AML Report 3617

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REPORT ON THE BONE FROM GISBOROUGH PRIORY, CLEVELAND

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February 1982

The Human Bone

A large sample of bone was submitted for examination. It was found that approximately half of the material came from animals and this therefore was reported separately. (See below - report by A Locker). The remainder of the bone was clearly human and evidently represented the remains of several individuals. On the basis of the number of left femora it was suggested that there was a minimum number of four individuals present. There were insufficient data to conclude that four was the precise number but visual examination of the bones suggested that this was probably the case.

The following bones were included in the sample:

Axial Skeleton

Skull:
i) Complete skull with mandible : Skull 1.
ii) Partial skull (face missing) with mandible: Skull 2.
iii) Occipital fragment.

Clavicle: One pair from an adult individual

Ribs:
i) One pair of first ribs from an adult individual.
ii) Seven rib fragments.

Vertebrae:
i) ? 9th-10th thoracic vertebrae.
ii) 12th thoracic vertebra - 2nd lumbar vertebra inclusive.
iii) 5th lumbar vertebra

It was suggested that all of the vertebrae came from one adult spine.

Pelvis:
i) Complete right innominate bone.
ii) Four fragments from adult individuals

Appendicular Skeleton: Arms

Humerus: One complete bone - left arm.

Radius: One partial bone - left arm.

Ulna: i) One complete bone - left arm.

ii) One partial bone - right arm.

iii) One shaft fragment.

Hands: One second left metacarpal bone.

All of the above listed arm bones came from adult individuals. It was suggested that the humerus and the complete ulna came from the same arm.

Appendicular Skeleton: Legs

Femur: i) One complete bone - left leg.

ii) One partial bone - left leg.

iii) One femoral head - left leg.

iv) One sub-adult distal femoral epiphysis - left leg.

v) One partial bone - right leg.

vi) One femoral head - right leg.

vii) One distal extremity - right leg.

viii) Two shaft fragments.

Tibia: Two shaft fragments.

Feet: One talus - right foot.

With the exception of the femur (iv) all of the bones came from adult skeletons. It was suggested that the femora (i) and (v), and (ii) and (vi) were pairs from two individuals. Further it was proposed that the complete right innominate bone belonged with the former pair ((i) and (v)). Finally the two tibial shaft fragments most probably could be regarded as coming from one individual.

In the above list of bones present it should be emphasised that any pairings between bones were based upon morphological examination only and cannot be regarded as conclusive. There were insufficient data available for any further skeleton reconstruction.

Details of age, sex and stature could be taken for some of the bones involved; these and the results obtained are listed in Table 1.

Age was assessed on the degree of wear on the occlusal surfaces of the teeth (Brothwell 1972), metarmorphosis of the pubic symphysis (Todd 1920, Brooks 1955), epiphyseal union and bone. The method used obviously was dictated by the bone involved but it should be noted here that the metarmorphosis of the pubic symphysis is subject to fewer variables than dental wear, therefore results based upon that bone are generally more reliable. The more accurate system for assessing the pubis of McKern and Stewart (1957) could not be used since the individual involved was clearly over 30 years of age. With the exception of the sub-adult femur ageing based on epiphyseal union was confined to a general assessment aimed at distinguishing between juvenile, sub adult and adult individuals.

Attribution of sex was based on morphological and metric observations of the individual bones. For the skulls cranial and mandibular discriminant functions were calculated after Giles (1964) and Giles and Elliott (1963). On the pelvis the ischio - pubic index was used (Washburn 1948). Femora were assessed on the maximum diameter of the femoral head (Stewart 1979) and a discriminant function analysis (Giles 1970). The humerus head diameter was taken from El-Najjar and McWilliams (1978). The talus sex estimate was obtained from a discriminant function (Steele 1976). Accuracy in sexing by the above methods ranges from approximately 85-95%, with the ischio - pubic index and the femoral discriminant function yielding the

Table 1. Results for Age, Sex and Stature for Gisborough Priory

Bone	Age		Sex		Stature
	Years	Method	M/F	Method	
Skull 1	40-50	Dental wear	M	Cranial and mandibular discriminant function	-
Skull 2	25-35	Dental wear	M	Mandibular discriminant function	-
Pelvis (i)	42-51	Pubic symphysis	M	Pelvic morphology and ischio-pubic index	-
Humerus	Adult	Epiphyseal union	M	Humerus head diameter	1.69m. ± 4.05 c.5' 7"
Ulna (i)	Adult	Epiphyseal union	??M	Bone size	1.67m. ± 4.32 c.5' 6"
Femur (i)	Adult	Epiphyseal union	M	Femoral discriminant function and head diameter	1.68m. ± 3.27 c.5' 6"
Femur (ii)	Adult	Epiphyseal union	M	Femoral head diameter	-
Femur (iii)	Adult	Epiphyseal union	M	Femoral head diameter	-
Femur (iv)	15-20	Epiphyseal union		-	-
Femur (v)	Adult	Epiphyseal union	M	Femoral head diameter	1.73m. ± 8.79 c.5' 8"
Femur (vi)	Adult	Epiphyseal union	M	Femoral head diameter	-
Talus	Adult	Bone size	M	Talar discriminant function	-

best results. Unfortunately data for the humeral and femoral head diameters were not available and it must be noted that estimates based upon a single measurement should be considered less reliable than those in which several are used (as in a discriminant function, for example). However results placed all the bones sexed as male and there was nothing observed in bone morphology or size to suggest otherwise.

Stature was estimated from the maximum lengths of the long bones (Trotter 1970). This was not possible for femur (v) and in this instance maximum length, thence stature, was obtained by Steele's method (1970). It can be seen from Table 1 that there was some disparity between the result for this bone and its supposed pair (femur (i)) but it is suggested that the method used for femur (v) is less accurate (note the larger standard deviation) and this would account for the difference.

Observations were recorded, where possible, for cranial (including dental) and post - cranial metrics and morphology. On such a small sample of material it cannot be considered justifiable to attempt a detailed analysis of the results but it may be noted that nothing unusual was found.

There was no evidence for any pathology on this material, whether trauma, injury or disease. Dental disease was similarly absent with the exception of heavy antemortem tooth loss on skull (ii) (mandible available only). Data were not available to discern whether disease had been causative in this, it was merely possible to state that the loss had occurred, that it was probably associated with the individual's age and that a number of factors (eg disease, hygiene, diet) had probably been contributory.

Conclusion

A mixed sample of human bone from Gisborough Priory was examined. A minimum number of four individuals were found to be present and subjective

observation suggested that probably there were not more than four. It was possible to use details of bone morphology for tentative reconstruction (pairing) of some of the bones. Further in the light of the metric age and sex results, it may be suggested that the following bones may all have come from one individual: Skull (i), pelvis (i), humerus, ulna (i), femur (i) and femur (v). Any other reconstruction was not feasible and it must be emphasised that the above results are not final. If however the assumption is made that they are acceptable then the results may be listed:-

1) Adult individual, age 40-50 years, male, height c1.68m ± 3.27 (the femur is used for stature here as the most accurate bone).
2) Adult individual, age 25-35 years, male, no further details
3) Adult individual, male, no further details.
4) Sub-adult individual, age 15-20 years, no further details.

The question was raised regarding the date of this material and if there were any evidence for artificial interference (human or otherwise, ante or post mortem). In the first instance the bone morphology and metrics were such as to fit equally well into the range of a mediaeval or modern population. However since the material came from the area of a Mediaeval monastery it is suggested, on the osteological evidence, that the most likely explanation is that the individuals concerned date to the period of that foundation. The only direct evidence for disturbance of the bone came from femora (ii) and (vi). Both of these bones were marked on the anterior shafts and it is suggested that these represent spade marks (or those of a similar implement) caused by post-burial disturbance of the graves (this could have happened either in historic or modern times).

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The Animal Bone

The following animal bones were identified;

Fallow deer (Dama dama). 1 proximal and midshaft end of an eroded metatarsal.

Sheep (Ovis sp.)
1 distal end of a left humerus.
1 left tibia shaft, broken across the shaft.
1 fragment of a metatarsal shaft.
1 fragment of a femur shaft.
1 skull fragment, basioccipital and parietal region, chopped axially through the skull and across the horn cores.

Pig (Sus sp.)
1 proximal end of a right scapula.
?1 fragment of radius shaft.

Horse (Equus sp.)
1 proximal and midshaft end of a metatarsal.
1 proximal end of a left scapula.
1 midshaft and distal end of a metatarsal
1 left astragalus, broken.
1 proximal end of a left scapula, broken.

Ox (*Bos* sp.)	1 right metacarpal, distally unfused, and broken. Proximally eroded.
	1 right metatarsal, slightly eroded proximally, distally unfused.
	1 midshaft (modern break) and distally broken left humerus.
	1 distal epiphysis of a left radius.
	1 proximal and midshaft of a left femur, chopped midshaft, proximal trochanter broken.
	2 upper molars.
	2 fragments of acetabulum.
	1 proximal and midshaft end of a right tibia, the medial side of the proximal articulation is broken.
	3 rib fragments.
	1 proximal end of a left radius, chopped across the shaft and eroded across the proximal articulation.
	1 proximal fragment of scapula, eroded and broken.
	1 split fragment of proximal articulation and midshaft of a radius.
	1 fragment of a distal articulation of a femur.
	5 long bone fragments.
	1 scapula blade broken.
	1 caudal vertebral body.
	1 thoracic vertebral body
Ox-sized fragments	1 tibia shaft, eroded.
	1 distal fragment of humerus.
	2 long bone shaft fragments.
	1 skull fragment
	1 proximal rib fragment

MEASUREMENTS (After Jones et al 1981).

Sheep humerus	5	6	7	10	
	27.0	17.5	28.7	29.5	
Pig scapula	2	3	4	5	6
	28.5	16.0	43.0	30.0	32.5
Horse metatarsal	2	3			
	59.0	44.0			
humerus	5	6	7	10	
	72.0	46.0	74.0	49.5	
scapula	2	3	4	6	
	64.5	29.8	90.0	58.2	
Ox radius epiphysis	6	9			
	109.2	99.5			
Ox femur	9	tibia 4			
	43.5	109.5			

The relatively large size of the pig scapula and some of the ox bones suggests that at least some of the bones may be fairly recent. The pig scapula compares with a modern specimen, a male wild boar, aged two and half years, live weight 146 kg and measuring 96 cms at the shoulder. The distal epiphysis of the radius is approximately four millemetres bigger (regarding its length and breadth) than that of modern Charolais/Fresian whose lean weight was 1173 kg. Sisson and Grossman quote the distal epiphysis of the radius as fusing at $3\frac{1}{2}$ to 4 years. The general size of these ox bones not withstanding their immaturity is far too large for the Medieval period. Though it is not inconceivable that the horse, fallow deer and sheep bones might not be earlier material that has become admixed, since they could not be excluded as not being from the monastic period on size grounds alone, in fact the eroded nature of the fallow deer metatarsal might support this.

References

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