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Ancient Monuments Laboratory
Report 63/88

THE HUMAN BONES FROM OAKRIDGE II,
BASINGSTOKE, HAMPSHIRE.

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Summary

Bones representing a minimum of 27 individuals from a well, the remains of two individuals from a grave cut, together with one inurned cremation, were located at the middle Iron Age/ Romano-British settlement site of Oakridge II, Basingstoke, Hampshire.

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THE HUMAN BONES FROM OAKRIDGE II, BASINGSTOKE, HAMPSHIRE (EXCAVATED 1965-66)

Introduction

Oakridge II lies on the north facing slope of a chalk down, to the north of Basingstoke town centre; the site has now been destroyed by building work. The site was a settlement occupied from the middle Iron Age to the late Romano-British period. All the human remains except one inhumation and a cremation are from feature 13, a well.

The well was 87' deep, and pottery evidence suggests that it was dug in the 1st century AD. The bottom two feet contain 1st century material; 2nd century material was found at a depth of 82-84' and third century material at 78-81'. A dense concentration of 4th century material was located between 41' and 52'. A concentration of amphibian bones was found at 36'-41', suggesting that these layers may have formed the uppermost deposits in the well and slumped to their present level with the settling of the fill. Hence it seems that there may have been a pause in the in-filling of the well. The top 15' consist of a weathered cone, containing no material later than 2nd century. This probably represents material redeposited from a nearby ditch.

Human bones were discovered by workmen in a grave cut; iron nails were found boxed with these remains, suggesting the presence of a coffin. One inurned cremation, probably dating to the earlier part of the 1st century AD or the later years of the 1st century BC, was also found.

The inhumations

The material from feature 13 comprises:

Depth	Deposit
75'9"-78'9"	Commingled bones representing a minimum of 2 adults
67'-63'1"	Partially commingled bones representing a minimum of 5 adults
51'9"-58'10"	Commingled bones representing a minimum of 11 adults and 3 children
46'5"	A few postcranial remains of 1 adult
32'-33'6"	Bones of 1 adult
15'-19'	Bones of 1 adult
6'3"-14'	Bones of 2 adults
Layer 3	A few bones, probably from one adult

Unstratified	A few fragments of bone, and dental material

The material from the grave cut comprises:

Grave burial ("Burial 2")	Bones representing a minumum of two adults

The preservation of the bone from the well was generally good. The material from contexts below 75' was stained brown, presumably as a result of being buried in wet deposits, although even these bones were strong and quite well preserved. All the material was quite fragmentary, presumably due to settling of the deposits in the well, a conclusion supported by the fact that adjoining fragments of particular bones were often located several feet in depth from one another.

The bones from the grave cut were markedly less well preserved that the other material. These bones seem to mainly derive from a single individual (female, aged 40-60), however there are two bones from a second individual. These last were markedly better preserved than the other bones, suggesting different burial conditions.

Determination of sex and age

Sex: this was determined using the dimorphism of the skull and pelvis (Workshop of European Anthropologists 1980). Although sexual dimorphism has long been recognised in the bones of children, there are considerable difficulties in operationalising this observation such that reliable determinations of sex can be made from skeletal remains. No attempt was made to determine the sex of child burials.

Age: for children dental development was used to estimate age. This is little affected by environmental factors, and is thus a fairly accurate indicator of age. Use was made of the chart reproduced in Ubelaker (1978: Fig. 62).

In the commingled material it was not possible to associate skulls with particular post cranial elements. Thus in the calculation of minimum numbers of individuals it was important to assess whether post cranial remains could have derived from the same individual as a particular skull. To this end the ages of children represented by post cranial elements was estimated using long bone length, with reference to the study of Stloukhal & Hanakova (1978).

For adult individuals age was determined using dental attrition, the wearing down of the teeth by food material and/or abrasive material therein. Use was made of the chart in Brothwell (1981: Fig. 3.9). When no dental material was available a general impression of age was gained from the state of closure of the skull sutures, with reference to the work of Perizonius (1984).

Results

Age(years)	Male	Female	Unsexable
Neonate	0	0	1
4	0	0	1
10-11	0	0	1
17-25	1	1	0
22-25	1	0	0
About 25	0	1	0
25-35	2	1	2
18-40	2	0	0
35-45	2	1	0
30-50	0	1	3
40-60	1	1	0
50+	0	1	0
Adult	1	1	3
TOTAL	10	8	11

Mean age at death of adults (i.e. those thought to be aged over 17)

Comparisons

Site	Date	Male	Female	Total	Reference
Oakridge II	Romano-British (rural)	32.5	37.3	34.6	-
Ulwell	Romano-British/ Anglo-Saxon (rural cemetery)	32.8	29.9	34.2	Mays 1983
Cirencester	Romano-British (town cemetery)	40.8	37.8	39.9	Wells 1982

At Oakridge II there is no significant difference in the numbers of male and female burials, and the mean ages at death for adults are similar to those calculated from other Romano-British sites. Infants and children are certainly under-represented in the Oakridge II sample - infant mortality in non-industrialised societies is generally high (Hassan 1981:106). As bone preservation was generally good it would seem that taphonomic factors alone cannot explain this. Another possibility is that small infant bones may not have been recovered in excavation; however the recovery of small animal bones appears good, so this explanation is unlikely. Thus it would seem that infants and children were generally not selected for burial at Oakridge II.

Stature

Adult stature was calculated from long bone measurements using the formulae of Trotter & Gleser for white races (reproduced in Brothwell 1981: Table 5). Since the formulae are different from males and females the sex of the individual must be known for stature to be calculated. This is problematic when the bones are commingled, as sex determination is generally not possible from an isolated long bone. Thus, for all adults stature ranges only are given, the assumption being that the largest bones are male, the smallest female. Figures are centimetres.

Results

Individuals identifiable to sex

Males			Females		
Mean	Range	N	Mean	Range	N
171	160-181	4	165	159-171	2

All adults

Range: 153-181

Non-metric variation

Non-metric traits take the form of minor variations in skeletal form such as presence or absence of bony spurs or foramina. Thirty cranial and nineteen post-cranial traits were scored on a presence/absence basis. The cranial traits are from those defined by Berry & Berry (1967) and the post-cranial traits are from those defined by Finnegan (1978). In pre-adolescent individuals the presence of many traits is age-correlated, hence most writers omit these individuals in population studies, a strategy pursued in the present work. For at least some of these variants there is evidence that they are to some extent inherited, although the aetiology of many remains obscure. The trait frequencies are presented below as number of occurrences over number of cases for which observations could be made. Traits with the scope for bilateral expression are scored separately for left and right sides.

Results

Cranial traits

Trait	Frequency	
Metopic suture	3/15	
Ossicle at lambda	3/12	
Lambdoid ossicle	6/10	
Sagittal ossicle	0/5	
Ossicle at bregma	0/7	
Coronal ossicle	0/6	
Epipteric bone	L 0/3	R 0/6
Squamo-parietal ossicle	L 0/7	R 0/4
Parietal notch bone	L 0/5	R 0/6
Ossicle at asterion	L 1/7	R 1/7
Palatine torus	0/9	
Auditory torus	L 0/9	R 0/12
Foramen of Hushke	L 0/9	R 0/13
Maxillary torus	0/3	
Extra-sutural mastoid foramen	L 5/11	R 3/13
Mastoid foramen absent	L 1/11	R 2/12
Double condylar facet on occipital	L 0/4	R 0/5
Parietal foramen	L 4/10	R 2/9
Accessory infra-orbital foramen	L 0/1	R 1/1
Zygomatic-facial foramen	L 7/7	R 6/7
Anterior condylar canal double	L 4/8	R 1/9
Pre-condylar tubercle	1/7	
Foramen ovale incomplete	L 0/3	R 0/3
Accessory lesser palatine foramen	L 2/3	R 2/2
Supra-orbital foramen complete	L 5/12	R 4/13
Maxillary M3 absent	L 1/9	R 1/9
Mandibular M3 absent	L 1/12	R 0/12
Fronto-temporal articulation	L 0/4	R 0/4

Post-cranial traits

Trait	Frequency	
Fossa of Allen	L 3/9	R 4/11
Poirer's facet	L 1/5	R 2/8
Plaque	L 1/10	R 2/9
Exostosis in trochantric fossa	L 5/15	R 6/11
Supra-condyloid process	L 0/14	R 0/15
Septal aperture	L 1/14	R 1/13
Acetabular crease	L 2/8	R 1/5
Accessory sacral facets on ilium	L -	R 1/1
Supra-scapular foramen	L 0/3	R 0/6
Vastus notch	L 3/8	R 3/10
Vastus fossa	L 0/8	R 0/10
Emarginate patella	L 1/9	R 0/10
Anterior calcaneal facet double	L 3/10	R 3/10
Anterior calcaneal facet absent	L 0/10	R 2/10
Atlas facet double	L 2/10	R 2/12
Posterior atlas bridging	L 0/7	R 0/10
Lateral atlas bridging	L 0/8	R 0/9

It is interesting to note that metopic suture, for which there is substantial evidence for an inherited component in its causation (Torgersen 1951), is present only in the material from the 51'9"-58'10" level, where it occurs in 3 of the 9 adult skulls. This raises the possibility of a familial relationship between these individuals. However with such a small sample size it is possible that the finding is fortuitous.

An anomaly which is properly considered as an aspect of non-metric variation is present in the individual from the 23'4" level (male aged 35-45). The atlas vertebra has a small bony bridge linking the right transverse process to the neural arch. In addition the right transverse process of the vertebra projects superiorly and bears a small joint surface which articulates with a facet medial to the the right mastoid process of the temporal bone.

The highly fragmentary nature of the material precluded any skull measurements.

Pathologies

Dental

At Oakridge II no child showed dental pathology; the frequencies given are for adults only.

(a) Caries

Dental caries was scored on a presence-absence basis for each tooth. The results are shown below as number of individuals with caries over the total number for whom dental material was present, and also as the number of carious teeth over the total number of teeth present. The mean age of those individuals for whom dental material is present is also noted; age must be taken into account when making comparisons as older individuals tend to have a higher caries frequency since their teeth have been longer exposed to the agents of decay.

Dental caries is a multifactorial disease, but many studies have shown a strong correlation between the disease and the proportion of carbohydrate in the diet.

Results

Males

Individuals	Total teeth	Mean Age
2/7	3/82	33.5

Females

Individuals	Total teeth	Mean age
4/6	13/64	36.8

Total adults

Individuals	Total teeth
6/15	19/197

Comparisons

	Caries frequency		
	Individuals	Teeth	Mean age (adults)
Oakridge II	40.0%	9.6%	34.6
Cirencester	41.6%	5.1%	39.9

(b) Tooth loss.

Ante-mortem tooth loss was scored on a presence-absence basis for each tooth position. Dental caries and gum disease are major causes of tooth loss during life.

Results

Males

Individuals	Tooth positions
3/6	14/155

Females

Individuals	Tooth positions
3/6	4/113

Total adults

Individuals	Tooth positions
7/14	27/371

(c) Dental calculus.

This takes the form of a concretion on the teeth which consists mainly of calcium salts, and, in life, food particles in which flourish numerous bacteria. It is associated with poor oral hygiene. Calculus deposits were classified as slight, medium or considerable after Brothwell (1981: Fig. 6.14A).

Results

None	Slight	Medium	Considerable
4	7	3	0

(d) Other pathologies of the jaws and teeth.

Two individuals (female aged 35-45 from the 15'-19' level and male aged 35-45 from the 8'7"-14' context) showed a single dental abcess in the mandible at the tip of a tooth root. One individual (female aged 40-60 from the grave cut) showed an irregular (approximately 10mmx10mm) exostosis of unknown origin of the medial side of the right mandibular condyle. The joint surface was not affected.

Degenerative joint disease

Degenerative joint disease is generally divided into two categories: that affecting the vertebral bodies is termed osteophytosis and that affecting the other joints is termed osteoarthritis (Collins 1949). Both conditions are related to mechanical stress of the joints, the most usual cause being repeated minor traumata as might result from day to day use of the joints. Repeated minor traumata lead to degeneration of the intervertebral disc or joint cartilage and subsequent bony lipping at the joints involved. As it is related to general "wear and tear" of the joints the incidence of degenerative joint disease varies with age, body weight and with the amount and degree of physical labour undertaken in life. This last has led to the use of degenerative joint disease to study distribution of labour in past populations. Osteophytosis may well be symptomless, but when symptoms do occur they consist of pain and stiffness of the joint which is worse after rest but decreases when the joint is "warmed up" by activity. In cases of osteoarthritis in which macroscopic bony changes are present symptoms, of a similar sort to the above, are generally present. In modern populations slight osteophytosis may occur as early as the fifth decade of life and osteoarthritis in the fourth decade; this last seems to be present to some degree in about 50% of people aged over 50.

Degenerative joint disease was distinguished from other arthropathies using criteria described by Steinbock (1976), Ortner & Putschar (1985) and Rodgers et al (1987). Osteophytosis was scored (for the cervical, thoracic and lumbar vertebrae) as slight, medium or considerable after the scheme of Brothwell (1981: Fig. 6.9, Pl. 6.9). The lesions of osteoarthritis were scored as slight, medium or considerable using criteria derived from Brothwell (1981: Fig. 6.9).

Results

(a) Osteophytosis

	Total	Slight	Medium	Considerable
Cervical	71	12	6	0
Thoracic	124	36	2	0
Lumbar	57	13	4	1*

*= sequential to a crush fracture of a neighbouring vertebra (see below).

(b) Osteoarthritis

The distribution of osteoarthritis in the appendicular skeleton is as follows:

Slight: proximal left clavical, right glenoid cavity, right proximal ulna, 2 left distal radii, 2 first metacarpals, carpal, third hand phalanx. 2 left acetabula, right acetabulum, 3 left femoral heads, 4 right femoral heads, right talus (posterior calcaneal facet), left calcaneus, 2 tarsals, left fifth metatarsal, right first foot phalanx (proximal surface).

Medium: left first metacarpal (distal surface).

Considerable: Lateral left clavical and distal right first metacarpal (also right proximal humerus and right scapula - sequential to unreduced dislocation of the shoulder - see below).

Cribra orbitalia

This takes the form of small pits or perforations in the orbital roofs. The type of lesions were scored into the categories of Brothwell (1981: Fig. 6.17). Of the 16 skulls for which one or more orbits were preserved one showed lesions of the cribriotic type (male aged 25-35) and two showed lesions of the porotic type (male aged 25-35 and an unsexable adult aged 30-50).

Cribra orbitalia seems to be associated with iron deficiency anaemia (Hengen 1971). In addition to a deficient dietary intake of iron, anaemias can be hereditary or caused by gut parasites. In the unhygienic conditions prevailing in the past these last were particularly common.

Other pathologies

51'9"-58'10" level

(1) The proximal one third of a right humerus and about one quarter of a right scapula from an adult of unknown sex. The anterior surface of the scapula adjacent to the glenoid cavity bears an oval shaped area (approximately 55x50mm) of sclerotic bone which is eburnated over most of its surface. There is some granulation tissue in the glenoid cavity. There is considerable flattening of the humeral head (which is damaged post-mortem) with sclerosis and eburnation.

These changes are typical of an unreduced anterior dislocation of the shoulder. The shoulder is the most commonly dislocated major joint in the body (Ortner & Putschar 1985:86); the glenoid cavity of the scapula is but a shallow depression upon which the humeral head rests but gets little support against dislocation. Anterior dislocation is the most common as the coracoid process and the acromion tend to prevent posterior dislocation. Continued use of the limb resulted in the formation of a secondary joint surface on the anterior surface of the scapula and the destruction of the cartilage on the proximal joint surface of the humerus, with consequent arthritic changes to the bone, notably eburnation from the bone on bone friction.

Although dislocations of the shoulder are not uncommon, they are generally quite readily reduced. Since only chronic dislocations will be apparent on the bones, shoulder dislocations are seldom evident in skeletal series.

(2) Approximately two-thirds of the midshaft of a left tibia of an adult of unknown sex. This bone shows a healed fracture of the midshaft area. The fracture line appears to run obliquely and it is strongly healed, although there is slight shortening of the bone due to the broken ends overriding one another.

(3) Right tibia with damaged proximal end from adult of unknown sex. The anterior border shows a raised nodule (approximately 10mm diameter with a flattened surface) about halfway down the shaft. The bone surrounding this lesion is pitted with a longitudinally striated appearance. This area is mainly restricted to the medial part of the anterior surface.

It seems probable that this lesion represents periostitis, the deposition of new bone by the periosteum (the membrane around the outer surface of the bone). A number of specific diseases give rise to periostitis (Mensforth et al 1978), and it may also be a reaction to overlying skin lesions or local trauma. Distinguishing the likely cause of the lesions in this case is rendered more difficult by the impossibility of distinguishing which bones form the rest of the skeleton of this individual - were other bones in the skeleton also to show periostitis then this would argue for the role of systemic disease in the aetiology of the lesions. None of the other bones in the 51'9"-58'10" level show periostitis. Although it is possible that the rest of the bones of this individual are not in this deposit, this would seem to argue that the condition was restricted to this particular bone, suggesting the primacy of local rather than systemic factors in the aetiology of the lesions. Another factor supporting this interpretation is that the lesion is focused around the nodule on the anterior surface - this would appear to betray the site of a skin infection or penetrating injury. The anterior border of the tibia is close to the skin surface and hence vulnerable to trauma and recurrent injury which might lead to chronic low grade infection or ulceration. It is difficult to decide whether the bony lesions are sequential to a single penetrating wound or to infection resulting from chronic low grade trauma. The small size of the nodular focus of the lesion is suggestive of the former.

(4) Three vertebrae (probably C7-T2) from an adult of unknown sex are fused together. The bones are heavily damaged post mortem, lacking neural arches. The lower of the three T2 shows moderate osteophytosis on the inferior surface of the centrum, as does the superior surface of the centrum of the upper of the three (C7). Small indentations are visible on the centra corresponding to the former disc

spaces. Where post mortem damage renders the internal structure of the bone visible trabecular continuity may be observed between the vertebrae.

It is possible that this is a case of congenital fusion of vertebrae (Schmorl & Junghanns 1971:69-72).

Another possible diagnosis is a sero-negative spondylo-arthropathy. This term describes a group of arthropathies with a number of factors in common including absence of a rheumatoid factor and a tendency to spinal involvement (Rodgers et al 1987:188). Ankylosing spondylitis (AS) is one of this group. In AS the initial lesions are usually in the sacro-illiac joints and the lumbar spine, and the disease generally ascends the vertebral column (Putschar & Ortner 1985:411); thus in cases involving the cervical and upper thoracic vertebrae one might also expect other vertebrae to be affected. The fact that no other vertebra from this level showed lesions characteristic of AS (or any other sero-negative spondylo-arthropathy) argues against AS as a diagnosis here.

Rheumatoid arthritis may involve the cervical and upper thoracic spine, however in rheumatoid arthritis the vertebral bodies might be expected to show osteoporosis (Putschar & Ortner 1985:403f), and, in any case, diagnosis of rheumatoid arthritis is very difficult in the absence of the rest of the skeleton, particularly the extremeties (Rodgers et al 1987:192).

Whatever the diagnosis, the trabecular continuity and the osteophytosis observed in C7 and T2 suggest that it was a long standing condition.

32'-33'6" level

A lumbar vertebra of a male aged 35-45 (probably nearer 35) shows a healed compression fracture. The vertebral body is wedged anteriorly and the superior surface is sclerotic and irregular and bears large osteophytes on the left side of the anterior border. The neighbouring vertebra bears osteophytes on the inferior border. On the inferior surface of the fractured vertebra there is an elliptical cavity; this probably represents a Schmorl's node (due to rupture of the intervertebral disc with herniation of the gelatinous part of the disc into the neighbouring vertebral body) sequential to the trauma episode which resulted in the fracture.

15'-19' level

A lumbar vertebra of a female aged 35-45 shows an irregular cavity in the left side of the inferior surface of the centrum. The affected vertebra is heavily damaged post-mortem with only the centrum present and this is damaged at the margins. The trabeculae surrounding the lytic area are slightly sclerotic and there is some periosteal reactive bone on the anterior wall of the vertebral body. Another lumbar vertebra (possibly the superior neighbour to the above) bears a large osteophyte on the left part of the inferior surface of the centrum and otherwise appears normal except for osteophytosis. A third lumbar vertebra was present and appeared normal. The rest of the skeleton

The cremation

Material

Colour: mainly white and red/brown, some black fragments.

Quantity:	Weight (g)	Approx. no. of fragments
Skull	119.6	130
Post cranial skeleton	432.5	1000
Total	552.1	1130

Mean fragment size: 2cm.

Sex: unknown.

Age: about 25-40.

Pathology: a thoracic vertebra bears small exostoses on the margins of the centrum, probably osteophytosis.

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