other cultural material, including pottery vessels, which may have been the remains of funerary or ceremonial meals or feasts.

The post-depositional damage which both the human and animal bones have suffered makes the consideration of whether bones were deliberately placed with the human burials difficult, even where context and dating are clear. This is well exemplified by some of the antlers, clearly substantially complete when deposited, which were recovered in many fragments. Where damage from compaction of the sediments and erosion in the soil has attacked bone after burial the more fragile bones are normally the first to be destroyed, and this makes the interpretation of the finds of maxillae, mandibles and loose teeth particularly uncertain. In most hostile sedimentary environments the bone of the skull will disappear before the teeth. The Irthlingborough cattle skulls show this clearly; the majority of these survived only as tooth rows, though there is little doubt that the barrow was originally piled with complete skulls (Davis and Payne 1993). There are a number of features at Barrow Hills where the presence of a maxilla or a tooth row raises the possibility that these are all that remain of a skull. However, as teeth are the part of the skeleton most resistant to destruction, it is these that best survive being disturbed, exposed, and redeposited in any subsequent feature such as a grave or ditch, so that it would be rash to propose this interpretation for a single isolated tooth.

There has been differential survival of bones themselves in the ground: the later Bronze Age calf burial from ring ditch 611 shows this clearly. It can be compared with one of the sheep burials from the Down Farm pond barrow in Dorset, from which tooth rows and some bones from the front legs, but no vertebrae, ribs, or any part of the back legs survived (Legge 1991).

Where traces of butchery or carnivore gnawing are visible, it is reasonable to infer that bones were buried only after consumption of the meat. This is the condition of most of the bones from the Grooved Ware pits. It is possible that such bones could also have been selected for deliberate deposition in proximity to human remains.

Summary of the main periods

Neolithic

Few of the middle Neolithic burials were certainly accompanied by grave goods or funerary deposits. Four groups of red deer antler were placed in the ditches of the oval barrow in its later phases (Fig. 3.2). Linear mortuary structure 5352 also had red deer antlers (AB5) and a pig mandible which was found over burial A (Fig. 3.5) can readily be interpreted as deliberate deposition. No animal bones were recovered from Neolithic flat graves 5354–6.

Final Neolithic/Beaker

This period is characterised by several types of bone deposit. The first comprises diffuse scatters of bone in

Table 7.24. Summary of main animal bone deposits

	Cattle	Sheep/ goat	Pig	Dog	Red deer	Roe deer	Deer	Subtotals	Eagle	Mallard	Subtotals	Pike	ULM[4]	UMM	Subtotals	Totals
LATER NEOLITHIC																
Ring ditch 611, phase 1	17	4	3	-	10	-	-	34	-	-	-	-	27	24	51	85
	50%	12%	9%	-	29%	-	-	40%	-	-	-	-	53%	47%	60%	
Pit 3196[1]	20	4	225	1	2	-	-	252	1	-	1	-	88	151	239	491
	8%	2%	89%		1%	-	-	51%	-	-	-	37%	63%	48%		
Pit 917	69	3	64	-	7	-	-	143	-	-	-	-	126	44	170	313
	48%	2%	45%	-	5%	-	-	46%	-	-	-	-	74%	26%	54%	
Pit 3831	13	1	36	-	3	-	-	53	-	-	-		35	68	103	156
	24%	2%	68%	-	6%	-	-	34%	-	-	-	-	34%	66%	66%	
Pit 913	18	5	35	1	2	-	-	61	-	-	-		33	93	126	187
	30%	8%	57%	2%	3%	-	-	33%	-	-	-	-	26%	74%	67%	
BRONZE AGE																
Ring ditch 611, phase 2[2]	49	1	-	-	1	-	-	51	-	-	-	-	18	-	18	69
	96%	2%	-	-	2%	-	-	74%	-	-	-	-	100%	-	26%	
Ring ditch 801	40	1	10	-	1	-	2	54	-	-	-	-	75	30	105	159
	74%	2%	19%	-	2%	-	4%	34%	-	-	-	-	71%	29%	66%	
Pond barrow 4583,	9	2	8	1	1	1	-	22	-	-	-	-	27	12	39	61
layers 1 & 2	41%	9%	36%	5%	5%	5%		36%	-	-	-	-	69%	31%	64%	
Barrow 12, ditch 601[3]	9	5	2	-	2	-	2	20	-	11	11	1	20	2	22	54
	45%	25%	10%	-	10%	-	10%	37%	-		20%	2%	91%	9%	41	
Pond barrow 4866,	1	-	1	-	6	-	1	9	-	-	-	-	-	-	-	9
grave 4969																

[1]The single eagle bone (a white-tailed eagle ulna) is worked
[2]45 cattle bones are from 1 skeleton
[3]Mallard bones are from one skeleton, the ditch also contained 2 small mammal incisors
[4]ULM Unidentified large mammal; UMM Unidentified medium mammal

most of the features. The major domesticates are represented in these scatters, but it seems unlikely in view of the diverse and fragmentary nature of most of the bones that they all are deliberate deposits. Much of this group probably represents bone that was 'kicked around' the area, and much is weathered and chewed.

A second group is the initial deposit in ring ditch 611, which is unique amongst the later Neolithic features of this site. The floor of the ditch was scattered with red deer antlers, and there were two diametrically opposed cattle limbs within the ditch (Fig. 4.1). These would all appear to be deliberate deposits. Although the cattle bones are from a fore and hind limb and are thus difficult to compare, they could well be from a single young calf. Similarly the inner ditch of the site 4 barrow at City Farm, Hanborough contained at least a dozen cattle bones, including skull, vertebra, ribs and limb bone splinters (Case *et al.* 1964–5) and Banks who analysed these 'surmised that the majority came from one animal'.

The antlers bear signs of human modification, mainly in the form of burning and tine removal, and are all shed. The use to which the antlers were put seems obscure. There is no sign of wear on the coronets such as is found on antler picks (Levitan 1990, 205-9), but antler picks would not appear to be used on a gravel site in the same manner as on chalk or limestone, where they were used as picks, wedges or levers to extract blocks of stone in the construction of ditches and other cut features.

The third is the Grooved Ware pits (2180, 3196, 917, 3831, 913 and 2082). Not all contained much (if any) bone. This group is characterised by very high proportions of pig bone. Pit 3196 is the extreme example, 89% of the identified bones being pig; pits 917, 3831 and 913 have 45%, 68% and 57% respectively (Table 7.24). All these percentages are much higher than the average for the Neolithic as a whole, but are closely paralleled in other Grooved Ware contexts, including the henge monuments of Durrington Walls and Marden in Wiltshire and Mount Pleasant in Dorset, as well as pits at Puddlehill, Bedfordshire and Boynton, Yorkshire (Grigson 1982).

Grigson admits that the deposits with large quantities of pig bones are apparently all from ceremonial sites, which presents a problem of interpretation in terms of animal husbandry, but she feels that the range of sites with this pattern to some extent overrides this problem. She also points to the contrast with Beaker and early Bronze Age faunal assemblages, where cattle are more common than pig. She puts this down to the mixed nature of the latter two periods (Grigson 1982, 306–7). However, the Beaker and Bronze Age deposits at Barrow Hills are not mixed, and the contrast in species, with pig less common in the later deposits can be seen here (Table 7.24). Thus the ceremonial aspect must still be seen as a major contributor to this pattern. Grigson argues that pigs were mainly used because they were an important part of the economy, but it may be equally true that they were used because they were relatively expendable.

The presence of such pits in the ritual landscape of Barrow Hills itself surely reinforces the hypothesis that they do not contain refuse that is merely domestic, but material collected and disposed of after food has been consumed as part of ritual activity.

Pit 942, which contained a disarticulated inhumation dated to the later Neolithic, also contained a pair of cattle frontal bones and an upper molar. As discussed above, the possibility that such fragments are all that remains of deliberately deposited skulls needs to be considered. The same holds true of the few cattle and / or pig skull fragments and teeth from Beaker 'flat' graves 919, 950 and 4660, while a cattle horncore and metatarsal from the ditch of barrow 4A could conceivably be the residue of a 'head and hooves' hide deposit.

There is very little animal bone from Beaker contexts. In the survey by Grigson cited above, the results from Beaker sites are more variable than from late Neolithic Grooved Ware sites (Grigson 1982, 308). The site of Charterhouse Warren Farm Swallet, Somerset, also has an horizon which was associated with a Beaker. The date of this is 2460–2120 cal BC (89% confidence)(3790±60 BP; OxA-1559; Levitan and Smart, 1989), and the bone evidence is certainly in line with the variable nature of Beaker sites seen by Grigson. Cattle are dominant, followed by sheep / goat with pig much less abundant, in third place (Levitan *et al.* 1988, 210).

Early Bronze Age

There are two deposits in which the animal bone appears to be an important component, the outer ditch, 601, of barrow 12 and grave 4969 in the flat grave cemetery associated with pond barrow 4866.

The outer ditch of barrow 12 had an unusual range of species, including the radius of an aurochs, most of the skeleton of duck, probably a mallard, and a pair of pike jaws. The aurochs radius was found where the barrow ditch was cut through later Neolithic ring ditch 611, and may conceivably have derived from this earlier context. The mallard and pike finds, however, were well clear of this area. Fish bones, like bird bones, are rare on Neolithic and Bronze Age sites. These may be compared with a pair of dentaries found on the base of the ring ditch at Manor Farm, Horton, Berkshire (Ford forthcoming), and a small number are present in both Neolithic and Late Bronze Age settlement debris from Runnymede (Serjeantson *et al.* 1995). Burial 4969 was accompanied by a set of seven red deer antlers (Fig. 4.62), all smashed from the skulls of slaughtered animals, rather than shed, in contrast to those from the earlier ring ditch finds, where all those in which the coronet survives are shed.

Later Bronze Age

The only skeleton from a carcass which appears to have been buried whole is the calf from the uppermost layer of ring ditch 611, shown to be a later Bronze Age insertion by its radiocarbon date of 1100–890 cal BC (94% confidence)(2820±40 BP; BM-2896). The animal

Table 7.25. Summary of animal bone measurements

All abbreviations from von den Driesch (1976) except:
Scapula: sg = shortest distance from base of spine to rim of glenoid cavity
Humerus: hmt = height of medial part of distal trochlea, hgt = height at central groove of distal trochlea
Metacarpal: dmt = depth of medial trochlea, dmc = depth of medial condyle, dlt = depth of lateral trochlea; dlc = depth of lateral condyle

Species	Element	Period	Measurements							
CATTLE	Scapula	Later Neolithic	SLC: 51.3, GLP: 71.3							
Humerus	Bronze Age	SD: 21.7								
	Radius	Later Neolithic	BFp	Bp	SD					
			-	-	38.4					
			-	-	41.8					
			67.4	74.1	-					
	Tibia		Bd	Dd						
		Later Neolithic	60.0	46.0						
			52.3	40.0						
	Astragalus		GL1	Dm	Bd					
		Middle Neolithic	70.7	-	45.3					
			63.5	36.0	37.5					
		Later Neolithic	65.1	37.1	40.8					
			71.8	-	46.3					
			63.6	-	40.3					
		Beaker	55.7	31.3	34.0					
	Metatarsal	Later Neolithic	SD: 26.5							
SHEEP/GOAT	Humerus (s)		SD	BT	hmt	hgt				
(s = sheep)		Later Neolithic	13.8	28.0	18.7	14.3				
		Beaker	14.5	26.4	18.2	14.0				
	Radius (s)	Later Neolithic	BFp: 26.6, Bp: 27.8, SD: 15.5							
	Metacarpal (s)	Early Bronze Age	Bp: 21.7							
	Tibia		SD	Bd	Dd					
		Later Neolithic	25.8	29.2	16.3					
			-	27.1	20.4					
	Early Bronze Age		-	22.1	18.1					
PIG	Scapula	Later Neolithic	SLC: 21.6, GLP: 34.5							
	Humerus	Later Neolithic	SD: 23.0, BT: 39.5, hmt: 37.5, hgt: 26.4							
	Tibia	?Bronze Age	SD: 23.8, Bd: 35.5, Dd: 30.9							
	Astragalus		GL1	Dm	Bd					
		Later Neolithic	43.2	21.2	25.2					
			45.8	24.0	25.3					
RED DEER	Scapula		SLC	GLP	sg					
		Later Neolithic	38.7	61.2	40.1					
		Later Bronze Age	36.6	59.1	34.2					
	Humerus	Later Neolithic	BT: 55.5, hmt: 41.2, hgt: 31.8							
	Metacarpal		GL	Bp	SD	Bd	dmt	dmc	dlt	dlc
			260.0	38.8	21.4	41.3	21.2	29.0	19.8	28.6
			-	43.6	-	-	-	-	-	-
ROE DEER	Radius	Beaker	GL: 172.8, BFp: 23.1, Bp: 24.3, SD: 15.1							
AUROCHS	Radius	Early Bronze Age	Bd: 107.3							
DOG	Radius	Later Neolithic	GL: 157.3, BFp: 15.1, Bp 16.2, SD: 11.4							

bone from the upper layers of pond barrow 4583, with two human burials dated to the same period, includes a possibly wild pig mandible, perhaps associated with one of the burials (Fig. 4.12), as well as bones of cattle, sheep/goat, domestic pig, dog, red deer and roe deer. The range of species contrasts this deposit with many of the others at Barrow Hills (Table 7.24). It is noteworthy that pig was a fairly important constituent of the deposit.

Conclusions

The overall impression gained from the bones from Barrow Hills is of a continuing tradition of ceremonial use, perhaps mainly in relation to burial practices, as seen in barrow 12 and burial 4969, and also possibly as part of separate activities, as in the Grooved Ware pits and ring ditch 611.

The main issues regarding these deposits relate to whether the choice of species represented the true economic value, and on what basis the age selection was made. On the first point, two scenarios can be envisaged; either the animals utilised were chosen to reflect their economic value, underlining the importance of the ceremonial aspect, or the animals were selected on the basis that they represented a smaller economic loss.

The age selection criteria could also have been along either of the lines described above. The tension between the need to make a real sacrifice (in economic terms) in order to give authority to the ceremonial aspects of life, and the need to conserve precious resources is undoubtedly a key issue which is difficult to resolve. The bones cannot provide an answer to this question in their own right, but they do serve to highlight both the problems and the possibilities.

LAND SNAILS
by Mark Robinson

The second gravel terrace of the Thames, on which the Barrow Hills monuments lay, consists of hard oolitic limestone which weathers slowly. Consequently, the soil which has developed over it (Sutton series; Fig. 7.10; Jarvis 1973, 117–20 and soil map) is non-calcareous or at least was so before ploughing incorporated gravel into the soil profile. Such conditions are not conducive to the survival of mollusc shells and sites on the second gravel terrace have the reputation for producing little other than *Cecilioides acicula*, a burrowing species. Indeed, a sample of over 2 kg taken from the bottom of the ditch of barrow 2 when it was sectioned in 1976 contained only a single shell, *Pupilla muscorum*, apart from those of *C acicula* (Robinson 1977). Evaluation samples from the 1983–5 excavations were similarly unproductive. However, when the flots for charred plant remains were examined, it was noticed that some of them contained shells of a range of mollusc taxa. These flots were from samples very much larger than standard molluscan samples, and shells had perhaps been concentrated from small pockets of more calcareous sediment within the deposits. It was decided that flots which contained a significant quantity of shells apart from burrowing species would be investigated in detail. Shells of two other apparently intrusive snails, *Candidula intersecta* and *C gigaxii*, were present in some of the shallow features.

Flotation may have been a highly effective way of concentrating shells from large samples, but it is not a thorough method of extraction. Not only would the majority of the shells have been left in the residue, there would have been selective recovery operating in favour of particular species which trap air inside them. The results listed in Table 7.26 therefore record only presence. the nomenclature follows Waldén (1976).

The shells from layers 3 and 4 of treethrow hole 5353, charcoal from which is dated to 7450–6600 cal BC (95% confidence)(8100±120 BP; OxA-1883), were all of woodland species, including *Discus rotundatus*, *Oxychilus cellarius* and *Clausilia bidentata*, and catholic terrestrial species. Such an assemblage is entirely appropriate to the fauna of a treethrow pit under wooded conditions or shells incorporated from a woodland soil.

In contrast, the assemblage from layers 2 and 4 of middle Neolithic long mortuary structure 5352 comprised various open country species: *Vertigo pygmaea*, *Pupilla muscorum*, *Vallonia costata* and *V excentrica*. This suggests that soil from a cleared landscape, probably grassland, had been used to backfill the grave.

The assemblages from several later Neolithic Grooved Ware pits (layers 1 and 2 of 913, layer 2 of 917, layer 3 of 3196 and layers 1 and 2 of 3831) and from layer 2 of probably natural hollow 2179, which also contained Grooved Ware, were mostly mixed. The majority of the shells were of open country species, *P muscorum* and *V excentrica* occurring in all the samples, but there was also a lesser presence of woodland species, with *Clausilia bidentata* in all but one of the pits. The woodland species would also have been able to live in the shaded bottoms of the pits, or amongst undisturbed coarse herbage, but would have required a shaded habitat from which to colonize the site. One sample contained a specimen of *Truncatellina cylindrica*, a snail of short-turfed dry grassland which is now very rare and no longer occurs in the region (Kerney and Cameron 1979, 68, 263). It appears, however, to have been of more widespread distribution during the Neolithic and Bronze Age (Evans 1972b, 140) and was identified from a small Neolithic enclosure at Thrupp (Robinson 1981, 317). Layer 3 of pit 911, the flint and bone artefacts from which are comparable with those from the Grooved Ware pits, produced an unexceptional open country fauna.

Layer 1 of Beaker 'flat' grave 919, in the SW of the excavated area, contained a largely woodland fauna, with *Pupilla muscorum* the only open country species. Beaker graves 206 and 203 in ring ditch 201 some 180 m to the NE, however, both had open country assemblages from which woodland species were absent.

Three early Bronze Age contexts, the middle fill of the outer ditch of barrow 12 (601/D/4), nearby cremation pit 614 and cremation pit 11 in barrow 1, all

Table 7.26. Molluscs from flots. + = present

Species	?Mesolithic 5353/B/3 & 4	Middle Neolithic 5352/2 & 4	Later Neolithic 911/3	2179/2	913/A/1 & 2, B/2	917/2	3196/3	3831/B/ 1 & 2	Beaker 919/1	203/1	206/1, /-	Early Bronze Age 601/B/ 3 & 4	614/1	11/1 & 2	Later Bronze Age 3430/2	4583/1 & 2
Pomatias elegans					+											+
Carychium sp.				+				+								+
Cochlicopa sp.	+	+		+	+		+	+		+					+	+
Truncatellina cylindrica					+							+				
Vertigo pygmaea		+	+	+						+		+	+			
Pupilla muscorum		+	+	+	+	+	+	+	+	+	+	+	+	+		+
Vallonia costata		+		+	+			+							+	+
V excentrica		+	+	+	+	+	+	+		+	+	+	+	+		+
Acanthinula aculeata															+	+
Ena obscura															+	
Discus rotundatus	+				+			+	+							+
Vitrina pellucida	+															
Vitrea sp.	+	+		+					+						+	+
Nesovitrea hammonis				+											+	
Aegopinella pura															+	+
Oxychilus cellarius				+					+						+	
Cecilioides acicula	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+
Cochlodina laminata					+										+	
Clausilia bidentata	+			+	+	+		+								+
Candidula intersecta								+								
C gigaxii		+	+	+	+	+	+	+			+	+	+	+		+
Helicella itala		+	+	+	+	+	+	+		+		+		+		+
Trichia hispida gp.	+				+	+		+								+
Cepaea sp.				+												
	W	O	O	M	M	M	O	M	M	O	O	O	O	O	W	M

W = woodland assemblage, M = mixed assemblage, O = open country assemblage contained rather similar open country faunas, with *P muscorum* and *V excentrica,* but with *V costata* absent. The ditch of barrow 12 gave a further record of *Truncatellina cylindrica.* Grassland probably prevailed around the barrows.

In contrast, apart from a few specimens of *Vallonia costata,* the assemblage from layer 2 of treethrow hole 3430, which contained sherds in Deverel-Rimbury fabrics, comprised a woodland fauna, with *Ena obscura, Aegopinella pura, Oxychilus cellarius* and *Cochlodina laminata* all present. This suggests that trees had become established in the vicinity of the monuments.

Similarly, the later Bronze Age sediments of layers 1 and 2 of pond barrow 4583 some 50 m to the SE produced a rich assemblage, with woodland species such as *Acanthinula aculeata, Aegopinella pura* and *Clausilia bidentata* joining the familiar open country species of *Pupilla muscorum, Vallonia costata* and *V excentrica.* It is very likely that the 'pond' had become overgrown with coarse vegetation.

The molluscan sequence can be summarised as follows: Mesolithic woodland had given way to grassland by the middle Neolithic and conditions on the site remained open until the later Bronze Age, when at least local tree regeneration occurred. Throughout this period, but especially during the later Neolithic, woodland species were able to re-establish themselves when suitable habitats, for example shaded or overgrown pit bottoms, became available. The regeneration which has occurred by the later Bronze Age need have been no more than scrub becoming established in the vicinity of some of the barrows.

THE PREHISTORIC USE OF PLANT RESOURCES *by Lisa Moffett*

Originally written 1988, revised 1995

Introduction

Neolithic and Bronze Age plant remains are a relative rarity from British sites. This remains persistently true despite a recent upsurge in the number of sites analysed for plant remains. Unlike sites of the same periods on the Continent, such as Heinheim (Bakels 1978) and Hochdorf (Küster 1985), which have produced charred plant material in abundance, most published sites in England have been poor in charred material. Barrow Hills provided an opportunity to increase our still scanty knowledge of the prehistoric use of plant resources and of how this use may have been related to the economy of the site.

Table 7.27. Charred plant remains from middle Neolithic inhumations

	5352/2	5352/4	5354
Sample size in litres	15	10	15
Malus sylvestris endocarp fragments	-	1 cf	-
Arrhenatherum elatius ssp. *bulbosum* tubers	2	-	-
Gramineae rhizome fragments	1	-	-
Unidentified	1	3	10

Methods

Samples

Soil samples were taken from contexts selected by the excavator, usually from deposits where there was visible charcoal. These were processed in the field by water flotation using a 0.5 mm mesh. The resulting flot was dried and sorted in the laboratory by a bio-technician using a low-power binocular microscope at x10. Final identifications were made using up to x100 magnification.

The sizes of the soil samples varied from extremely small (about 0.5 litres) up to 32 litres with the average size being around 10 litres. Some of the sample sizes were obviously dictated by the size of the deposits, but where this was not the case it is felt that generally the sample size was smaller than might be recommended for such an early site.

Fortunately, in some cases, especially the Grooved Ware pits and Bronze Age cremations, several samples were taken from the same context, thus effectively giving a larger sample from the context. These multiple samples were analysed and scored separately, but where the areas from which each sample derived were not differentiated archaeologically, the results were later combined to reduce the complexity of the tables. Many of the samples taken did not produce charred plant remains other than wood charcoal.

Identifications

Identifications were made primarily on the basis of comparison with modern reference specimens, but for identifications of the *Malus sylvestris* remains and the material referred to as *Malus/Pyrus,* the sections on *Malus* and *Pyrus* in Winton and Moeller (1906, 323–31) were also consulted.

Most of the samples contained some items that could not be identified, and sometimes the sample consisted entirely of unidentifiable items. Usually this was due to poor preservation, as most of the un-identifiable items were fragments of the internal parts of seeds. There was one type of item, however, which appeared to be relatively well-preserved but could not be identified. Mostly this type was associated with one of the early Bronze Age cremations, where 24 of the 25 specimens were found. The other specimen was found in a later Bronze Age inhumation. This unknown type appears in the tables as item A to distinguish it from the other morphologically various fragments classified as 'unidentified'.

Lumps of charred parenchymatous tissue were found in two of the Grooved Ware pits and one of the early Bronze Age cremations. Although techniques for identifying archaeological parenchyma are now being developed (Hather 1991), at present the Barrow Hills material cannot be identified. Most of the

Table 7.28. Charred plant remains from later Neolithic pits. (N) = approximate numbers of whole items

	Grooved Ware				Aceramic
	913	917	3196/3	3831	911
Triticum sp.	-	-	1	1	-
Cereal indet.	-	1 cf	3+1 cf	1+1 cf	1 cf
Cruciferae indet.	-	-	-	-	1 cf
Chenopodium album type	-	-	1	-	-
Vicia / Lathyrus	-	-	1	-	-
Rumex sp.	-	-	-	1	-
Malus sylvestris seeds	-	-	3	-	-
Malus sylvestris endocarp fragments	-	-	106	-	-
Malus sylvestris calyx fragments	-	-	5	-	-
Malus / Pyrus seed fragments	-	-	39 (7)	-	-
Malus / Pyrus epidermal fragments	-	-	171	-	-
Corylus avellana fragments	1	44 (1)	257 (10)	-	5
Gramineae indet.	-	2	-	1	-
Gramineae culm node	-	-	-	1	-
Gramineae rhizome fragments	1	-	-	-	-
Unidentified	1	-	5	1	-

parenchymatous material, however, was associated with the remains of apple and the parenchymatous fragments appear (at a maximum of x100 magnification) to be identical in structure to fragments of tissue adhering to epidermal fragments of apple / pear. This cannot be considered an identification, and should be regarded only as a likelihood.

Mark Robinson suggested that two charred vegetative items were Umbelliferous root tops. This was investigated and confirmed, and by consulting the Umbelliferae section of the Warwickshire Herbarium, which contains most of the British species, possibilities were narrowed down to two, pignut *(Conopodium majus)* or great pignut *(Bunium bulbocastanum)*.

Results

Middle Neolithic Inhumations (Table 7.27)

Two inhumations produced plant remains. Excluding unidentified items, the sample from layer 2 of linear mortuary structure 5352 (Figs 3.5–8) contained two tubers of onion couch grass *(Arrhenatherum elatius* ssp. *bulbosum)*, and a fragment of grass rhizome. *Arrhenatherum* tubers are a common find on prehistoric sites. A large number of them were found in late Bronze Age contexts at Rockley Down, Wiltshire (Godwin 1975, 404), and others are known more locally from Bronze Age contexts at Ashville Trading Estate (Jones 1978, table VII) and Rollright (Robinson 1988). Layer 4 of 5352 produced a fragment of apple core. Single inhumation 5354 (Fig. 3.9) produced only unidentifiable fragments.

Later Neolithic Pits (Table 7.28)

The Neolithic pits contained general occupation debris including bone, Grooved Ware pottery, flint, antler and charcoal (Figs 4.31-9). Plant remains were found in all of the five pits which were sampled.

The plant remains consisted of wheat *(Triticum* sp.), some unidentifiable cereal grains, a few weeds which could have grown either on waste ground or in crop fields, nutshell fragments of hazel *(Corylus avellana)* and the skin, core and seed remains of (crab) apple *(Malus sylvestris)*.

It was unfortunately not possible to tell if the wheat grains were from a hulled wheat or a free-threshing one. Free-threshing wheat is known from Neolithic sites but the most common wheat until at least the late Bronze Age was the hulled wheat, emmer. Emmer impressions have been found in locally-made prehistoric pottery from the Abingdon causewayed enclosure, along with impressions of six-row hulled barley, sloe and apple (Murphy 1982).

Taking all the remains of edible plants from the pits together, there were ten cereal grains, the remains of approximately 11 hazel nuts and a large number of apple fragments which is roughly estimated to represent about five whole apples. By weight this represents considerably more collected food than cultivated food. It is difficult, however, to estimate the relative probabilities of the different food remains becoming charred. Hazelnut shells and apple cores might be very likely to have been disposed of in domestic fires. Cereal grains could also have had a high probability of becoming charred in cooking fires. If the wheat was emmer, it would have had a high risk of contact with fire if it was being processed by the parching and pounding methods ethnographically documented and described by Hillman (1984).

Beaker and Early Bronze Age Inhumations (Table 7.29)

Grave 206 in ring ditch 201 (Fig. 4.73) was poor in charred remains and yielded only two fragments of Gramineae rhizome from 20 litres of soil. Child inhumation 5274, one of the burials around pond barrow 4866 (Fig. 4.61), produced only two unidentified fragments.

Early Bronze Age Cremations (Table 7.30)

Central cremation pit 11 in barrow 1 (Fig. 4.82) produced an assemblage entirely unlike any of the earlier contexts. The sample was dominated by

Table 7.29. Charred plant remains from Beaker and early Bronze Age inhumations

	206/3	5274
Sample size in litres	20	10
Gramineae rhizome fragments	2	-
Unidentified	-	2

what is probably a grassland assemblage consisting of vegetative fragments of grass and a large number of Leguminous seeds *(Melilotus/Medicago/Trifolium/Lotus).*

Many of the small-seeded Leguminosae are too similar in morphology to be identifiable, especially after charring, which distorts both shape and size. Most of the seeds in the sample had also lost both the testa (the seed coat) and the hilum (the attachment area on the seed which is usually one of the most diagnostic morphological characters for identifying Leguminosae). A few seeds, however, did retain their hila, and these seemed to vary slightly relative to the circumference of the seed, suggesting the possibility that more than one species is represented.

Although the identification of small-seeded legumes is extremely problematic even when the seeds are complete, some possibilities within this group of Leguminosae are tentatively suggested. The most likely types seem to be the large-seeded clovers, such as red clover *(Trifolium pratense)* and birdsfoot trefoils *(Lotus corniculatus* and *L. tenuis),* or black medick *(Medicago lupulina).* These and many other small-seeded Leguminosae flower and fruit continuously from approximately midsummer until autumn and therefore give only the most general indication of the time of year at which they were collected.

Other possible grassland species in the sample include blinks (*Montia fontana* ssp. *chondrosperma*), which usually grows in damp grassland, sheep's sorrel *(Rumex acetosella* agg.*)* and field madder (cf *Sherardia arvensis).* These three species are also known from later sites to have grown as weeds in cereal crops and, given the presence of a few cereal grains in the sample, it is possible that they derived from an arable rather than a grassland assemblage. This sample also produced most of the specimens of item A, which has so far eluded identification.

The grasses appear from the presence of culm (stem) bases and rhizome fragments to have been uprooted. Two tubers of onion couch show that this was one of the species present. The absence of grass seeds is worth noting since grass seeds, especially those of large-seeded grasses such as *Arrhenatherum,* usually survive charring quite well. The grasses may have been uprooted before they had set seed or after the seeds were shed. Other explanations are also possible, however, such as regular grazing or fungal and insect attack. Some perennial grasses often propagate themselves from rhizomes and only occasionally set seed. For all of these reasons it would be hazardous to attempt to suggest from the absence of seeds a time of year when the grasses might have been uprooted.

The remains of grass and small-seeded Leguminosae may indicate the use of grass or hay as tinder for lighting the fire used for cremation. Grass or hay might also have been used as bedding for the corpse prior to cremation.

The pignut or great pignut tubers may have arrived in the assemblage from a different source. *Conopodium majus* is a common plant over much of the British Isles. Clapham *et al.* (1987, 282–3) say that it grows on acid soils and is common except on chalk and in fens, but according to Fitter (1978, 133) it does also grow on calcareous soils. *Bunium bulbocastanum* is a very local plant of chalk grassland. The tubers of both plants are edible and would probably have to be to be dug for as the tubers detach from the stem very easily (Grigson 1975). It seems unlikely that the tubers of either plant would be uprooted by accident in the process of gathering handfuls of grass. If the pignut tubers were being collected deliberately, then it seems probable that they were being utilised as food, and their presence

Table 7.30. Charred plant remains from early Bronze Age and undated cremations. ++ = present

	11	601/B/3	802	614 (undated)
Sample size in litres	43.5	?	25	10
Cereal indet.	3	-	-	1 cf
Montia fontana ssp. *chondrosperma*	1	-	-	-
Medicago / Melilotus / Trifolium / Lotus	897	-	-	-
Conopodium majus / Bunium bulbocastanum tubers	2	-	-	-
Rumex acetosella agg.	1	-	-	-
Rumex sp.	-	-	-	1
Sherardia arvensis	1 cf	-	-	-
Arrhenatherum elatius ssp. *bulbosum* tubers	2	-	8	-
Eleocharis palustris / uniglumis	-	-	-	1 cf
Gramineae aerial stem fragments	59	-	6	-
Gramineae culm nodes	-	-	3	-
Gramineae culm bases	73	-	-	-
Gramineae rhizome fragments	526	-	6	-
Rhizomes indet.	9	-	-	-
Parenchyma fragments	-	++	-	-
Tree buds	1	-	-	-
Item A	24	-	-	-
Unidentified	4	1	1	-

could be in some way connected with ritual relating to the cremation, though it is also possible that they are merely the result of accidental incorporation. The identification and significance of the pignut tubers is discussed more fully in Moffett (1991).

The cremations in a pair of miniature vessels in the outer ditch (601) of barrow 12 (Fig. 4.49) were rather less informative, producing only a few parenchymatous lumps and an unidentified fragment.

The other early Bronze Age cremation which produced plant remains was central burial 802 of ring ditch 801 (Fig. 4.9). This sample contained onion couch tubers and vegetative grass remains, which may indicate a similar use of grass material to the central cremation in barrow 1.

Undated cremation 614, which lay between barrows 12 and 13, produced a cereal grain, a dock seed *(Rumex* sp.*)* and a spike-rush seed *(Eleocharis palustris/uniglumis)*. Dock is a weed of both disturbed and arable ground. Spike-rush is not specifically an arable weed but it grows on open, damp ground (Walters 1949) and has been found in archaeological contexts associated with cereals which have presumably been grown on poorly drained soils (Jones 1978).

Later Bronze Age Inhumation (Table 7.31)

Both spreads of charred material in pond barrow 4583 were sampled (Fig. 4.12). Associated with deposit B, which included the legs, arms and skull of the earlier, partly disarticulated burial, were some apple core fragments and Gramineae rhizome fragments. The sample associated with deposit A, which comprised both animal and human bone, included more apple core fragments, some vegetative stem fragments that did not appear to be Gramineae, a single seed of indeterminate Labiatae and a specimen of the unidentified type labelled for convenience as item A. As far as it is possible to tell from such a small number of items, the assemblage resembles those from the Neolithic inhumations in having apple remains and grass with a few unidentified seeds and fragments. The apple remains are mostly associated with the sample from deposit A.

The incorporation of charred plant remains in inhumation deposits is likely to be the result either of ritual activity associated with the burial which included the burning of plant material, or accidental inclusion of charred material such as occupation debris in the backfill of the burial.

Undated and Later Pits (Table 7.32)

Pit 3421, of indeterminate prehistoric date, produced a single fragment of hazelnut shell from a very small sample of roughly 0.5 of a litre. The moderate-sized sample from Romano-British pit 411 SE of barrow 13, charcoal and charred grain from which are dated to cal AD 130–510 (1710±70 BP; OxA-1885), contained a substantial amount of pure grain, most of it free-threshing wheat. It is already known that there was free-threshing wheat present during the Saxon occupation phase of Barrow Hills (Moffett 1987). Almost certainly of Saxon date is the sample from 2135, the fill of pit 2142 within the segmented ring ditch, charcoal from which has been dated to cal AD 390-600 (1570±50 BP; BM-2705). The sample contained a wheat grain and an oat grain *(Avena* sp.*)*

Table 7.31. Charred plant remains from later Bronze Age deposits in pond barrrow 4583

	4583/A, deposit A	4583/C, deposit B	4583/2
Sample size in litres	14	21	12
Malus sylvestris endocarp fragments	6	3	-
Labiatae indet.	1	-	-
Gramineae rhizome fragments	-	2	-
Stem fragments, not Gramineae	2	-	-
Item A	1	-	-
Unidentified	1	9	1

Discussion

As far as it is possible to tell from the small amount of remains, the samples from the Neolithic inhumations contain no cereal remains, but otherwise the material seems to be similar to that from the Grooved Ware pits, and would indicate the exploitation of collected food plants as well as the cultivation of cereal crops.

The charred plant remains from the Grooved Ware pits appear to be part of an assemblage of occupation material which also included pottery, bone, charcoal, antler and flint. In this association the plant remains could represent an incidental deposit or household debris that was deliberately selected for inclusion in the pit deposits.

The predominance of collected food plants over cultivated food plants in Neolithic samples is in line with the pattern that has so far emerged over much of England and Wales of an economic strategy that combined gathering wild foods with cultivation of cereals and did not apparently involve as heavy a commitment to agriculture as that seen on contemporary continental sites. An exception to this pattern appears in areas of Wessex where cereal remains are more abundant, and where the commitment to cereal farming may have been greater (Moffett *et al.* 1989). The fact that the collected foods were wild does not exclude the possibility that the wild resources were sometimes managed to increase their productivity.

The early Bronze Age cremation samples are different and generally reflect a grassland flora, possibly indicating the use of grass for tinder. Pignut tubers are also present in cremation pit 11. These may have been deliberately collected and they may have served a ritual purpose. Alternatively, as there are a very few cereal grains in the sample, it may be that these food remains are accidentally incorporated occupation rubbish. The latter suggestion is not borne out by the rare and elaborate artefacts accompanying the cremation (Fig. 4.82–3). The presence of pignut tubers in Bronze Age contexts indicates a continuing use of collected wild plants, though as these were more definitely in a ritual context, it is difficult to tell how large a role these played in the economy.

THE ANALYSIS OF WOOD CHARCOALS FROM SELECTED PITS AND FUNERARY CONTEXTS

by G B Thompson

Originally written 1986, revised 1995

Introduction

Charcoals are mainly collected and analysed for dating purposes. At Barrow Hills, however, analysis of the charcoal assemblage also contributes to the interpretation of archaeological features and particularly of funerary practice.

Table 7.32. Charred plant remains from uncertainly dated and later pits

	3421 (Indet. prehist.)	411 (Roman)	2135 (Saxon)
Sample size in litres	0.5?	7	10
Triticum sp. free-threshing type	-	36	-
Triticum sp. indet.	-	36	1
Hordeum sativum hulled	-	5	-
Cereal indet.	-	107	-
Corylus avellana fragments	1	-	-
Avena sp.	-	-	1
Unidentified	-	1	-

Selection of Samples

On-site sampling strategies and extraction methods are described above by Lisa Moffett. Unless stated to the contrary, all samples were derived by flotation. The aim of this study was to identify materials from charcoal-rich samples from well-defined, dated prehistoric deposits of known context type, to assess their taxonomic composition and examine variation between context types. Table 7.33 lists the contexts examined.

Contexts Sampled

Later Neolithic pits. Wood charcoals were examined from five later Neolithic pits because these sealed deposits, rich in occupation debris, could be dated by their contained artefacts.

Undated apparently prehistoric features. Priority was given to analyzing charcoal from aceramic, apparently prehistoric features which were due to be radiocarbon-dated. Results from the samples that have proved to be post-prehistoric are listed in Tables 7.33–6, but are not discussed.

Funerary contexts. Flot samples suitable for charcoal identification were chosen in order to address specific questions about the burial rites. Samples from inhumations were examined only when the charcoal was considered by the excavator to have been directly associated with the burial. The selected samples were analysed because the charcoal probably represented wood which had played some role in the burial itself. It was not possible to examine flot samples from all the cremations because charcoal analysis had not been anticipated at the time of excavation. Those listed in Table 7.33 were examined because they were taken from secure contexts and produced a not insignificant quantity of charcoal.

Laboratory procedures

The samples examined are listed in Table 7.33 in the context groups outlined above. Each sample was sieved through a 3.35 mm mesh and the entirety of the larger fraction was retained for examination. Individual fragments of charcoal were fractured and examined in transverse section, at x25 and x50, using ring illumination on a Wild M5A binocular microscope, and in tangential and radial longitudinal sections at x100, x200 and x400, using a Swift epi-illuminating petrographic microscope. They were compared against modern specimens of charred wood in the Oxford University Museum's comparative collection, and identified with reference to the key for European hardwoods in Schweingrüber (1978, 45–48).

The combined weights of all the fragments in each taxon are presented in Table 7.34; counts for the total number of fragments examined in each sample are presented in Table 7.35. Where replicate samples had been taken from a single layer or feature, the raw data have been combined, and, in order to allow for easy cross comparison between the various assemblages, the weights and numbers of fragments for each category have been expressed as percentages of all the charcoal examined in that context and/or layer in Table 7.36. The two methods of recording produce broadly similar sets of data, but are presented together so that anomalies in the general pattern may be recognised (for instance in Grooved Ware pit 3831). The tables are arranged with contexts listed in the structural and functional groups defined above, ranked as far as possible in chronological order within those groups.

Results

Seven taxa have been positively identified, including five to generic level: *Quercus* sp. (oak), *Corylus* sp. (hazel), *Alnus* sp. (alder), *Rhamnus* sp. (buckthorn) and *Acer* sp. (maple). Determinations have been restricted to this level in order to be confident of the accuracy of identification, as it is not always possible to

Table 7.33. Samples examined for charcoal. 'Unknown' means that a 'small sample' of unspecified volume was collected during excavation. Total weight of charcoal examined 97.14 g; total number of fragments examined 2706

		Weight of charcoal examined (grammes)	Number of fragments examined	Volume of soil floated (litres)	% of flot >3.35 mm examined
Grooved Ware pits	913/A/1	1.16	41	14.00	100
	913/A/2	0.50	21	6.00	100
		2.62	64	15.50	100
	913/B/2	0.71	28	10.00	100
	917/A/2	7.32	137	15.00	100
		4.55	148	12.50	100
	917/B/2	6.15	127	10.00	100
	3196/3	4.37	153	10.00	100
		3.14	87	10.00	100
		0.69	20	10.00	100
		2.74	115	10.00	100
		4.21	164	15.00	100
	3831/A/1 & 2	1.40	15	20.00	100
	3831/B/2	2.39	20	10.00	100
		0.63	25	10.00	100
		1.41	26	5.00	100
Later Neolithic pit	911/3	0.50	10	10.00	100
Treethrow hole, ?Mesolithic	5353/B/2	1.11	35	17.00	100
		0.05	2	8.00	100
	5353/4	0.55	11	10.00	100
		1.90	41	10.00	100
		0.45	17	5.00	100
Pit beneath Neolithic linear mortuary structure	5352/12	0.29	15	0.25	100
Treethrow hole, ?Bronze Age	3430/2	4.77	88	5.00	25
		3.38	95	5.00	25
		3.30	95	5.00	25
Roman pit	411	2.28	63	7.00	100
Saxon pit	2135	2.23	84	10.00	100
Undated pit	5357	2.92	40	unknown	100
Neolithic linear mortuary structure	5352/2	0.78	53	5.00	100
EBA inhumation	4969	5.16	152	10.00	25
		3.99	132	10.00	25
LBA inhumations	4583/A/1, deposit A	0.81	29	14.00	100
	4583/C/1, deposit B	0.29	9	6.00	100
		1.34	40	5.00	100
		2.66	67	10.00	100
	4583/2	0.74	20	12.00	100
EBA cremations	605/1	0.77	36	unknown	100
	802	3.21	81	25.00	100
		0.93	3	unknown	100
	11/2	0.47	5	10.00	100
		0.25	7	unknown	100
	11/4	0.84	21	unknown	100
		3.43	144	32.00	50
	611/A/1	2.63	88	0.50	100
	611/C/2	1.12	32	1.00	100

distinguish adequately between two species of one genus on the basis of their anatomy alone. However, given the biogeography of these taxa, it is likely that the specimens referred to as *Corylus* sp. are *Corylus avellana* L., *Rhamnus* sp. are *Rhamnus cathartica* L., and *Acer* sp. *Acer campestre* L.

The fragments of *Prunus* cf *spinosa* (blackthorn or sloe) are named to species level because these woods can generally be separated according to the ray width seen in tangential longitudinal section. The Pomoideae (trees including hawthorn, apple and pear amongst others) have been scored as a single group.

The eighth category in the tables is that of 'indeterminate', comprising fragments which could not confidently be assigned to a known wood type. These may have derived from a piece of wood with atypical cellular structure, perhaps from rootwood or a small twig. Alternatively, the diagnostic features may have been grossly distorted by burning in intense heat. The latter reason seems to account for the greater part of the indeterminates scored here. Many transverse sections resembled oak in which the cells have been fused by sudden exposure to high temperatures. It is unlikely that any of the fragments scored as indeterminate had originated from a tree or shrub not positively identified from the site.

Discussion

Given the problems of extrapolating directly from charcoal records to regional vegetation, it is possible to comment only in general terms about wood resources around Barrow Hills. The charcoal types found in the flot samples are consistent with a range of utilitarian woods derived from local riverine habitats, secondary and scrubby woodland, and hedgerows, though there was probably also some access to mature woodland. The charcoals identified include taxa which are not very tolerant of shade. *Rhamnus* is typically found in scrub, while *Prunus spinosa* and some of the other Rosaceous trees may be found in thickets, hedges and woodland margins. *Acer*, though, is not a pioneer tree, being confined to later stages in woodland succession, from which it might be inferred that there was still, during the Neolithic and Bronze Age, some relatively old woodland in the vicinity. *Acer* and *Rhamnus* are both indicative of high base status. The large quantity of *Alnus* recorded in grave 4969 is likely to have been hauled up to the gravel terrace from Daisy Banks nearby, or from the floodplain, as alder has a preference of growing in valleys close to watercourses.

More detailed comments can be made about the various uses of woody materials brought onto the site.

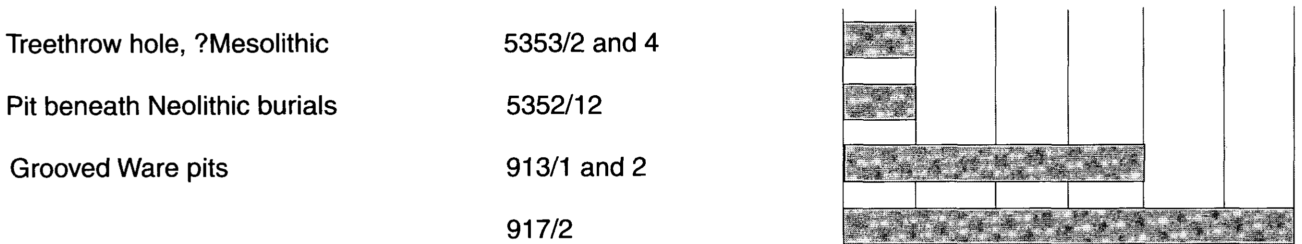


Figure 7.6 Numbers of taxa positively identified in charcoal samples

Table 7.34. Weights (g) of charcoal examined from selected contexts

Context	*Acer* sp. Maple	*Alnus* sp. Alder	*Corylus* sp. Hazel	Pomoideae Hawthorn type	*Prunus* cf *spinosa* Blackthorn	*Quercus* sp. Oak	*Rhamnus* sp. Buckthorn	Indet.	Total weight
LATER NEOLITHIC PITS									
913/1	-	-	-	-	0.04	0.77	-	0.35	1.16
913/2	-	-	0.09	0.50	0.03	1.55	-	1.66	3.83
917/2	0.38	0.13	3.50	0.44	0.69	7.08	-	5.80	18.02
3196/3	-	-	1.42	0.08	0.03	9.07	0.13	4.42	15.15
3831/A/1 & 2	-	-	0.22	-	0.03	1.00	-	0.15	1.40
3831/B/2	-	-	1.94	0.06	0.03	2.03	-	0.37	4.43
911/3	-	-	-	-	-	0.41	-	0.09	0.50
MISCELLANEOUS CONTEXTS									
5353/2	-	-	-	-	-	0.93	-	0.23	1.16
5353/4	-	-	-	-	-	2.74	-	0.16	2.90
5352/12	-	-	-	0.29	-	-	-	-	0.29
3430/2	-	-	-	-	-	10.14	-	1.31	11.45
411	-	-	0.04	-	-	2.24	-	-	2.28
2135	-	-	-	0.05	-	1.56	-	0.62	2.23
5357	-	-	-	-	-	2.84	-	0.08	2.92
NEOLITHIC AND BRONZE AGE INHUMATIONS									
5352/2	-	-	-	-	-	0.69	-	0.09	0.78
4969	-	6.75	-	-	-	-	-	2.40	9.15
4583/A/1, deposit A	-	-	-	-	0.15	0.22	-	0.44	0.81
4583/C/1, deposit B	-	-	0.07	-	0.80	3.00	-	0.42	4.29
4583/2	-	-	-	-	-	0.66	-	0.08	0.74
EARLY BRONZE AGE CREMATIONS									
605/1	-	-	-	-	-	0.69	-	0.08	0.77
802	-	-	-	3.55	-	0.41	-	0.18	4.14
11/2	-	-	-	-	-	0.46	-	0.26	0.72
11/4	0.10	-	-	-	-	3.34	-	0.83	4.27
611/1	-	-	-	-	-	2.63	-	-	2.63
611/2	-	-	-	-	0.05	0.87	-	0.20	1.12

Table 7.35. Numbers of charcoal fragments examined from selected contexts

Context	*Acer* sp. Maple	*Alnus* sp. Alder	*Corylus* sp. Hazel	Pomoideae Hawthorn type	*Prunus* cf *spinosa* Blackthorn	*Quercus* sp. Oak	*Rhamnus* sp. Buckthorn	Indet.	Total fragments
LATER NEOLITHIC PITS									
913/1	-	-	-	-	1	27	-	13	41
913/2	-	-	2	11	1	72	-	27	113
917/2	2	2	109	8	15	183	-	93	412
3196/3	-	-	64	3	1	289	7	175	539
3831/A/1 & 2	-	-	7	-	1	4	-	3	15
3831/B/2	-	-	49	2	2	6	-	12	71
911/3	-	-	-	-	-	9	-	1	10
MISCELLANEOUS CONTEXTS									
5353/2	-	-	-	-	-	30	-	7	37
5353/4	-	-	-	-	-	64	-	5	69
5352/12	-	-	-	15	-	-	-	-	15
3430/2	-	-	-	-	-	228	-	50	278
411	-	-	2	-	-	61	-	-	63
2135	-	-	-	1	-	57	-	26	84
5357	-	-	-	-	38	-	-	2	40
NEOLITHIC AND BRONZE AGE INHUMATIONS									
5352/2	-	-	-	-	-	49	-	4	53
4969	-	229	-	-	-	-	-	55	284
4583/A/1, deposit A	-	-	-	-	4	10	-	15	29
4583/C/1, deposit B	-	-	2	-	18	82	-	14	116
4583/2	-	-	-	-	-	17	-	3	20
EARLY BRONZE AGE CREMATIONS									
605/1	-	-	-	-	-	35	-	1	36
802	-	-	-	58	-	20	-	6	84
11/2	-	-	-	-	-	8	-	4	12
11/4	1	-	-	-	-	133	-	31	165
611/1	-	-	-	-	-	88	-	-	88
611/2	-	-	-	-	1	26	-	5	32

Table 7.36. Percentage frequency of charcoals by context (1)
***Upper row: % weight,** lower row % number of fragments*

Context	*Acer* sp. Maple	*Alnus* sp. Alder	*Corylus* sp. Hazel	Pomoideae Hawthorn type	*Prunus* cf *spinosa* Blackthorn	*Quercus* sp. Oak	*Rhamnus* sp. Buckthorn	Indet.
LATER NEOLITHIC PITS								
913/1	**-**	**-**	**-**	**-**	**3.4**	**66.4**	**-**	**30.2**
	-	-	-	-	2.4	65.8	-	31.7
913/2	**-**	**-**	**2.3**	**13.1**	**0.8**	**40.5**	**-**	**43.3**
	-	-	1.8	9.7	0.9	63.7	-	23.9
917/2	**2.1**	**0.7**	**19.4**	**2.5**	**3.8**	**39.3**	**-**	**32.2**
	0.5	0.5	26.5	1.9	3.6	44.4	-	22.6
3196/3	**-**	**-**	**9.4**	**0.5**	**0.2**	**59.9**	**0.8**	**29.2**
	-	-	11.8	0.6	0.2	53.6	1.3	32.5
3831/A/1 & 2	**-**	**-**	**15.7**	**-**	**2.1**	**71.4**	**-**	**10.8**
	-	-	46.7	-	6.7	26.6	-	20.0
3831/B/2	**-**	**-**	**43.8**	**1.4**	**0.7**	**45.8**	**-**	**8.3**
	-	-	69.0	2.8	2.8	8.4	-	16.9
911/3	**-**	**-**	**-**	**-**	**-**	**82.0**	**-**	**18.0**
	-	-	-	-	-	90.0		10.0
MISCELLANEOUS CONTEXTS								
5353/2	**-**	**-**	**-**	**-**	**-**	**80.2**	**-**	**19.8**
	-	-	-	-	-	80.0	-	20.0
5353/4	**-**	**-**	**-**	**-**	**-**	**94.5**	**-**	**5.5**
	-	-	-	-	-	92.8	-	7.2
5352/12	**-**	**-**	**-**	**100**	**-**	**-**	**-**	**-**
	-	-	-	100	-	-	-	-
3430/2	**-**	**-**	**-**	**-**	**-**	**88.6**	**-**	**11.4**
	-	-	-	-	-	82.0	-	18.0
411	**-**	**-**	**1.8**	**-**	**-**	**98.2**	**-**	**-**
	-	-	3.2	-	-	96.8	-	-
2135	**-**	**-**	**-**	**2.2**	**-**	**70.0**	**-**	**27.8**
	-	-	-	1.2	-	67.8	-	31.0
5357	**-**	**-**	**-**	**-**	**-**	**97.3**	**-**	**2.7**
	-	-	-	-	-	95.0	-	5.0
NEOLITHIC AND BRONZE AGE INHUMATIONS								
5352/2	**-**	**-**	**-**	**-**	**-**	**88.5**	**-**	**11.5**
	-	-	-	-	-	92.5	-	7.5
4969	**-**	**73.8**	**-**	**-**	**-**	**-**	**-**	**26.2**
	-	80.6	-	-	-	-	-	19.4
4583/A/1, deposit A	**-**	**-**	**-**	**-**	**18.5**	**27.2**	**-**	**54.3**
	-	-	-	-	13.8	34.5	-	51.7
4583/C/1, deposit B	**-**	**-**	**1.6**	**-**	**18.7**	**69.9**	**-**	**9.8**
	-	-	1.7	-	15.5	70.7	-	12.1
4583/2	**-**	**-**	**-**	**-**	**-**	**89.2**	**-**	**10.8**
	-	-	-	-	-	85.0	-	15.0

Table 7.36. Percentage frequency of charcoals by context (2)
***Upper row: % weight,** lower row % number of fragments*

Context	*Acer* sp. Maple	*Alnus* sp. Alder	*Corylus* sp. Hazel	Pomoideae Hawthorn type	*Prunus* cf *spinosa* Blackthorn	*Quercus* sp. Oak	*Rhamnus* sp. Buckthorn	Indet.
EARLY BRONZE AGE CREMATIONS								
605/1	**-**	**-**	**-**	**-**	**-**	**89.6**	**-**	**10.4**
	-	-	-	-	-	97.2	-	2.8
802	**-**	**-**	**-**	**85.8**	**-**	**9.9**	**-**	**4.3**
	-	-	-	69.1	-	23.8	-	7.1
11/2	**-**	**-**	**-**	**-**	**-**	**63.9**	**-**	**36.1**
	-	-	-	-	-	66.7	-	33.3
11/4	**2.3**	**-**	**-**	**-**	**-**	**78.2**	**-**	**19.5**
	0.6	-	-	-	-	80.6	-	18.8
611/1	**-**	**-**	**-**	**-**	**-**	**100.0**	**-**	**-**
	-	-	-	-	-	100.0	-	-
611/2	**-**	**-**	**-**	**-**	**4.5**	**77.7**	**-**	**17.8**
	-	-	-	-	3.1	81.3	-	15.6

One starting point for analysis is to examine the relationship between the number of taxa and class of context, and then the actual taxa represented. At Barrow Hills the charcoal samples from the Grooved Ware pits (913, 917, 3196 and 3831) have greater taxonomic diversity than charcoals from other types of feature. These pits typically contained four to six taxa, while the funerary contexts and other features contained only one or two (or in a single case, three) taxa (Figs 7.6–7). Notably, the sample from the remaining later Neolithic pit (911) is limited to a single taxon, though in view of the relative paucity of this sample (only 10 fragments from 10 litres of soil), this is clearly an atypical deposit.

Internal variability within a feature is seen in pit 913, where the charcoal assemblage consisted of two taxa in the upper, and four taxa in the lower layer of fill. Lateral variation is also illustrated by the contrast in proportions of hazel and oak in samples from the two halves of pit 3831. Cultural material from all these pits consists of occupation debris, likely to have derived from a number of burning events, most probably from fires burning a range of fuels and types of occupation debris. This is reflected in the variety of wood types in the charcoal record, and also in the other classes of charred plant macroremains, which are at their most diverse in these contexts (Table 7.28).

The charcoal assemblages from other contexts typically comprise a single taxon, which tends to support the idea that the charcoals could be the remains of artefacts, such as coffins. These are usually oak, though the small sample from 5352/12 is wholly Pomoideae (Fig. 7.7).

Charcoals from ten of the eleven funerary contexts are dominated (with more than 60% by weight) by a single taxon, and in eight of these ten cases oak is dominant (Table 7.36). The spread of oak charcoal in middle Neolithic linear mortuary structure 5352 was recorded as lying only immediately above the bodies. This might represent a charred lid placed on the blocks of conglomerate which roughly lined the grave (Fig. 3.5) or could be the remains of a fire lit over the grave after the burial. The latter is less likely in the absence of traces of *in situ* burning.

All the identifiable fragments from the 'tree trunk coffin' in grave 4969 are alder and appear to come from mature wood, as the curvature of annual rings apparent in twigs was not observed. Fragments of charcoal were found lying over the body as well as more obviously along the edge of the grave cut. A number of interpretations could be proposed. The most likely is that the child's body was laid on the charred interior surface of a hollow alder log. A lid was then added and the body interred.

The charcoal spreads accompanying the later Bronze Age funerary deposits in pond barrow 4583 included both hazel and blackthorn, though the samples were still dominated by oak.

It is unlikely that the composition of cremation pyres was entirely the product of chance. The fact that a single taxon commonly dominates the samples from cremations suggests that one type of wood was deliberately chosen for the funeral pyre, or even that a single tree or bush was burnt and that this choice may have been of ritual significance.

The investigation of charred plant remains provides an opportunity, then, to examine certain aspects of both domestic and ritual activity, including prehistoric burial rites. The kinds of information which could potentially be derived by analyzing the wood charcoal assemblages from inhumations and cremations have been touched on above, and tied in with a small number of charcoal samples from the prehistoric phases at Barrow Hills.

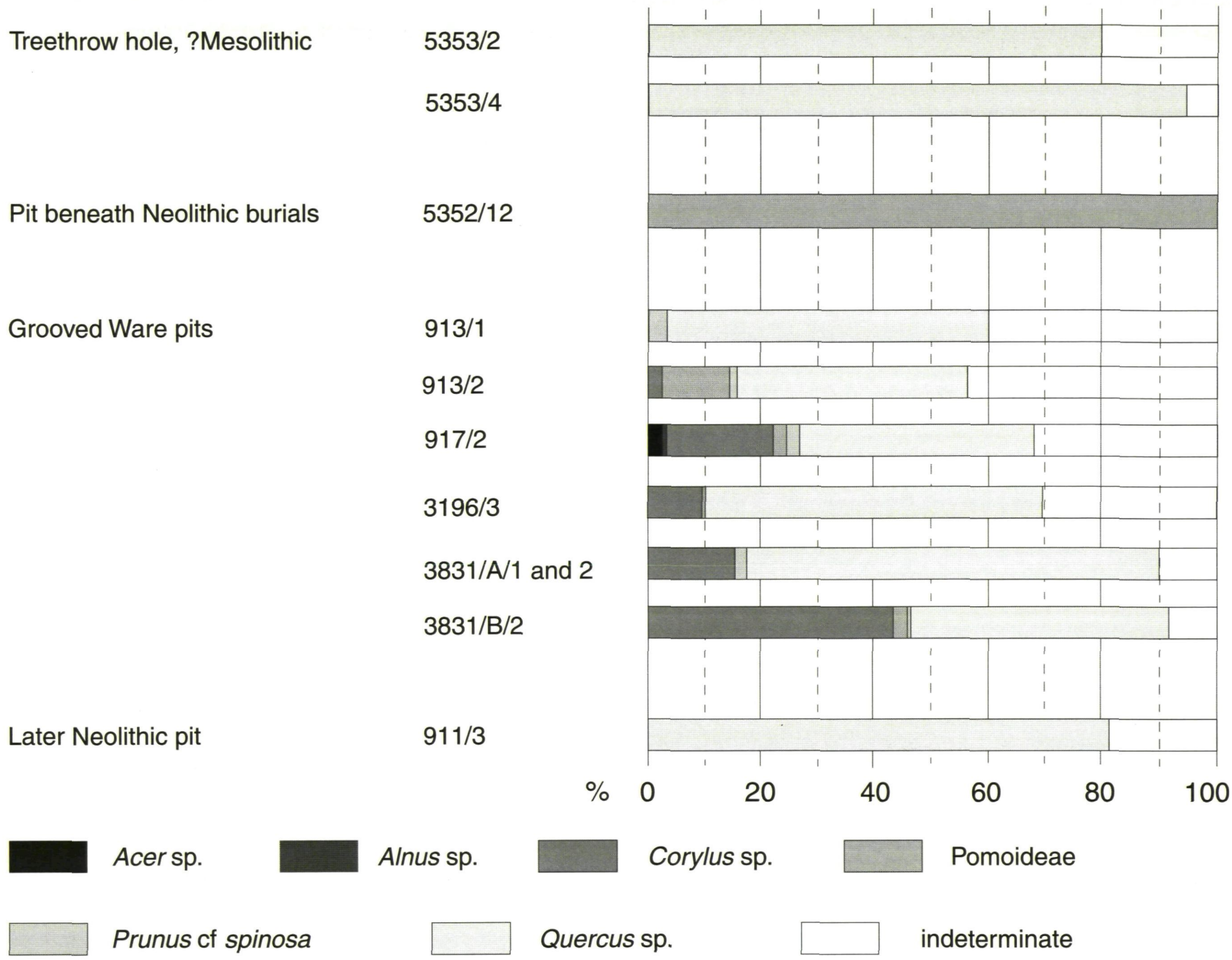


Figure 7.7 Percentage frequency by weight of taxa among charcoal from Neolithic and ?Mesolithic contexts

THE POLLEN AND SEDIMENTS OF DAISY BANKS FEN

by Adrian Parker

Introduction

Daisy Banks Fen lies at SU 512 981, at an altitude of 55 m OD in a break in the gravel terrace immediately W and S of the area excavated in 1983–5 (Fig. 1.3), occupying the confluence of the two streams which seem to have bounded the Abingdon causewayed enclosure (Fig. 1.2). The fen was used as a medieval fishpond, which formed part of the Abingdon Abbey estates, and remnants of the medieval earthwork embankments are still evident (Miles 1986, fig. 1). Its sediments span the period from *c.* 4350–3750 cal BC (95% confidence) (5240±110 BP; OxA-4559) to the present, with an hiatus in accumulation between the mid second millennium cal BC and the early second millennium cal AD (Fig. 7.11) This report is condensed from a fuller account which forms part of the author's D Phil thesis (Parker 1995a), and provides a paleo-botanical record for the locality which covers the periods of activity at Barrow Hills.

The fen is a 7 ha relict wetland site consisting predominantly of soligenous calcareous fen and wet meadow vegetation. On the areas of drier ground tall herb, scrub and woodland occur, all associated with a high water table. The fen is fed by groundwater and two small streams, the sources of which lie due north of the site.

The origins of this water are of prime importance in determining the existence of this fen and the composition of the species at this location. The existence of the fen (and its vegetational composition) are attributed to the geological conditions of the area explained in the following sections.

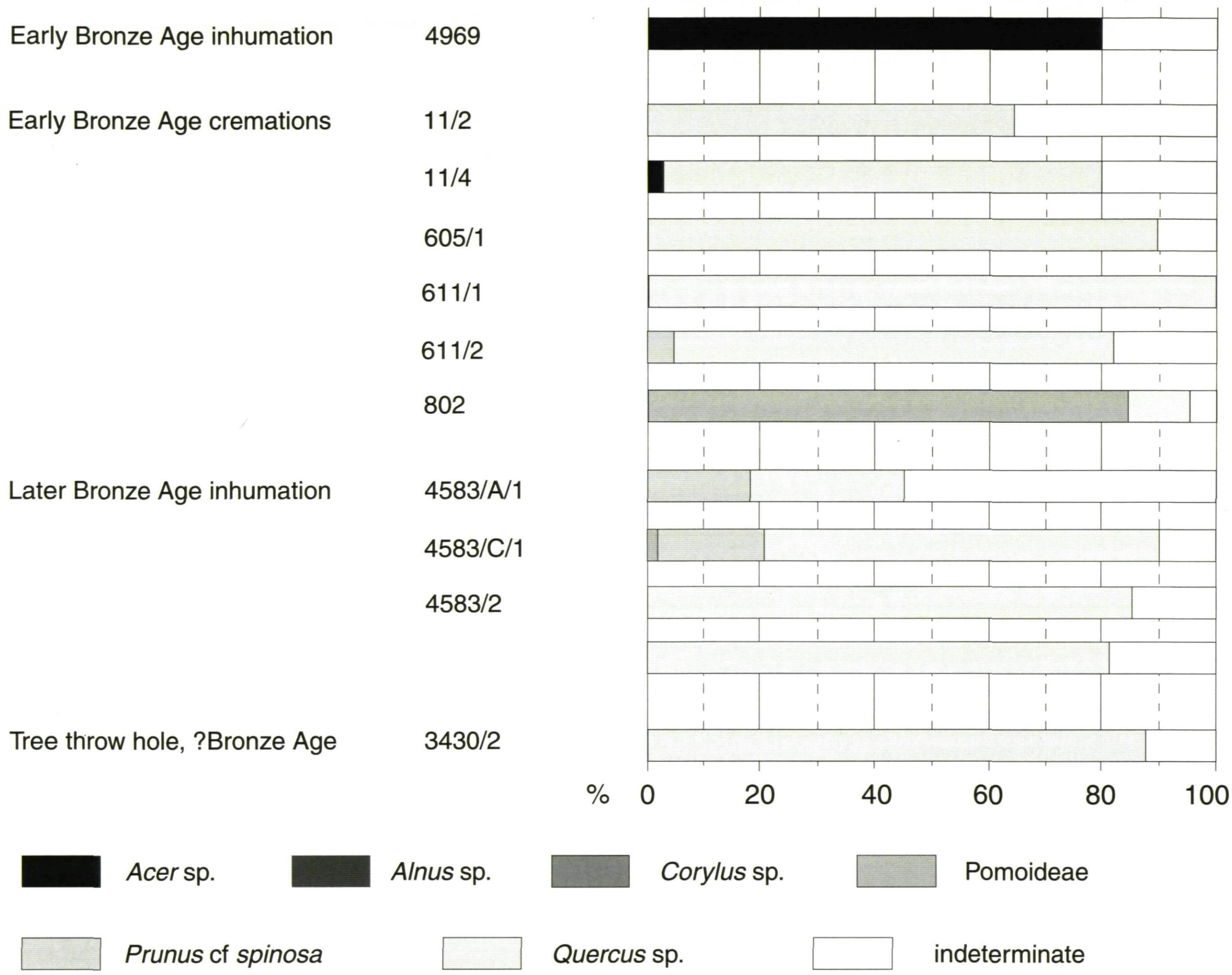


Figure 7.8 Percentage frequency by weight of taxa among charcoal from Bronze Age contexts

Physical information

Geology: Bedrock and Quaternary

The geology of the site, determined from the British Geological Survey's records, is as follows. Kimmeridge Clay underlies the fen and acts as an aquitard; on top of the Kimmeridge Clay lies head with coarse gravel. The areas of higher ground consist of gravels from the Summertown-Radley terrace, superimposed on the Kimmeridge Clay (Fig. 7.9).

Hydrogeology and Drainage

Springs emerge along the interface of the Kimmeridge Clay and second terrace gravels. Other surface deposits include gravels and clays (head), tufa and alluvium in addition to peat. Calcareous peat, underlain by marl, clays and gravel, has developed over much of the central part of the fen, restricted by the topography and groundwater head. Peripheral deposits of peat and alluvium are also present over gravels on the edge of the fen. The impact of housing has affected the infiltration and throughflow into the underlying gravel aquifer component inhibiting/reducing re-charge, therefore reducing output via springs at the gravel-Kimmeridge Clay interface.

Soils

Figure 7.10 shows the soil types of Daisy Banks Fen and its vicinity. Details of each soil type are derived from Jarvis (1973).

The fen itself comprises soils of the Hatford-Kelmscott complex. These are loamy or clayey calcareous humic gley soils which have generally developed over calcareous alluvium with humose and peaty layers. The Hatford-Kelmscott complex is often to be found along narrow alluvial bottom lands associated with the Corallian dip-slope streams and river terraces. It is a very poorly-drained soil with slow subsoil permeability, which is waterlogged for much of the year and is constantly influenced by the groundwater table.

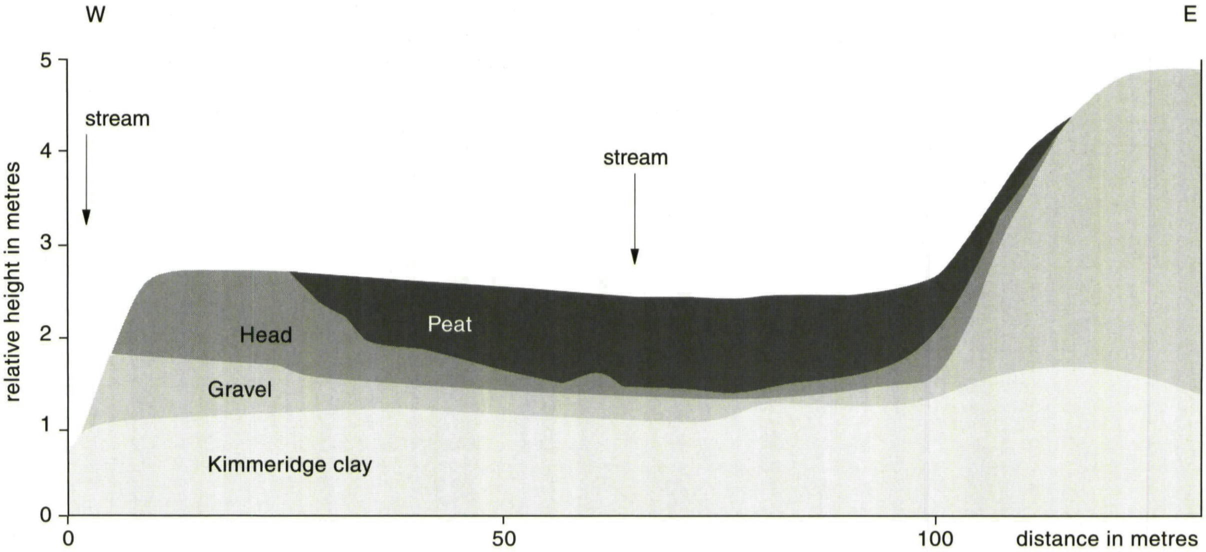


Figure 7.9 Daisy Banks Fen: E–W geological cross-section

Gleyed brownearth soils of the Isle of Abbot series have developed on loamy drift, often with very stony layers, over areas of the Kimmeridge Clay. These are moderately well or imperfectly drained loamy soils with slow subsoil permeability and are liable to cap or pan. Gleyed calcareous soils of the Evesham series have also developed on the Kimmeridge Clay. The subsoil in this series is relatively impervious with slow internal drainage.

Brownearth *(sol lessivé)* loamy non-calcareous soils of the Sutton series have developed over the areas of calcareous river terrace gravels. These are shallow, freedraining and often stony. Finally, surface water gleyed soils of the Rousham series are to be found on clayey drift with gravelly horizons over *in situ* Kimmeridge Clay. These soils are poorly-drained with slow subsurface permeability.

Vegetation

The present day vegetation may be classified into five broad categories (after Young 1989, 222).

a. Woodland. Woodland is found on the NE tributary of the site, and the E and W flanks. It comprises a mixed deciduous flora with *Ulmus* (elm), *Quercus* (oak), *Fraxinus* (ash), *Acer* spp. (sycamore and maple) and *Corylus* (hazel). In places it grades into carr with *Populus* (aspen), *Salix* (willow) and some *Alnus* (alder).

b. Reedbeds. The areas of reedbed are dominated by *Phragmites* (reed). Other species occurring include *Apium nodiflorum* (fool's watercress), *Berula erecta* (narrow-leaved water parsnip), *Molinia caerula* (purple moor-grass), *Iris pseudocorus* (yellow flag), *Typha* spp. (reedmace), *Mentha aquatica* (water mint), *Equisetum* (horsetail), *Scrophularia auriculata* (water betony) and a variety of *Carex* spp. (sedges).

c. Wet meadow. The wet meadow areas comprise locally abundant patches of *Caltha palustris* (marsh marigold), *Carex* (sedges), *Juncus sub-nodulosis* (blunt-flowered rush), *Filipendula ulmaria* (meadowsweet), *Lychnis flos-cuculi* (ragged robin) and *Anagalis tenella* (bog pimpernel).

d. Tall herb. The areas of tall herb are dominated by *Epilobium angustifolium* (great willowherb), with lesser stands of *Eupatorium cannabinum* (hemp agrimony), *Potentilla* spp. (cinquefoil), *Rumex* spp. (dock/sorrel), *Vicia* spp. (vetch) and *Valeriana* spp (valerian).

e. Scrub. Areas of drier ground have well developed stands of scrub with *Rubus fruticosus* (bramble), *Crataegus* spp. (hawthorn), *Prunus* (blackthorn), *Sambucus nigra* (elder) and *Rosa canina* (dog rose).

Local Palaeobotanical Work

The pre-Iron Age palaeobotanical record for the area is summarised here. An organic deposit thought to be Mesolithic in age (Mark Robinson pers. comm.) at Radley (SU 489 942), near to the Drayton cursus, was analysed for its pollen content by Innes (unpublished). The deposit showed a generally wooded environment with *Betula, Pinus, Fraxinus, Ulmus* and *Quercus* present. Grain impressions on earlier Neolithic pottery from the Abingdon causewayed enclosure are of *Triticum, Hordeum, Malus* and *Prunus* (Murphy 1982). The charcoal from the enclosure was mainly of *Quercus* but also included *Fraxinus, Corylus, Prunus, Fagus, Populus, Carpinus, Acer, Pyrus, Sorbus, Alnus, Sambucus, Crataegus, Euonymus, Ligustrum, Clematis* and *Hedera* (Western 1982, 49). These identifications of *Fagus* and *Carpinus* wood charcoal from Neolithic contexts may provide the earliest records of these taxa: the evidence of pollen across southern England has suggested that they were much later invaders, (*c.* 2500 cal BC (4000 BP); Huntley and Birks 1983, 662). Wood remains of *Euonymus, Ligustrum* and *Clematis* are also unusual, though not exceptional, finds. At Barton Court Farm, carbonized plant remains from later Neolithic pits containing Grooved Ware included emmer wheat *(Triticum dicoccum)*, bread wheat *(Triticum aestivocompactum)*, six-row barley *(Hordeum*

Figure 7.10 Soils of Daisy Banks Fen and surrounding catchment, derived from the Soil Survey's map for the Abingdon and Wantage area

vulgare), hazelnut and crab apple (Jones 1986), with radiocarbon determinations of 2590–2190 cal BC (95% confidence)(3910±70 BP; HAR-2388) and 2780–2450 cal BC (78% confidence)(4030±70 BP; HAR-2387).

The early and middle Bronze Age record consists primarily of the work of Lisa Moffett, Jill Thompson and Mark Robinson on the charred material and molluscs from Barrow Hills (above). For the later Bronze Age and early Iron Age, pollen from two waterholes at Eight Acre Field, Radley, dated respectively to 1680–1420 cal BC (95% confidence)(3250±60 BP; GU-3379) and 1040-790 cal BC (95% confidence)(2720±70 BP; GU-3378), revealed an open landscape characterised by low frequencies of tree pollen (3.2% and 2.7% as percentages of total land pollen (TLP)), with small quantities of *Pinus, Quercus, Ulmus* and *Alnus*. Shrub pollen occurred at slightly higher frequencies accounting for 5.7% and 8.8%, with *Corylus* c. 4.9% and 7.6%. The samples were dominated by herbaceous taxa (71.6% and 83.5%). Gramineae occurred at high frequencies (45.2% and 46.5%), with relatively high values of *Plantago lanceolata* (12.1% and 13.4%), Compositae Liguliflorae (4.7% and 8.1%), *Urtica* (1.4 and 1.2%), *Cirsium* (2.7% and 2.6%). Cereal pollen accounted for less than 1% of the earlier sample and 2.8% of the later one. The herbs comprised a mixture of taxa characteristic of arable agriculture and of pasture (Parker 1995b).

Results

Stratigraphy

The stratigraphy of the fen peat at Daisy Banks was investigated by borings and stream sections. The site was surveyed along straight line transects and probed in order to determine fen bathymetry. A series of cores was extracted from the deepest part of the fen, using a 50 mm diameter x 500 mm long Russian corer. The cores were extruded on site, wrapped in cling film and aluminium foil and placed in lengths of plastic drainpipe before being transported and transferred into cold storage.

The sequence consists largely of fibrous to humified and well decomposed peats, with marl, clay and gravel underlying these. A maximum depth of 1 m of sediment was recovered from the coring. The sediment lithology was described using the Tröels-Smith (1955) system. The sequence of sediments observed from the longest core is set out in Table 7.37.

Radiocarbon chronology

The calcareous nature of the sediments and the potential for modern root penetration made conventional radiocarbon dating inappropriate. Accelerator dating of specially selected plant macrofossils such as fruits and seeds was therefore undertaken. Throughout the sequence the sediment was sieved in order to retrieve macrofossils from emergent aquatic and terrestrial type plants which could be used for dating. These were favoured over submergent aquatic vascular plants and mosses, which may assimilate ^{14}C-deficient carbon when growing in calcareous waters, although they are often important peat formers. The five accelerator mass spectrometry (AMS) dates obtained are listed in Table 7.38.

Sediment deposition rates have been derived from a graph of radiocarbon age against depth (Fig. 7.11). Where no ^{14}C determination is available for an inferred vegetational change, an interpolated date is read from this line. Results given in this form are obviously subject to the statistical errors of measurement attendant on radiocarbon dates, together with such errors as may have occurred by interpolation and by the assumption of a constant deposition rate. The large standard deviations of the two earliest measurements (OxA-4558 and -4559) increase the uncertainty, giving rise to calibrated age ranges of nearly 300 and 400 years at 1σ and more than 500 and 600 years at 2 σ.

Between 430 and 640 mm there is a very slow accumulation rate. At 570 mm there is a marked sedimentological change, suggesting an hiatus in deposition. The inferred interpolated ages would suggest a standstill from the mid second millennium cal BC to the early second millennium cal AD.

Table 7.37. Sequence of sediments observed in the longest core from Daisy Banks Fen, described using the system of Tröels-Smith (1955)

Unit	Depth (mm)	Description
9	0–220	Very dark brown fibrous peat 10 YR 2/2; Nig 3, Strf 0, Elas 3, Sicc 3. Humo 2, Lims inf 1. Sh 1; Th^{2}3 Calc +
8	220–380	Very Humified peat 10 YR 2/2; Nig 3, Strf 0, Elas 2, Sicc 2. Humo 3, Lims inf 1. Sh 3; Th^{3}1; Calc +, Anth 25 and 32
7	380–570	Light brownish grey, marly gyttja 10 YR 6/2; Nig 1, Strf 2, Elas 2, Sicc 3. Humo 3, Lims inf 2. Th^{2}2; Lc 1; As1; Ag1; Calc +
6	570–610	Very dark brown, humified peat 10 YR 2/1; Nig 3, Strf 0, Elas 2, Sicc 3. Humo 3, Lims inf 1. Sh 2; Th^{2}2; As+; Ag+
5	610–630	Light brownish-grey, marly peat 10 YR 6/2; Nig 1, Strf 2, Elas 2, Sicc 3. Humo 3, Lims inf 2. Th^{2}2; Lc 1; As1; Ag1; Calc +
4	630–720	Very humified dark brown peat 10 YR 2/2; Nig 3, Strf 0, Elas 2, Sicc 3. Humo 3, Lims inf 1. Sh 2; Th^{2}2; As+; Ag+
3	720–740	Light brownish peat 10 YR 6/2; Nig 1, Strf 2, Elas 2, Sicc 3. Humo 3, Lims inf 2. Th^{2}2; As1; Ag1; Calc +
2	740–870	Black, very humified peat. 10 YR 1/1; Nig 4, Strf 0, Elas 2, Sicc3. Humo 3, Lims inf 1. Sh 3; Th^{3}1, Dg+
1	870–1000	Grey, clay with organic banding 10 YR 6/1; Nig 1, Strf 3, Elas 2, Sicc 3. Lims inf 1. As 2; Ag 2; Th$^+$, Ga$^{+,}$ Calc 3

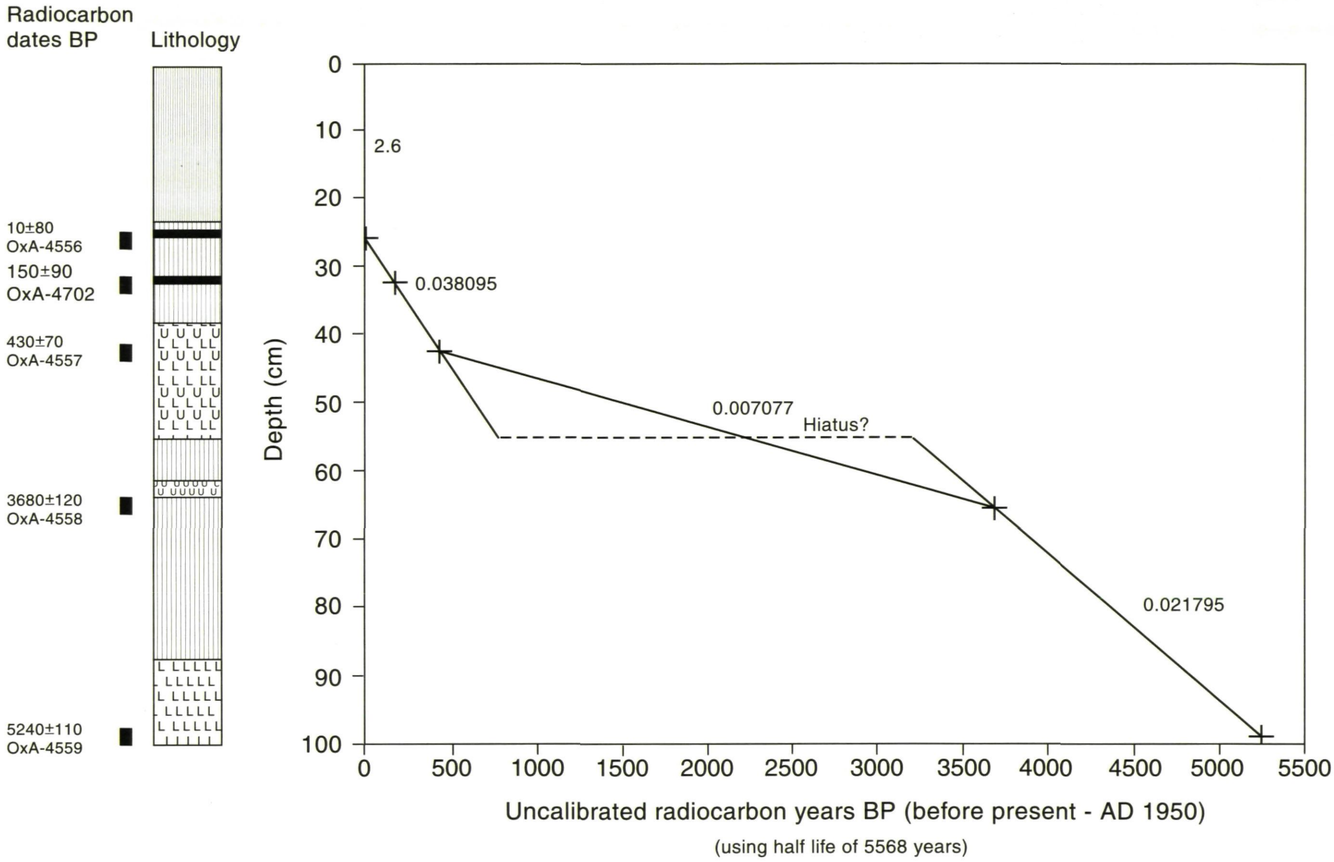


Figure 7.11 Daisy Banks Fen: time-depth curve

Pollen analysis

Subsamples were prepared using standard techniques outlined in Moore *et al.* (1991). The residues were suspended in glycerol jelly. Pollen was counted using a Leica Axioscope at a magnification of x400 with x1000 oil immersion and phase contrast being used for critical determinations. Percentage calculations are based on a pollen sum (Σ TLP including all identifiable pollen and spore types with the exception of those of obligate aquatic plants calculated at percentage of Σ TLP + Σ Aquatics). Double counting of grains was avoided by ensuring at least 1.5 fields of view were used between each traverse.

Identification of the pollen and spore types was made using an herbarium collection of reference type slides. Pollen keys were also used for identification purposes. Those used were Fægri and Iverson (1989) and Moore *et al.* (1991).

Gramineae-type grains were counted as Cereal-type if the length exceeded 44μm and the annulus width greater than 10μm (Andersen, 1979). The taxonomic nomenclature for vascular plants follows Clapham *et al.* (1987). A pollen sum of (Σ-pollen) of at least 300 identifiable grains was counted for each sample. This sum comprised pollen of trees, shrubs, non-aquatic herbaceous plants and spores.

The pollen diagram was drawn using the programs TILIA AND Tilia*GRAPH ©. The pollen diagram was divided into a series of site pollen assemblage zones based on the results obtained from the numerical

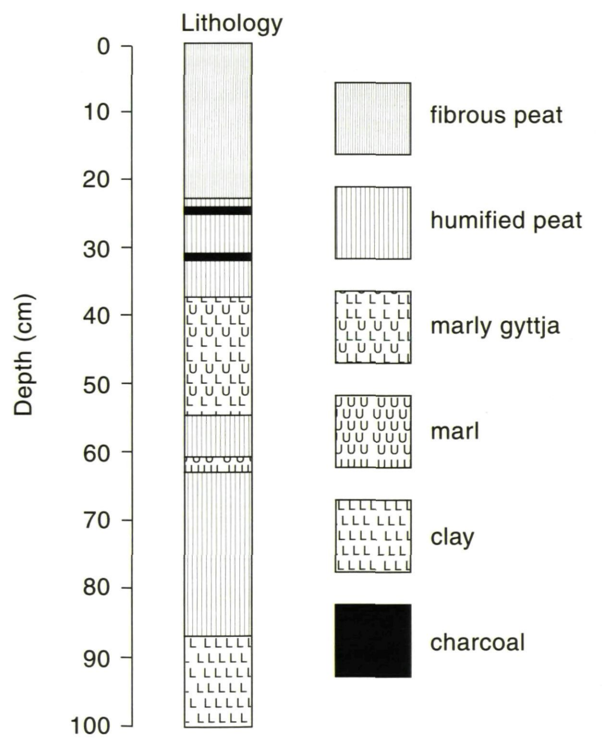


Figure 7.12 Daisy Banks Fen: key to sediment lithology conventions

Table 7.38. Radiocarbon determinations on plant macrofossils from Daisy Banks Fen

Lab. no.	Sample no.	Depth (mm)	Material	BP	$\delta^{13}C \pm 0.5$-1.0 relative to PDB	cal BC/AD up to 68% confidence	cal BC/AD up to 95% confidence
OxA-4556	DBF 5	250–270	Charred free-threshing wheat seeds	10±80	-29.9‰	-	-
OxA-4702	DBF 4	320–330	Mixed charcoal and seeds	150±90	-25.1‰	-	-
OxA-4557	DBF 3	420–430	*Menyanthes* and *Carex* seeds	430±70	-26.1‰	AD 1410–1520 (59%)	AD 1390–1650 (95%)
OxA-4558	DBF 2	640–650	*Carex* seeds	3680±120	-30.7‰	2210-1900 BC (61%)	2500–1750 BC (95%)
OxA-4559	DBF 1	980–1000	Wood and seeds	5240±110	-28.7‰	4240-3970 BC (68%)	4350–3750 BC (95%)

zonation method CONISS. The zones are numbered from the base upwards, prefixed with each site abbreviation DBF.

The methods for the determination of the physical and chemical properties of the sediments are given in Parker (1995a).

The General Sequence — Results of Palaeoecological Investigation

The bulk sediment core has been analysed using a variety of palaeoecological techniques in order to reconstruct environmental changes. The results of pollen analyses are presented as a pollen percentage diagram (Fig. 7.13). Pollen and spores occurring at a frequency of less than 1% are omitted from the diagram. The diagram has been divided into seven major local zones based on changes in the frequencies of pollen and spores using the zonation programme CONISS. These zones, which are interpreted as biostratigraphical units, are numbered in ascending order. Cores have also been analysed for physical and chemical properties and selected results of these analyses are shown in Figures 7.14–15.

Zone DBF 1 1000-890 mm *Quercus-Ulmus-Corylus*-Gramineae lpaz (late fifth millennium cal BC to mid fourth millennium cal BC.). The sediment in this zone was a dark grey silty clay. This zone has high frequencies of pollen of arboreal (26%) and shrub taxa (10%). *Ulmus* in the lower part accounts for *c.* 15%, though it declines at 950 mm to less than 1%. *Quercus*, *c.* 7%, and *Corylus*, *c.* 8% (though declining), are the only other well represented arboreal taxa. Smaller quantities of *Tilia* (*c.* 1%), *Pinus* (*c.* 2%) and *Betula* (*c.* 1%) were also encountered. Pollen of *Salix* and *Alnus* is represented sporadically at values of *c.* 1%, though a *Salix* bud was present in the macrofossil record.

The herb pollen content represents between 60% and 85% of the total sum. Gramineae is the most abundant pollen type recorded, accounting for between 35% and 70%, with Cyperaceae at 10% to 20%. Cereal-type pollen is well represented with up to 7%. Low frequencies of Chenopodiaceae, Caryophyllaceae, Compositae Liguliflorae, *Filipendula*, *Umbelliferae* (macrofossils of *Berula* cf *erecta* were also present), *Plantago lanceolata*, *Rumex acetosa* and *Bidens* type were also identified.

Spores accounted for *c.* 7% with Filicales and *Pteridium aquilinum* each accounting for *c.* 3%–4%. Aquatic pollens were initially high, though declining upwards. They were represented by *Myriophyllum* (*c.* 7% to less than 1% of the total sum plus aquatics) and *Nymphaea* (*c.* 3% to 0% of the total sum plus aquatics). *Potamogeton* was also present (*c.* 40% to 2% of the total sum plus aquatics), along with a low number of macrofossil remains.

Zone DBF 2 890-770 mm *Pinus-Alnus-Corylus*-Cyperaceae lpaz (mid fourth millennium cal BC to early third millennium cal BC). There is a distinct change in sediment lithology from the basal inorganic silty clay to a humified peat. DBF 2 is characterised by poor preservation in the lower part of the zone and by an increase in the frequencies of tree and shrub pollen. There is a large peak in *Pinus* pollen (*c.* 40%) at 880 mm, with an abrupt fall to *c.* 7% through the rest of the zone. There is a marked decrease in the frequencies of *Quercus*, *Ulmus* and *Tilia* to low or non-existent counts. *Corylus*, *Salix* and *Alnus* all increase. There is a marked decrease in the frequency of Gramineae pollen, which falls from *c.* 75% in the top of the previous zone to less than 20% throughout this zone. There is also an increase in the numbers of Cyperaceae which rise to over 40%. Cereal-type pollen steadily rises to *c.* 6% and very low frequencies of Umbelliferae, Ranunculaceae, *Plantago lanceolata*, Rosaceae, Caryophyllaceae and *Filipendula* were recorded. *Artemisia* and Compositae Liguliflorae were recorded at frequencies greater than 5%. Spore frequencies were very low, with *Pteridium* and Filicales recorded only in the bottommost sample from this zone.

Zone DBF 3 770–570 mm Gramineae-*Filipendula*-*Plantago* lpaz (early third millennium cal BC to mid second millennium cal BC). Zone DBF 3 comprises five different lithological units. The lowest unit is the same as for the preceding zone DBF 2, a black, well humified peat. At 740 to 720 mm this changes to a light brown peat. Above this, up to 630 mm, the sediment changes to a very humified peat. At 630 to 610 mm the sediment changes to a light brownish-grey marly peat. The final change, from 610–570 mm, is to a very humified dark brown peat.

Tree and shrub pollen, (5% and 6% of the total sum respectively), are represented by low frequencies of *Quercus* (oak), and very low and sporadic frequencies of *Pinus*, *Ulmus* and *Tilia* with *Corylus* and *Crataegus* type present. Gramineae are the dominant pollen type, increasing from *c.* 20% in DBF 2 to *c.* 70% at the base of DBF 3. There is then a decline to *c.* 50% at around 700 mm. Cereal-type pollen is initially high in this zone at *c.* 8% but steadily declines up the profile to the top of the zone where it accounts for less than 1%. Cyperaceae pollen declines from *c.* 30% at the top of DBF 2 to less than 10% at the base of the zone and increases slightly to *c.* 20% along with a small number of *Carex* indet. macrofossils. Amongst the herbaceous species present were relatively high frequencies of *Filipendula*, Rosaceae and *Plantago lanceolata*. Macrofossil remains included *Viola* cf *arvensis* and *Hyocyamus niger*. Pollen of Ranunculaceae, *Lotus* type, Umbelliferae, *Urtica*, *Rumex* and Cruciferae, along with Compositae Tubuliflorae are present at low frequencies, *c.* 3%, but disappear from *c.* 650 mm.

Spores from ferns / pteridophytes are very sparse in this zone. Small occurrences of aquatics were noted, with *Menyanthes*, *Alisma* pollen and *Myriophyllum* pollen and macrofossils present at 710 mm. *Nymphaea* pollen was noted at 640 mm.

Zone DBF 4 570–470 mm Gramineae-Cyperaceae lpaz (early second millennium cal AD to mid second millennium cal AD). Zone DBF 4 is characterised by a marly gyttja. Arboreal pollen (*c.* 7%) and shrub pollen (*c.* 4%) are represented by low frequencies of oak, pine, elm, alder and hazel. *Ulmus* is present in greater quantities than in DBF 2. The herb component is dominated by high frequencies of Gramineae and Cyperaceae. Gramineae, although high, decline from 40% to 20% and Cyperaceae rise from 15% in DBF 3 to 50%. Cereal pollen remains around 5% throughout the zone. Other herbaceous taxa include low frequencies of *Filipendula*, *Potentilla*, Rosaceae, *Plantago lanceolata*, *Plantago major/media*, Compositae Liguliflorae, *Achillea* type and *Rumex acetosa*. Very low and sporadic occurrences of Umbelliferae, *Urtica* and *Artemisia* were also present. There is a small increase in fern spore taxa with *Pteridium* and *Filicales* and the occasional grains of *Cystopteris*, *Equisetum* and *Polypodium*. There is an increase in the aquatic pollen content with *Typha* *c.* 5%, *Menyanthes* rising from 1% to 10% and *Nymphaea* and *Myriophyllum* rising from 0 to 6%.

Zone DBF 5 470–320 mm Gramineae-Cyperaceae-*Menyanthes*-*Typha* lpaz (mid second millennium cal AD to late second millennium cal AD). The sediment from 470 to 380 mm is the same as in the previous zone, a marly gyttja. At 380 mm this changes to a humified peat, with a band of charcoal at 320–330 mm. The arboreal and shrub pollen content is the lowest recorded, accounting for less than 5% of the total pollen sum. Only *Corylus* was recorded at a frequency greater than 2%. Shrub macrofossils included a number of *Rubus fruticosus* and *Sambucus nigra* seeds. Pollen of Cyperaceae, along with macrofossil remains of

Table 7.39. Inferred vegetation changes

Zone	Vegetation	Inferred date of change: BP	cal BC / AD	Depth (mm)
7			-	210
6	?increased scrub regeneration			
		140	-	310
5	Open conditions and open water			
		750	AD 1260	470
4	Open conditions and open water			
HIATUS				
		3300	1600 BC	570
3	Initially open conditions with reversion to scrub			
		4200	2800 BC	770
2	Clearance			
		4800	3500 BC	890
1	Reasonably large woodland component			
		5300	4200 BC	1000

Carex and Cyperaceae indet., dominates this zone, accounting for between 70% and 50%, and Gramineae between 10 and 40%. Other herbs are included at very low levels except for *Centaurea cyanus*, which was present throughout at *c.* 2% to 3%. Also noted were two single grains of *Vitis*. Macrofossil records of *Ranunculus flammula*, *Ranunculus acris*, *Potentilla*, *Ajuga reptans*, *Valeriana* and *Silene* cf *latifolia* were all noted. Aquatic pollen peak in the lower part of the zone and account for 60% of the total pollen plus aquatic pollen sum. Pollen of *Menyanthes* (up to 40%), *Typha* (up to 20%) and *Potamogeton* (*c.* 5%) was recorded. Aquatic macrofossil remains included a quantity of *Menyanthes trifoliata* seeds. At 330 mm a number of macroscopic charcoal fragments were recovered.

Zone DBF 6 320–230 mm *Corylus*-Gramineae-Cerealia-*Plantago* lpaz (*c.* 130–8 BP). The sediment comprises a humified peat similar to that in the top of the previous zone, with a distinctive charcoal band at 240 mm. There is a slight increase in the frequencies of arboreal and shrub pollen, which each rise to 5%, *Quercus* accounting for 2% and *Pinus* 2%. A few grains of *Betula*, *Ulmus* and *Alnus* were recorded. Shrubs were represented by the pollen of *Corylus* (*c.* 5%) and *Salix* (*c.* 1%). Gramineae are the dominant pollen taxon, rising from *c.* 45% to 75%, but falling to *c.* 25% towards the top. Cyperaceae are initially low, accounting for only 5% of the total sum. They increase at the top of the zone to 28%. Cereal-type and *Plantago lanceolata* pollen are well represented, reaching up to 10% and 5% respectively. Pollen of Cruciferae, Compositae Liguliflorae, *Rumex* and Rosaceae are also present. There is a small increase in spores, with *Filicales* (4%) present. The number of aquatic grains is low at the bottom, but increases up the zone, with *Typha* reaching over 20% of the total sum plus aquatics.

Zone DBF 7 230–0 mm *Quercus*-Gramineae lpaz (*c.* 8 BP-present). This part of the sediment sequence comprises fibrous peat. Arboreal and shrub taxa remain low in DBF 7, accounting for only 10% of the total pollen sum. *Quercus* is present throughout. *Corylus* declines to low levels. A small number of *Betula* and *Crataegus* plant macrofossils were also recovered. Gramineae remain the most abundant pollen type, accounting for *c.* 65% of the total sum. Cyperaceae fall to low levels (*c.* 5%) throughout this zone. Cereal-type pollen also declines to *c.* 1%. Other herbs are preserved sporadically with no taxa accounting for more than a few percent. Again spores are sparsely represented accounting for around 1% of the total sum. Aquatic pollen is relatively high with *Typha* reaching 30% in the lower levels of the zone, but declining to very low levels at the top (less than 1%).

Numerical Analyses

The significance of vegetation changes between zones 1 and 2, 2 and 3, and 5 and 6 is confirmed by the distances between samples in detrended correspondence analysis, which are summarised in Table 7.39. This analysis is described in full elsewhere (Parker 1995a), together with R- and Q-mode factor analysis of the mineral magnetic results.

Discussion

Sediment accumulation at Daisy Banks Fen began in the late fifth millennium cal BC. Zone 1 represents a phase of transition. The earliest part of the diagram represents a fairly wooded environment with open elements. Within this woodland elm, oak and hazel were present, with smaller quantities of birch, pine and lime. Along with the pteridophytes *Filicales* and *Pteridium*, this assemblage indicates that there was mixed deciduous woodland within the surrounding area. *Tilia* is often under-represented in pollen diagrams due to its poor pollen dispersal, rather than low pollen productivity. Indeed, it is a prolific pollen producer (Greig 1982; Godwin 1984). If Andersen's (1970) pollen representation factors are applied to the spectrum at 990 mm, the following approximate estimate of composition of the local woodland may be obtained: *Quercus* 11%; *Corylus avellana* 11%; *Ulmus* 38%; *Tilia* 35%; *Pinus* 4% and *Betula* 1% of the total arboreal component. *Alnus* and *Salix* were most likely restricted to the fen or to the stream 'corridor' entering it. Low levels for both suggest that the formation of the fen had been relatively recent, so that they would not have had suitable conditions for their establishment in the surrounding area, due to the lack of sufficiently damp sites.

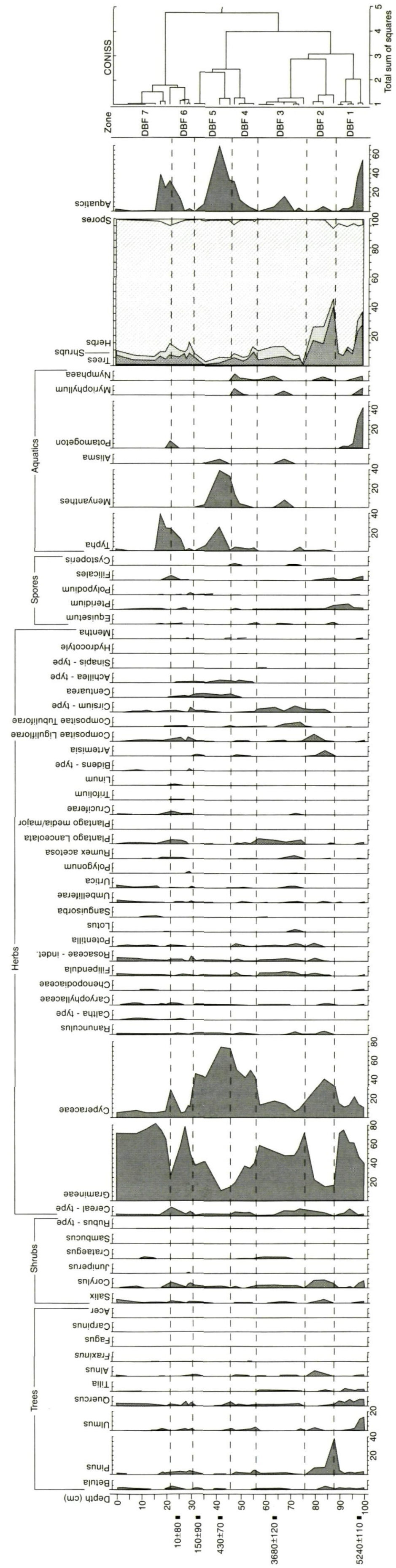


Figure 7.13a Daisy Banks Fen: pollen diagram

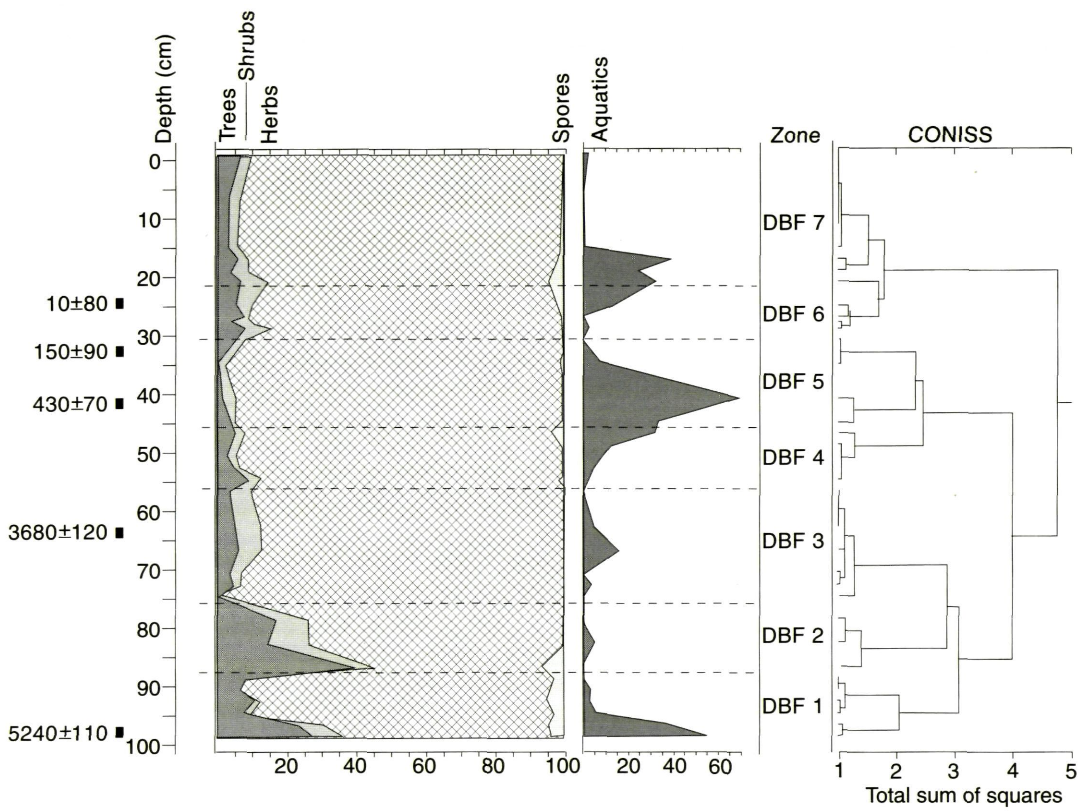


Figure 7.13b Daisy Banks Fen: pollen diagram summary

Shallow open water with floating aquatic macrophytes surrounded by reed and sedge swamp is suggested by pollen and macrofossil remains of *Potamogeton* and Cyperaceae and pollen of *Myriophyllum* and *Nymphaea*. *Nymphaea* requires water depths greater than 200 mm, while *Nuphar* can tolerate seasonal drying. A ground flora of sedges and tall-herb communities included *Filipendula*, *Rumex* and Umbelliferae (including *Berula* spp.). The presence of open water would suggest a relatively high water table at this time.

At 960 mm there is a decline in elm pollen to very low levels. The elm decline appears in many diagrams across NW Europe from *c.* 4200 to 3700 cal BC (5300 to 5000 BP). At Daisy Banks this is dated to the early fourth millennium cal BC. Other sites in the British Isles show drastic reductions in pollen influx and concentrations late fifth to early fourth millennium cal BC (Smith and Cloutman 1988). At Waun-Fignen-Felen, south Wales, Smith and Cloutman suggested that climate change may have been a mechanism for the elm decline on the basis of reduced pollen influx. Daisy Banks and two other sites in the Upper Thames basin, Sidling's Copse (Day 1991) and Spartum Fen (Parker 1995a) corroborate findings in Wales. These sites also display major changes in their stratigraphical record. Both Daisy Banks and Spartum would indicate high water tables at around this time, while at Sidling's Copse there was a change in deposition from calcareous tufa to organic mud. The Upper Thames sites also show low contemporary frequencies of charcoal, perhaps due to a wetter climate. Osborne's (1976; 1982) proposed deterioration in the climate between 4500 and 3690 cal BC (5500 and 4800 BP) on the basis of coleopteran evidence from the Midlands would support the theory as well. If there was a deterioration in climate which affected thermophile pollen concentrations an increased incidence of late frosts may have been a contributing factor. Thus, changes in the climate, alongside localised human activity and possibly disease may have all contributed to the decline of elm at Daisy Banks.

Cereal cultivation is evidenced by pollen of cereal (10%) and other herbaceous taxa occurring as the woodland component decreased. Vuorela (1970) has shown that cereal pollens are poorly dispersed beyond the immediate vicinity of crop growth. It is highly likely that the pollen was derived from the vicinity of the site and that cereal cultivation was of local origin, reflected in the grain impressions from the Abingdon causewayed enclosure.

It would seem likely that the zone 1 sediment initiation and accumulation were related to disturbance by human activity in and around the site. Increasing clearance of woodland at the time of the construction of the causewayed enclosure and perhaps the earliest episodes of monument building at Barrow Hills, would have led to reduced evapotranspiration and increased infiltration and erosion susceptibility within the catchment, leading to a rise in the water table and conditions suitable for fen formation. This was perhaps aided by the decomposition of mineral matter, including clays, which would have enhanced the water retention

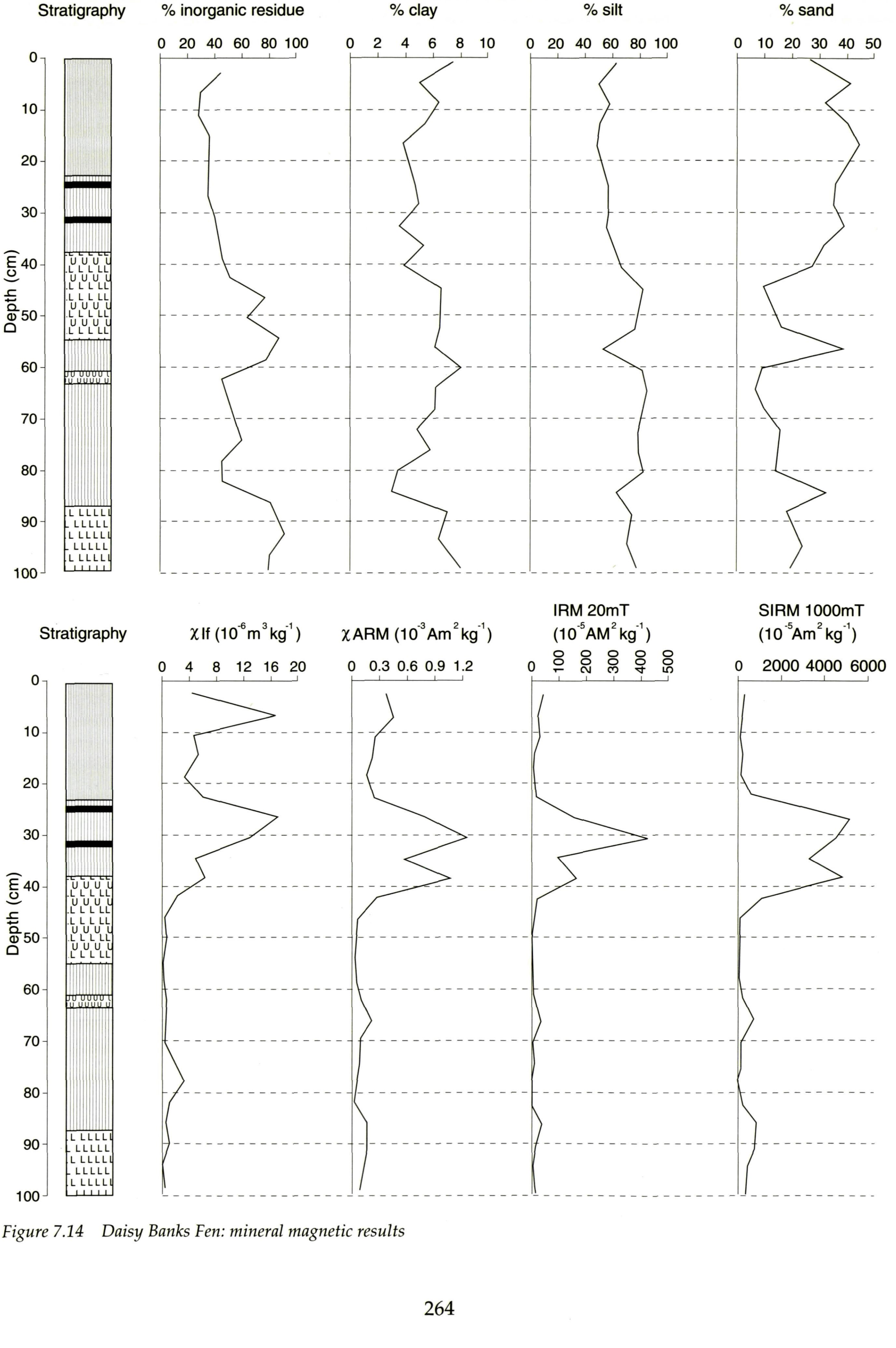


Figure 7.14 Daisy Banks Fen: mineral magnetic results

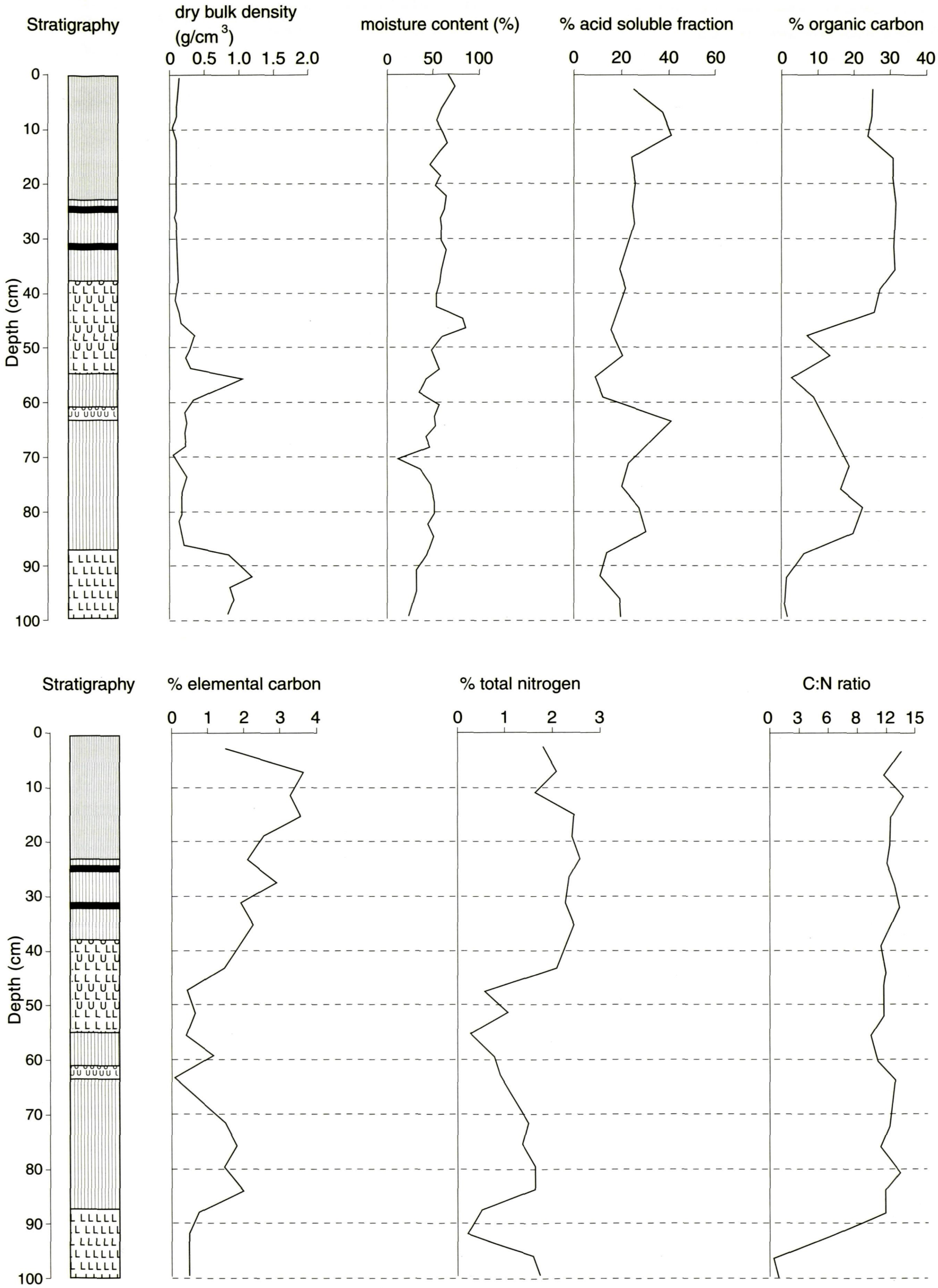


Figure 7.15 Daisy Banks Fen: selected attributes of sediments

capacity. Such mechanisms have been demonstrated as the factors responsible for the initiation of some English valley mires (Moore and Willmot 1976; Moore 1986). In this way the commencement of sediment accumulation at Daisy Banks Fen itself indicates a change in the hydrological budget.

The pollen between 900 and 800 mm was relatively sparse and showed signs of deterioration. The low pollen frequencies suggested that biological decomposition and oxidation may have been active, or that minerogenic rich sediment had been washed in from erosion in the catchment. A high representation of Compositae pollen such as occurs here is often a symptom of such conditions, this pollen presumably being structurally preserved. *Pinus* was also indicated in the spectrum at unusually high levels, although this may have resulted from long distance transportation. However, it is plausible that stands of pine may have persisted on the acidic sands on the Corallian upland. Such data must be interpreted with great caution, as it was apparent that preferential destruction of pollen grains had occurred. This will lead to a bias in the results, with over-representation of some types of pollen and under-representation of others.

A more plausible explanation is that erosion was occurring in the catchment, presumably triggered by the clearance of woodland, inwashing older reworked material. This would account for the low numbers of pollen grains encountered and for the likely preferential preservation of resistant taxa. This hypothesis is supported by several aspects of the sedimentary evidence. The particle size coarsens, with an increase in the sand fraction indicating a greater energy environment. The increase in sand content is matched by an increase in the bulk density of the sediment and enhanced magnetic minerals which are often used as a surrogate measurement for erosion. This idea is further strengthened by the increase in elemental carbon (charcoal) in the sediment, implying that burning was in progress in the immediate, if not surrounding area. This event took place between the mid fourth millennium cal BC and early third millennium cal BC, perhaps corresponding to the enlargement of the causewayed enclosure, the construction or modification of the oval barrow and the creation of the linear mortuary structure at Barrow Hills. The increase in the frequency of *Alnus, Salix* and *Corylus* was most likely due to a regeneration of these taxa in areas of wetland newly created in response to the human disturbance associated with the rise in the water table. It may in part relate to an apparent lull in monument building at Barrow Hills *c.* 3000–2600 cal BC (Ch. 9), although given the imprecise nature of the calibrated dating for the pollen core this suggestion is tentative.

Cultivation subsequently became increasingly important and there was a phase of greater impact in the lower parts of zone 3, perhaps corresponding to an upsurge of activity at Barrow Hills in the later Neolithic, including not only monument construction but the generation of settlement debris, seen in the contents of the Grooved Ware and other pits and the bulk of the flint scatter collected during fieldwalking before the excavation (*c.* 2900–2200 cal BC), as well as to contemporary settlement at Barton Court Farm. There is a marked expansion of herbaceous pollen with other 'cultural herbs' (Iversen's anthropochorous types (1949)). Indicators of disturbance are *Urtica* (nettle), *Rumex* (dock / sorrel), Cerealia (cereal) and Ranunculaceae (buttercup). These perhaps suggest that small-scale cultivation was practised alongside a larger grassland component. Evidence from the sedimentological analyses includes a decrease in organic carbon, an increase in coarse silt and sand fractions, a rise in the charcoal content and a small peak in the χlf and SIRM magnetic signals, indicating magnetic enhancement, probably due to burning. All these signals point towards intensified increased clearance with associated erosion in the catchment.

The radiocarbon determination at 650–660 mm, near the top of this zone, of 2500-1750 cal BC (95% confidence)(3680±120 BP; OxA-4558), would suggest that it continued to accumulate to the end of the early Bronze Age. Around this time there was a decline in cereal pollen, a rise in *Plantago lanceolata* and an increase in shrub pollen, including hawthorn, blackthorn, elder and brambles, suggesting the onset of scrub vegetation in the vicinity. This may be due to abandonment of the local area, and / or to greatly reduced use of the monument complex. The barrows would probably have remained as earthworks, at least until the Saxon period (Chapter 6), and scrub may have developed upon them. Despite the increased shrub pollen component, the samples were dominated by Gramineae (grasses) with lesser frequencies of Cyperaceae (sedges). Grassland appears to be the most important ecological group, both in numbers and taxa represented. Most of the pollen comes from grasses, plantain and composites. The grassland and associated herb pollen suggest short grassland, perhaps associated with some pasture. *Plantago lanceolata* is normally regarded as an excellent anthropogenic indicator (Iversen 1949; Hicks 1971; Behre 1981; 1986; 1988) and is common in meadows and pastures. It is associated with distinct land-use practices (Iversen 1949; Tröels-Smith 1956; Behre 1981; 1986; 1988) and has the ability to colonise previously cultivated land. Thus it may be diagnostic of fallow or some system of crop rotation.

An apparent climatic warming between 3200 and 1800 cal BC (4500 and 3500 BP) has been suggested for Britain. In areas of upland Britain many sites exhibit tree stump horizons, especially pine, reflecting episodes of drier climate. A lowering of the water table in zone 2 at Daisy Banks, between the mid fourth millennium cal BC and the mid second millennium cal BC is suggested by alterations in the level of decomposition and macrofossil preservation (*sensu* Martin and Holding 1978; Dickinson 1983; Moore 1986), with very few visible remains. There is little palaeoecological evidence from the Upper Thames around this time, most likely as the result of drier conditions and hence little organic preservation due to a regionally low water table. An exception to this is Gravelly Guy, Stanton Harcourt, where waterlogged wood from the fill of a gully on the floodplain was dated to the early Bronze Age by a radiocarbon determination of 2340-2020 cal BC (94% confidence)(3740±50 BP; GU-5097; Lambrick 1992a, fig. 20.7). The associated pollen indicated a semi-cleared woodland/scrubby environment dominated by oak, lime and hazel with alder. Results for samples of later date from the same sequence showed that the land-scape was cleared of woodland between the early Bronze Age and the late Bronze/early Iron Age (Scaife forthcoming).

At Daisy Banks Fen after the mid second millennium cal BC sediment accumulation ceased, and there would appear to have been an hiatus in deposition from the end of the early Bronze Age until the early medieval period. This is assumed on the basis of a very slow accumulation rate (0.071 mm yr^{-1}) if radiocarbon samples 2 and 3 are joined as shown in Figure 7.11. Around 570 mm there is a strong change in the sediment lithology from a well humified peat to a calcareous gyttja. There is also an increase in coarse particulate material and an associated increase in bulk density. This would suggest that sedimentation had stopped and that coarse material had accumulated possibly during high-order low-magnitude events during this standstill phase. A number of sites across the country also display either a slowing down or halt in sedimentation around 1600 cal BC (3300 BP), eg Spartum Fen (Parker 1995a) and Willow Garth, Yorkshire (Bush 1993).

The hiatus inferred from the lithology and pollen stratigraphy at the depth of 570 mm rules out a single linear regression through all five radiocarbon measurements. Below the unconformity a linear regression was used, giving a sedimentation rate of 0.22 mm yr^{-1}. Above the hiatus a linear regression between radiocarbon samples three, four and five gave an accumulation rate of 0.38 mm yr^{-1}.

The fen would appear to have started accumulating again at the beginning of *c.* cal AD 1050. The sediment is characterised by a fine-grained lake mud rich in aquatic macrofossils. This renewed accumulation was caused by the construction of a medieval dam across the site in order to create a fishpond for the monks of Abingdon Abbey. A fishpond is first mentioned at this site in the Domesday census of 1086 (Bond 1979).

The rise in Cyperaceae would suggest a wetter environment, most likely due to the construction of the dam. The presence of a fishpond with open water is supported by the emergence of *Hydrocharis, Typha, Menyanthes, Myriophyllum* and *Nymphaea*. Pollen preservation was relatively good throughout this part of the core. Relatively low CONISS values show that spectra in this zone are clearly related. The percentages of arboreal and shrub pollen are low. It is interesting to note that two grains of *Vitis vinifera* were found in the gyttja material at 550 and 530 mm respectively. These distinct grains indicate the presence of vineyards in the region. Indeed, documentary evidence refers to two vineyards in the possession of the Abbey during the medieval period.

Towards the top of the lake mud there is a reduction in cereal pollen associated with increasing Gramineae, perhaps reflecting a reversal to fallow, or pasture. This lake mud deposit would appear to have stopped forming around AD 1560. It is most likely that the fishpond fell into a state of disrepair shortly after the dissolution of the monasteries in 1538.

At the transition between the lake sediment and the peat there is evidence for major change in and around Daisy Banks Fen. The upper parts of zone five and zones six and seven consist mostly of fibrous peat which dates between AD 1580 and the present. A rapid sediment accumulation rate of 26 mm yr^{-1} between radiocarbon sample five (OxA-4556) and the surface is consistent with human disturbance in the catchment. Gramineae pollen increases slightly and dominates the spectra with 40%–60%, along with an increase in cereal pollen. Many pollen types occur as sporadic traces, indicating rapidly changing conditions, from a lake to a fen. This change is also shown by the increased dissimilarity shown by the high CONISS values in the upper spectra. Charcoal levels increase, reaching the highest recorded in the core, along with a strong mineral magnetic signal and a large input of coarse particulate matter. All these factors point towards large-scale change in the catchment, most likely associated with the renewal of arable farming, winter-sown crops and erosion.

In zone 5 there is a continuous curve for *Centaurea cyanus,* once a common cornfield weed but now rare (Clapham *et al.* 1987). *Centaurea cyanus* pollen is very thick-walled and tricolporate and very distinctive from other *Centaurea* species eg *Centaurea scabiosa* (Greig 1991; Webb pers. comm.). Greig (1991) has shown that from *c.* AD 1200 records become more common at sites in many parts of Britain, having been sparse prior to this. It is possible that it was previously present in the British flora, but that it did not become well established. So, although it is found at Daisy Banks in a decreasing phase of agriculture, the lack of evidence prior to the middle ages does not preclude its having been present earlier.