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Report on the Human Bone from Baldock, Herts.

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A large sample of human bone, comprising both inhumations and cremations, was submitted for examination. The inhumation group included a number of infant burials which therefore were considered separately.

The Inhumations

Of the material examined only two samples were found to contain the remains of more than one individual: TZ/KM,LC and JD/KA,KF. Sample size was therefore estimated at 14 on the assumption that each find represented the remains, however fragmentary, of not more than one individual. This was clearly a small number and one which was further restricted by the amount of bone present. Thus it was possible to divide the sample into two groups:-

Group 1: Those for which a reasonable amount of the skeleton was present.

Group 2: Those represented by one bone or one area of the skeleton only.

Group 1: TL/BH,BJ
TZ/KM,LC:1
JA:1
JA:2
JC/L1,LJ,KL,KM

Group 2: TK/CB
TZ/KM,LC:2
TY/DZ
JA/FR
JA/LY
JB/AZ,AV
JC/JF
JD/KA,KF (both)

For full details by individual burial see Appendix 1.

It was found that bone preservation varied directly with the amount of bone present: thus on the more complete skeletons it was fairly good but on the single finds it was very poor.

All of the remains were assessed for details of age, sex, stature and health (pathology). A record was also made of metric and morphological variables but in view of the small sample size analysis could not be considered justifiable. (This also applied to any comparison of the material from different areas of the site). The results for metrics are listed in Appendix 2.

Age, Sex and Stature

Full results for age, sex and stature are given in Table 1 below.

Table 1. Results for Age, Sex and Stature

No.	Age	Sex	Stature
Group 1			
TL/BH,BJ	30-35 years	Male	1.68m ±.0827 c.5'6"
TZ/KM,LC:1	20-25 years	Male	1.77m ±.0337 c.5'10"
JA:1	44-54 years	Female	1.54m ±.0424 c.5'1"
JA:2	52-59 years	Female	1.62m ±.0424 c.5'4"
JC/LI,LJ,KL,KM	35-40 years	Female	1.58m ±.0424 c.5'0"
Group 2			
TZ/CB	Adult	-	-
TZ/KM,LC:2	20-25 years	Male	-
TY/DZ	Adult (25+)	?Female	-
JA/FR	Adult	?Male	-
JA/LY	50-55 years	-	-
JB/AZ,AV	Adult	?Male	-
JC/JF	20-25 years	?Male	-
JD/KA,KF:1	Adult	-	-
JD/KA,KF:2	Juvenile	-	-

Age was generally assessed using whichever bones were available, it was not feasible to select for accuracy of method. In the event this was found to involve mainly the teeth and pelvis. Dental wear was taken from Brothwell (1972) and Miles (1963). Metamorphosis of the pubic symphysis was calculated using Gilbert and McKern's method (1973). More general estimates of age were taken from skeletal growth and maturation as represented by epiphyseal union and endocranial suture closure.

Attribution of sex was based on skeletal morphology of the pelvis and skull and on metric analysis of the skull.

Discriminant function analysis of the mandible was taken from Giles (1964) and of the cranium from Giles and Elliott (1963).

Estimates of stature were calculated using regression equations for maximum lengths of the long bones (Trotter 1970).

With such a small sample it was felt that discussion of the results could not be justified. However it was noted that there were no unusual findings for age, sex or stature.

Evidence for Health

The investigation of health from skeletal remains is limited both by the absence of the soft tissue and by the restricted number of illnesses which affect the skeleton. Thus, for example, there is an absence of direct evidence for epidemic diseases such as plague and smallpox. Nevertheless where the skeletal remains are relatively complete information which may give an indication of an individual's degree of health, or lack of it, may be obtained. To this end both the teeth and the bony skeleton are assessed.

The Dental Evidence

All teeth and jaws were observed for details of tooth wear, dental caries, abscesses, antemortem tooth loss, periodontal disease, calculus deposits and enamel hypoplasia.

This data may yield evidence for diet, hygiene and dental disease. Six individuals only were sufficiently well preserved for observations of the dentition to be made. This was an extremely small sample therefore it must be emphasized that any conclusions drawn from this data concern those individuals only and in no way can they be applied to a hypothetical Romano-British population from Baldock.

Tooth Wear: As expected observations for wear on the occlusal surfaces of the teeth showed that severity increased with age. However it was interesting to note that the degree of wear present at particular ages conformed to the pattern characteristically found at this period, that is to say, greater than that usually seen in modern populations, less than that of the Anglo-Saxon period and approximately the same as that seen in the Mediaeval period.

Caries: Carious infection of the dentition was present in three individuals from Baldock. However in view of the small numbers of teeth present (76 out of a possible total of 192 - or 40%) caries cannot be taken to have been definitely absent elsewhere. Table 2 below provides a summary of results obtained for the caries rate for a number of Romano-British samples. (The caries rate is an expression of the percentage of teeth carious against the total teeth present). From this it can be seen that Baldock is within the range to be expected for the period, although of course it must be stressed that the sample was very small. The

carious lesions that were present were most commonly located at the cemento-enamel junction on the interstitial surfaces.

Table 2. Overall Caries Rate - Romano-British Period

Site	No. of Skulls	No. of Teeth	No. of Teeth Carious	% Carious
Trentholme Drive, York	299	4963	226	4.55
Poundbury Camp, Dorset	517	-	-	15.8
Romano-British (unspecified)	412	-	-	9.3
Romano-British (unspecified)	-	870	99	11.38
Magiovinium 17, Bucks.	13	150	11	7.33
Baldock, Herts.	6	76	5	6.58

Data for the above sites taken from (in descending order): Cooke and Rowbotham (1968); Whittaker et al (1981); Moore and Corbett (1973); Brothwell and Blake (1966); Henderson (1981) and Henderson (present report).

Abscesses: Two individuals had ascesses present. On one (TZ/KM,LC) apical abscesses at the roots of the left maxillary first and second molars could probably be associated with a carious infection on those teeth. On the other (JC/LI,LJ,KL,KM) this was not the case and the two apical abscesses on the maxillary second molars must have been the result of some other local infection.

Antemortem Tooth Loss: This showed an overall rate of 17.36% (the number of teeth lost antemortem expressed as a percentage of the number of sockets present) which was similar to the 23.93% reported by Brothwell and Blake (1966). However it should be noted that the Baldock figures also reflected an increasing tooth loss with age hence greatest incidence on JA:1 and JA:2 (the age

estimate on both these individuals was taken from the pubic symphysis).

Periodontal Disease: Like antemortem tooth loss this showed an increase in severity with age of the subject. Further even with the younger adults it was present to a moderate degree (with approximately half of the root surfaces exposed).

Calculus Deposits: Calculus deposits were present on three of the four individuals for whom data were available, showing a moderate level of severity. Location was generally at the cemento-enamel junction and covered all tooth surfaces. The fourth dentition had no deposits present but it must be stressed that calculus may be lost very easily postmortem therefore its absence in excavated material cannot be taken as conclusive evidence for the antemortem situation.

Enamel Hypoplasia: Only two individuals could be assessed for lines, pits or grooves indicative of enamel hypoplasia. Lines were present on TZ/KM,LC but not on JA:2. However this observation could be attributed to the small number of teeth actually present for JA:2.

The Bony Evidence

Observations for skeletal pathology could be made on seven individuals only: TL/BH,BJ; TK/CB; TZ/KM,LC; JA:1; JB/AZ,AV and JC/LI. For the most part there was very little

evidence for pathology owing to the poor condition of the material.

Infections: There was evidence for localised infections on the following individuals: TL/BH,BJ; TK/CB and TZ/KM,LC.

TL/BH,BJ: The lateral border of the shaft of this individual showed some subperiosteal deposition of new bone in the proximal third. This was apparently confined to the right fibula and therefore it was suggested that this represented an example of a localised infection most probably as the result of an injury or trauma.

TK/CB: The bones from this individual were in extremely poor condition however some subperiosteal new bone deposits were observed on one of the long bone fragments. In the absence of most of the skeleton it was impossible to determine whether this occurrence was localised or not but it was felt that most probably it represented a similar case to TL/BH, BJ.

TZ/KM,LC: Both tibiae showed evidence for some alterations along the anterior border in the mid-distal third of the shaft. This was much more marked on the left than on the right where the changes were suggestive of subperiosteal new bone deposition which to some extent had been remodelled into the cortex. Radiographic examination of both bones showed that there had been some loss of cortical bone and also a generalised decrease in density. It was not possible to define the cause of these changes but from the data available (including the other bones) the most likely causes were either a localised trauma, stress, infection

or some kind of nutritional deficiency (there was some slight evidence for porotic hyperostosis of the cranium which would support this latter suggestion).

The right foot of this individual showed some osteophytic development along the medial border of the first distal phalanx. This was entirely localised and it was suggested that it was the product either of a local trauma and subsequent infection or of a mild hallux valgus (lateral deviation of the great toe).

Trauma: **JA:1:** There were fractures present in the shafts of the left tibia and fibula (see Plates 1 and 2). In the tibia the fracture was situated in the distal third of the shaft. In the fibula there were fractures in both the proximal and distal thirds of the shaft. The proximal fracture of the fibula showed displacement of the superior fragment in a postero-lateral direction. Both distal fractures were displaced posteriorly, it was also possible that there had been some rotation of the distal fragments but postmortem damage to the bone prevented further analysis of this. Both fractures of the fibula indicated that the length of the bone had been shortened. It was not clear whether this was true of the tibia. The distal fractures of the tibia and fibula had subperiosteal depositions of bone and on the tibia in particular this extended approximately half way up the shaft.

It was not possible on the evidence available to come to a firm decision as regards the course of this trauma.

Nevertheless it could be suggested that the area involved (in the fracture) was the leg - ie. the shafts of the tibia and fibula, not the ankle or knee joints, and that the bone changes observed might well have been indicative of repeated injury. The evidence for repetition was taken from the location of the injuries: a fracture in the proximal third of the fibula is very often the result of a spiral fracture which at the same time breaks the distal shaft of the tibia, the causative force of which is most commonly rotational (Adams 1978). However a rotational strain would not give rise to the posterior displacement observed, therefore it was suggested that a transverse fracture through the distal thirds of the tibia and fibula might well have been involved. The fracture itself might not have directly caused the displacement but delayed union of the fracture together with attempted use of such an unhealed limb might well have led to such a complication. That union was delayed is strongly implied by the degree of subperiosteal depositioning of bone on the distal shafts of the tibia and fibula which was most probably the result of an open wound and consequent infection. Although the tibia was broken distally it was suggested that this was a postmortem artefact. Radiographs of the tibia and fibula showed the presence of callus on both sides of the fracture and in particular in the case of the fibula there was continuity of bone trabeculae across the break (the tibia was too damaged to be certain of this). Both the presence of callus and the bone trabeculae fulfil the accepted criteria for union (Adams 1978) and it was suggested that these injuries had healed, at least in

part, during life. The degree of mal-union observed almost certainly gave rise to some deformity. The shortening of the fibula most probably was insignificant in these terms but the posterior displacement of the distal fragments of tibia and fibula would have caused severe disability in that region and presumably would have led to great difficulty in walking. The absence of the bones of the foot precluded any further comment on this. Finally it should be noted that there was no evidence to suggest that this injury had been the cause of death although it could not be ruled out as a possibility. It should also be emphasized that the course of the injury offered here is speculative and that the only firm details are those that are actually descriptive of the trauma.

Degenerative Joint Disease: With the data available there was very little evidence for the degree and incidence of degenerative joint disease (osteoarthritis and osteophytosis). However it was observed to be present on a few individuals: On both JA:1 and JA:2 there was osteoarthritis present at the sacro-iliac joint and on the spine (both osteophytosis and osteoarthritis). JA:2 also showed a mild degree of osteoarthritic lipping at the hip joint. On JB/AZ,AV there was severe osteoarthritic lipping on the margins of the left femoral head and on the feet. On JC/LI there was moderately severe osteoarthritis involving (in decreasing order of severity) the hip, wrist, neck, temperomandibular, shoulder and elbow joints. Since the lower extremities of this individual were missing it was not possible to assess them for degenerative joint disease.

In none of these individuals was it possible to discern an increased severity in one area over another (owing to the absence of data) but it could be suggested that in both JA:1 and JA:2 the ages of the subjects (44-54 and 52-59 years) were probably involved in the incidence of the disease and this was probably also true of JB/AZ,AV (this individual could only be aged as an adult). JC/LI was somewhat younger (35-40 years) and although at this age in an individual from this period it is common to find osteoarthritis present on the skeleton it is suggested that other factors may well have been contributory to the severity observed. Unfortunately since the precise aetiology of such degenerative joint disease is unknown it was not possible to say anything further about this.

Discussion

On the data available it was not possible to reach any conclusions concerning health that might be applied to a general Baldock sample but there were certain points that might be made about these few individuals.

Evidence for diet could be obtained from the dentitions. The level of wear on the occlusal surfaces of the teeth suggested that although the diet would have been somewhat coarser than that found at present it was not unusual for that period. This was also supported by the caries incidence where

the findings were similar to those of Moore and Corbett (1971,1973,1975, 1976) who remarked a close correlation between an increasing number of carious teeth (and particularly lesions of the contact surfaces) and a more highly refined diet from the late Mediaeval period onwards. Some possible bony evidence for dietary deficiency came from TZ/KM,LC but this was very inconclusive.

An assessment of hygiene could be made on indirect evidence only. In the dentition this involved periodontal disease and calculus deposits and in the bones evidence for infection. Research on teeth has shown that there is a close correlation between poor dental hygiene and the incidence of periodontal disease (Sheiham 1970). Further Alexander (1970) has demonstrated a relationship between calculus deposits and inflammation of the gingiva (which in bone is then reflected in the appearance of periodontal disease and alveolar recession). It could therefore be suggested that the moderately high severity of both periodontal disease and calculus deposits observed in the individuals from Baldock reflected a low standard of dental hygiene. Evidence for hygiene in the bone was very limited owing to poor preservation of the material but in general it may be stated that the presence of any degree of subperiosteal bone attributable to a local infection suggests that there has been a failure to prevent a lesion from becoming infected.However it must be remembered that this applies to any population prior to the advent of antibiotics and cannot be taken to imply that personal hygiene and cleanliness was necessarily of low priority.

The principal evidence for dental disease in this sample came from the carious lesions and abscesses which were found to be present. The incidence of caries was similar to that observed elsewhere for the Romano-British period (see Table 2). Further the location of most of the caries at the cemento-enamel junction on the interstitial surfaces of the teeth was in keeping with the findings of Moore and Corbett (1973). One of the abscesses recorded could be associated with a carious lesion on the adjacent tooth but on the other individual there were no such caries present. However an incipient carious lesion which would not have been susceptible to visual examination might have been present and cannot therefore be ruled out. In the absence of caries it can only be suggested that the abscesses were caused by some other local infection.

There were no examples of any disease involving bone in this sample. There was only one instance of trauma, JA:1, where there were fractures of the left tibia and fibula (see above). In view of the small sample size it cannot be assumed that this evidence is indicative either of absence of disease or of trauma in the sample. Although the presence of degenerative joint disease was recorded it was not feasible on the data available to make any comments concerning its incidence.

The Infants

Preliminary examination of the infant bones showed that there was a minimum number of 36 individuals present. This included a few samples where more than one individual was found. (TA:1, TL/CV,EW,BD,DD,BW, JB/CZ,HO,BO). Most of the bone was found to be in poor condition such that only a limited amount of information could be obtained from the material. Observations were made for details of age, stature and health. Attribution of sex was not attempted owing to the poor condition of the material and the high degree of unreliability of the methods for sexing infant remains.

Age - Method

Age was assessed on the development of the deciduous dentition (Moorrees, Fanning and Hunt 1963), the development of the tympanic ring (Anderson 1960, Warwick and Williams (eds.) 1973) and infant diaphyseal long bone length and stature (Olivier and Pineau 1958, 1960, Ubelaker 1978, Stewart 1979). For consistency the bones of the lower extremity were used in preference to those of the upper, in the order: femur, tibia, fibula. Where both bones of a pair were present the maximum diaphyseal lengths were averaged. The individual results are listed below in Table 3. It should be noted that "birth" (or "term") is here defined as occurring at 10 lunar months (40 weeks).

Table 3: Results for Estimation of Infant Age and Stature

No.	Age	Stature (cm.)
TA/EH, CN, CM	9-9.25 lunar months	46.58 ±1.82
TA/EI, ET	6 months - 1 year	71.27 ±1.8
TL/CV	Birth ±	-
TL/EW	Birth - 6 months	51.20 ±1.82
TL/BD	9.25-9.5 lunar months	47.30 ±1.82
TL/DD	Birth ±	-
TL/BW	Birth ±	-
TW/CX, BG	9.5-9.75 lunar months	48.39 ±1.92
TW/BH	Birth - 3 months	52.27 ±1.59
TW/AZ	Birth ±	-
TD/CG	9.25-9.5 lunar months	47.28 ±1.92
TG/ET	Birth ±	-
TG/DR	Birth ±	-
TG/HI	9.25-9.5 lunar months	47.50 ±1.92
TG/GE	9.5-9.75 lunar months	48.24 ±1.92
TG/CZ	Birth - 3 months	53.32 ±1.59
TT/CT	9.5-9.75 lunar months	48.12 ±1.82
TT/CV	Birth ±	-
TV/GE, KD	9.25-9.5 lunar months	47.62 ±1.82
TV/AH	1 - 3 years	-
TV/CT	Birth - 6 months	-
TZ/DM	Birth ±	-
JB/BM, GS	8.75-9.0 lunar months	45.10 ±1.82
JB/CZ	Birth ±	-
JB/BO	8.75-9.0 lunar months	45.10 ±1.82
JC/CF	Birth ±	-
JD/JS	9.5-9.75 lunar months	48.75 ±1.82
JD/FT	c.2 months	-
JD/FK	9.25-9.5 lunar months	47.80 ±1.8
JD/FJ	c.2 months	45.79 ±1.82
JD/EW	9.25-9.5 lunar months	47.62 ±1.82
JD/CG	6.25-6.5 lunar months	33.40 ±1.82
JD/CO	c.2 months	53.26 ±1.8
JD/EV	9.0-9.25 lunar months	46.96 ±1.82
JE/IP, HU	Birth - 3 months	52.24 ±1.8
JE/BW, DT	Birth - 6 months	55.42 ±1.82

Age - Results

Nearly all of the infant remains (33) could be grouped into a class which might be generally described as one of perinatal mortality. Two of the individuals were not strictly speaking "infants" since they could be aged at greater than six

months. These were TA/EI,ET (6 months - 1 year) and TV/AH (1 - 3 years). Only one individual could be positively described as foetal: JD/CG was aged at 6.25-6.5 lunar months on stature; even allowing for some margin of error in the use of this method for ageing it is clear that these remains could not be considered to be near term.

Age - Discussion

Clearly the sample from Baldock included a large number of victims of perinatal mortality. However examination of the methods used showed that the precision obtained was not such that it was possible to conclude to what extent death occurred before, at or after birth. This was, for the most part, the result of using the parameter of stature (body size) to estimate age. Teeth provide the most reliable method for estimating age but were only present in a very few individuals . This was also true of the tympanic ring which anyway only yields a general indication of age.

Olivier and Pineau (1958, 1960) used a modern sample to establish their equations for assessing stature; to apply these equations to an archaeological sample is to use them on an unknown group (unknown in the sense that there are no written records) for whom there is no information regarding birth size of the normal population (normal individuals are those who, in this instance, reach adulthood). Thus it is conceivable that at this period factors of maternal health and nutrition ensured that all

individuals were relatively smaller at birth than, for example, those in the sample used by Olivier and Pineau. Further it was noted that there was some apparent disparity between estimates made on the bones of the lower extremity and those for which the upper was used. The results for those individuals for whom bones of upper and lower extremities were available for measurement are listed below in Table 4.

Table 4: Estimates of Stature from Upper and Lower Extremities

No.	Femur	Tibia	Humerus	Ulna	Difference (Lower - Upper)
TL/EW	51.20	-	-	57.51	6.31
TT/CT	48.12	-	52.48	-	4.36
TV/GE,KD	47.62	48.39	51.76	52.62	Min. 3.37
					Max. 5.00
JB/CS,BM	45.10	-	51.29	-	6.19
JD/JS	48.75	-	53.27	-	4.52
JD/FJ	45.79	-	48.12	47.34	Min. 1.55
					Max. 2.33
JD/EV	46.96	-	52.24	-	5.28

Range of Difference: 1.55-6.31cm.

Average Difference: 4.32cm.

Obviously this was an extremely small sample from which no final conclusions could be drawn but its importance lay in the fact that the pattern was consistent (of upper extremity giving higher estimates than lower) and that the difference might affect ageing. Thus, for example, on TT/CT use of the femur suggests an infant younger than term, whereas use of the humerus indicates post-term. If the assumption is made that this discrepancy applies to the whole sample then it immediately becomes clear

that stature alone cannot be used to make a precise estimate of infant age, and that in the absence of other evidence (eg.teeth) it is only justifiable to describe these individuals in terms of perinatal mortality. It was interesting to note that these findings for stature were contrary to those of Olivier and Pineau (1960) who claimed that there was no significant difference between an estimate made on one bone from one made on another.

Stature

As mentioned above stature was estimated using maximum diaphyseal bone length and the regression equations of Olivier and Pineau (1960). The calculation of such stature estimates was primarily for ageing purposes and the results and applications of this parameter are given in detail above.

Health

There were no examples of the presence of any abnormality in this sample and only one of a pathology. However it must be emphasized that the condition of most of the material was not such that pathology could be assumed to have been absent.

There was evidence for a bone infection in JE/BW,DT. This individual was moderately well preserved and most of the major long bones were present either whole or in part (humeri, ulnae, radii, femora, tibiae, fibulae). On all these bones subperiosteal new bone was observed, particularly on the humeri,

femora and tibiae - which were in the best condition. The new bone had been deposited along the borders of the shafts and there was no particular bone or area that had been affected more than any of the others. Radiographic examination showed this subperiosteal bone clearly but did not illustrate any focus of infection.

In view of the fact that the skeleton was incomplete and only in fair condition it was not possible to identify the cause or causes of this infection. It was only feasible to describe it as an osteo-periostitis which had led to the formation of much new bone but which had apparently been widely disseminated through the skeleton. The cause of this could have been either traumatic, infectious or nutritional. It was not possible to determine whether this had been the cause of death or not.

The Cremations

Twenty-three samples of cremated human bone were examined from the Baldock site. The material was assessed for demographic data (age, sex and stature), health (pathology) and for any details with regard to the mode of burial. Information was not available for analysis of the dentitions or of population morphology and metrics.

Bone preservation was generally poor and as a result the sample sizes were small. There was no evidence for the presence of more than one individual in any of the samples but that possibility could not be excluded. Bone weights for each sample are given in Table 5 below. The range of sample size was from 5.0g to 1094.0g. The average, dry, fat-free skeleton weighs approximately 2-4kg and the average weight of a cremated skeleton is 1.6kg (Krogman 1962 and Evans 1963). Therefore for the most part the sample sizes from Baldock were well below the average and any conclusions or analysis of the material were necessarily limited by this factor.

Table 5. Results for Weights, Age and Sex of the Cremations

No.	Weight(g)	Age(years)	Sex
TE/AF	10.5	-	-
TN/BU, DK, BF, BX, CD	628.0	Juvenile: 6-18	-
TW/DG, DD	681.0	Young Adult: c.18-30	-
TF/DR	779.0	Adult	-
TF/EU	872.0	Adult	-
TS/AM	1094.0	Adult	-
TS/CA	527.0	Adult	?Male
TS/BH	311.0	Adult	-
TS/CN	145.0	Adult	-

Table 5 cont.

No.	Weight(g)	Age(years)	Sex
TS/CP	589.0	Adult	-
TB/BC	96.0	-	-
TK/CM	323.0	-	-
TH/BG	593.0	-	-
TH/BK	112.0	Adult	-
TH/BO	222.0	Adult	-
TH/BP	307.0	Adult	-
TH/BT	6.0	-	-
TH/CB	5.0	-	-
TH/CH	399.0	Adult	-
TH/CL	687.0	-	-
TH/CW	39.0	Adult	-
TH/AC	10.0	-	-
TH/BJ	128.0	Adult	-

Note: All weights are given rounded to the nearest whole number.

Demography

Full results for age and sex are given in Table 5 above. On those samples for which data were available age was generally assessed on the degree of dental development and epiphyseal union. Data for sex were available on one sample only where the vertical diameter of the femoral head was used for the estimate. It was not possible to measure stature on any of the samples.

Clearly therefore there was very little demographic data available for the cremated human remains other than for age and there it was only feasible to limit results to assessments as adult or juvenile. Of those samples for which age was estimated only one juvenile was found to be present, the rest being adult (sample size: 15). With such limited results comparison between

the different parts of the site obviously was not possible.

Health

Evidence for bone pathology was found on two samples only. On TF/DR there was some osteoarthritic lipping of the facets on fragments of two vertebral bodies. on TS/CA there was some slight subperiosteal deposition of bone on a long bone shaft. In neither case was there enough evidence to justify further analysis.

Mode of Burial

All of the material examined had been cremated and no examples of inhumed human bone were found. All of the samples were observed for proportions of identified bone, weight, maximum length of the fragments and colour to see if any differences were to be seen across the site. As expected the proportions of bone identified varied directly with sample size. Thus on the very small samples long bone shafts only were present but on others it was also possible to identify skull, tooth, vertebral, scapular and pelvic fragments. Examination of the material by area of the site showed no major differences; further on those numbers where a sufficient quantity of bone was present it was possible to recognise all, or nearly all, of the major parts of the skeleton. Therefore it might be suggested that it was not a practice at Baldock to exclude certain parts of the skeleton in the burial

after cremation.

The total bone weights for each cremation sample are given in Table 5. As already stated these weights were all below the average for cremated remains. On the data available it was impossible to say whether this was as a result of cremation practice or post-burial preservation. However it could be tentatively suggested that the weights alone supported the hypothesis that none of the samples represented the remains of more than one individual (but note that this can only be accepted as conclusive evidence of more than one individual if the bone weight is significantly greater than the average for one skeleton).

The maximum length of the bone was measured for each sample. On cremation bone does not burn therefore in order to include the remains in a cremation urn it would have been necessary for there to have been some post-cremation fragmentation of the skeleton. The general size of the cremation fragments from Baldock suggested that there had probably been some post-cremation breakage of the bone and this was found throughout the site.

The colour of the bone may give some indication of the degree of burning at cremation. Thus the presence of black material may be the result of a low level of burning or post-burial contact with charcoal or humus. Blue-grey bone represents the last stage before bone turns white and suggests that there is

some organic matter remaining in the bone. Most of the Baldock samples were white although some of those from areas TB,TK and TH contained fragments of blue-grey.

Summary

A large sample of human skeletal remains from Baldock comprising both inhumations and cremations was examined. It was found that there were 50 inhumed and 23 cremated individuals present. The inhumations included 14 adults and 36 infants. The bone was in poor condition so that few details could be recorded but it was feasible to assess most of the material for age at death and pathology and for the adult inhumations sex, stature, morphology and metrics as well. There were no very unusual findings but it was remarked that there was a noticeable absence of juveniles: thus there were a number of infants and adults but nothing inbetween.

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Appendix 1. Details of the Inhumation Burials - Amount Present

No.	Amount or Bone(s) Present
Group 1	
TL/BH,BJ	Approximately half of the skeleton, mainly legs and arms. Poor condition.
TZ/KM,LC:1	Nearly complete skeleton. Good condition.
JA:1	Nearly complete skeleton. Fair condition.
JA:2	Nearly complete skeleton. Fair condition but not as good as JA:1.
JC/LI,LJ,KL,KM	Upper half of the skeleton. Fair condition.
Group 2	
TK/CB	1 leg (femur,tibia,fibula). Poor condition.
TZ/KM,LC:2	Femora, hands. Good condition.
TY/DZ	Cranial fragment. Good condition.
JA/FR	Left innominate fragment. Good condition.
JA/LY	Mandible. Fair condition.
JB/AZ,AV	Legs and feet only. Poor condition.
JC/JF	Skull fragment. Poor condition.
JD/KA,KF:1	Tibia, vertebrae,phalanx (hand). Good condition.
JD/KA,KF:2	Proximal tibia. Fair condition.

Appendix 2. Inhumations: Metric and Morphologic Results

1. CRANIAL METRICS

Measurement	JA:1	JA:2	JC/LI,LJ,KL,KM
Maximum Length (L)	181.0	175.0	174.0
Maximum Breadth (B)	136.0	134.0	-
Basion-Bregmatic Height (H')	127.0	132.0	-
Basion-Nasion (LB)	100.0	97.0	-
Basion-Alveolare (GL)	91.8	-	-
Min.Frontal Breadth (B')	94.0	99.0	88.0
Frontal Arc (S1)	125.0	126.0	-
Parietal Arc (S2)	124.0	128.0	-
Occipital Arc (S3)	108.0	109.0	-
Transverse Arc (BQ')	291.0	304.0	-
Frontal Chord (S1')	104.0	110.5	-
Parietal Chord (S2')	111.6	114.4	-
Occipital Chord (S3')	87.8	90.0	-
Biasterionic Breadth (BiB)	106.7	108.5	-
Foraminal Length (FL)	35.0	35.9	-
Foraminal Breadth (FB)	30.7	28.7	-
Cranial Index (B/L)	75.14	76.57	-
Height-Length Index (H'/L)	70.17	75.43	-
Height-Breadth Index (H'/B)	93.38	98.51	-
Cranial Module (L+B+H/3)	359.33	353.0	-
Gnathic Index (LB/GL)	91.8	-	-

2.MANDIBLE METRICS

Measurement	TZ/KM,LC	JA:1	JA/LY	JC/LI
Symphyseal Height (H1)	40.0	-	33.2	29.5
Condyle-Symphyseal Length(ML)	-	100.0	-	86.5
Bigonial Diameter (GoGo)	108.2	91.8	110.0	98.6
Bicondylar Width (W1)	-	-	-	118.4
Ramus Height (CrH)	-	50.0	-	46.7
Min.Ramus Breadth (RB')	31.7	31.0	-	27.0
Foramen Mentalia Breadth(ZZ)	44.2	45.7	45.8	39.8
Body Height at M1/2	29.0	23.0	25.6	20.7
Body Thickness at M2	19.0	15.0	18.2	18.5

3. POST-CRANIAL METRICS

	TL/BH,BJ		TZ/KH,LC:1		TZ/KH,LC:2		JA:1		JA:2		JC/LI		JD/KA,KF	
HUMERUS	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.
Maximum Length (HuL1)	-	-	360	342	-	-	299	293	-	293	273	273	-	-
Max.Head Diameter (HHD)	-	-	46.6	45.4	-	-	43.4	42.5	43.0	43.0	38.0	37.7	-	-
Mid-shaft Max.Diameter (HuD1)	-	-	24.0	23.9	-	-	23.0	22.7	-	22.0	18.5	19.5	-	-
Mid-shaft Min.Diameter (HuD2)	-	-	19.0	19.3	-	-	16.8	16.0	-	16.3	13.2	13.6	-	-
Epicondylar Width (HuE1)	66.2	-	66.3	68.6	-	-	61.6	59.6	58.7	56.5	-	51.6	-	-
RADIUS														
Maximum Length (RaL1)	-	-	261	260	-	-	211	-	-	226	208	-	-	-
Max.Head Diameter	-	-	-	-	-	-	-	-	22.5	22.5	-	-	-	-
ULNA														
Maximum Length (UlL1)	-	-	284	282	-	-	233	225	244	247	221	-	-	-
CLAVICLE														
Maximum Length (ClL1)	-	-	161	160	-	-	133	132	-	143	125	-	-	-
FEMUR														
Maximum Length (FeL1)	448	-	473	472	-	492	-	-	-	-	-	-	-	-
Oblique Length (FeL2)	444	-	468	467	-	489	-	-	-	-	-	-	-	-
Vert.Head Diameter (FHD)	-	-	47.0	46.3	47.6	46.8	-	-	45.6	-	-	-	-	-
Sub-troch.A-P.Diameter	-	-	28.6	28.0	31.4	29.0	25.7	-	24.6	25.4	-	-	-	-
Sub-troch.M-L.Diameter	-	-	36.6	33.5	39.0	36.2	34.5	-	33.8	30.0	-	-	-	-
Mid-shaft.A-P.Diameter	-	-	30.7	30.4	-	29.3	-	-	-	-	-	-	-	-
Mid-shaft.M-L.Diameter	-	-	27.2	27.5	-	30.0	-	-	-	-	-	-		
TIBIA														
Maximum Length (TiL1)	-	-	-	389	-	-	-	-	-	-	-	-	369	-
Oblique Length (TiL2)	-	-	-	388	-	-	-	-	-	-	-	-	369	-
Nut.For.A-P.Diameter	-	-	35.0	35.5	32.0	33.0	29.3	30.5	-	-	-	-	32.7	-
Nut.For.M-L.Diameter	-	-	26.2	25.6	23.0	24.0	24.3	24.2	-	-	-	-	23.3	-
Bicondylar Breadth	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FIBULA														
Maximum Length (FiL1)	-	-	364	-	-	-	323	330	-	-	-	-	-	-

Appendix 2 cont. Post-cranial Metrics

INDICES	TL/BH,BW		TZ/KH,LC:1		TZ/KH,LC:2		JA:1		JA:2		JC/LI		JD/KA,KF	
	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.
Brachial Index	-	-	72.5	76.0	-	-	70.6	-	-	77.8	76.2	-	-	-
Platymeric Index	-	-	78.1	83.6	80.5	80.1	74.5	-	72.8	84.7	-	-	-	-
Pilastric Index	-	-	112.9	110.6	-	97.7	-	-	-	-	-	-	-	-
Shaft Robusticity Index	-	-	17.8	17.9	-	18.0	-	-	-	-	-	-	-	-
Femoral Head Index	-	-	10.0	9.9	-	9.6	-	-	-	-	-	-	-	-
Platycnemic Index	-	-	74.9	72.1	71.9	72.8	82.9	79.3	71.3	-	-	-	-	-