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ROBERT G. F. BRUKNER

**USING MORTUARY EVIDENCE TO DESCRIBE
AND INTERPRET SOCIAL STRUCTURES AND CHANGE:
AN INVESTIGATION AT THE ROMAN PROVINCIAL
CAPITAL EBORACUM IN YORK, ENGLAND**

1 The History and Archaeology of York

York is a city of great historical value, with an extensive medieval core and significant Roman, Anglo-Saxon, Viking and Norman period remains. It has vied for dominance with other cities at several times in the history of the Britain and has occasional been the political and religious centre of a number of regional and island wide societies in its 2,000 year history. Ancient writings, both literary and epigraphic, have been used by historians and archaeologists to elicit a great many details about Eboracum. The first recorded presence in the region being that of the Ninth Legion under the Roman Governor, Quintus Petilius Cerealis, who moved northward from Lincoln to invade the territory of the Brigantes. The first documented permanent settlement at York was the Roman fortress, established at the confluence of the Ouse and Foss rivers by the Ninth Legion, after finishing off the Brigantes c. 71 AD, and subsequently maintained and continually occupied by Roman Legions to c. 410 AD.

Throughout the Roman military occupation the legionary fortress was the garrison for several thousand troops, and the centre of a *territorium* –its resource base and area of control– that extended far across the region. It was the central feature of a growing civilian settlement, comprised of indigenous agriculturists and pastoralists, Legionary veterans, administrators, and émigrés from older Roman provinces and from Roman itself. We know of the existence of temples, bath complexes, ornate palaces and houses, well built roads and walls, and a complex regional social, political and industrial infrastructure. There were a number of large cemeteries to the west and south, straddling the major roads leading from the city. As elsewhere in the Empire large numbers of burial vaults, elaborate tombs, sarcophagi and sepulchral stones are known to have existed along the road ways. At its height Eboracum was the seat of the highest

Imperial officials of the Empire, reaching its pinnacle when the Emperor Septimius Severus and the Imperial court were resident in the city from 209 until his death in 211 AD. The Emperor Constantius Chlorus fought northern campaigns from Eboracum with his family, and upon his death in Eboracum c. 306 AD, his son, who was later to be known as Constantine the Great, left the city for Rome in his fight for Imperial power. It is thought he was proclaimed Emperor in the Legionary fortress. A little later, in 314 AD, a Christian bishop from Eboracum is record at the Council of Arles, in Gaul.

Documentary evidence has provided a great deal of information about events, figures and large scale social projects. Archaeologists have reinforced this picture through their continual focus on monumental architecture and „precious” luxury objects, and by using the known historical framework for much of their interpretation. They have, as in the example of the British government’s „Royal Commission” inventory, preferenced road side sepulchral monuments and „interesting” burial practices to the vast majority of simple unadorned inhumations and artefacts. However, archaeology has also shown us a picture of Eboracum far more complex than the many reports and studies indicate, at first glance.

Eboracum appears to have been a polyglot of various peoples, administrative powers (native, Legionary, civilian, Provincial, Imperial) and classes. Over the course of the Roman occupation the city played a variety of roles within its province, as a base for occupation troops, supply depot, way station, industrial centre, retirement village, market place, economic nexus, Colonia (1 of 4 on the island), and Provincial capital. It is highly likely that the city serviced Rome’s intense economic exploitation of the region, as the centre for the control and extraction of human, mineral, agricultural and forest resources; thereby enriching Roman tax farmers and investors, local administrators and indigenous elite. That it benefited from the control and exploitation of these resources is strongly implied by the presence of a massive military fortress, a large well-maintained and mobile army, its role as provincial capital and by the many large and elaborate construction projects over the centuries.

On the whole however the social structure and behaviours of Eboracum and its peoples remain relatively unknown. Very little is known, for example, of the health, regional origin, gender roles, civilian lifestyle or community social relations within the general non-military and non-elite population of York. There is a massive gap in our understanding of the various communities that met here, and of the matters of social structure and change. There is a gap in the archaeological record, largely because of the destruction or non-recording of evidence considered unimportant, and because pre-conceptions of Roman social structures and history have precluded any attempt at a thorough archaeological evaluation along these lines.

It is clear that archaeological investigations of Eboracum have and continue to suffer from historical pre-conceptions and a tendency to preference historical documentation over material evidence. But when the evidence uncovered by archaeology is examined in consideration of other questions it provides

a breadth and depth of information about the people of the city that is rarely accounted for by most scholars. Archaeological study can continue to fill out the social study of Eboracum if it sets its own questions and establishes the validity and potential of the material evidence at its disposal.

2 Research in York

This research project was begun in an attempt to fill in some of the gaps, through the creation of new evidence by synthesis and through the rehabilitation of older remains which have so far not been included in any synthetic study of the region or time. It attempted to aid the analysis of how social identity is manifest in human and material mortuary remains, and to develop a rationale for, and a means of identifying the community affiliations of buried individuals in the early period of the Roman Empire. This identification and differentiation of mortuary remains can aid the necessary but often absent analyses of Roman period social behaviours and structures, including roles (e.g., civilian, soldier, male and female), age, health, status (e.g., rich, poor, master-slave, patron-client), regional origins and beliefs (e.g., Mithraic, Pagan, Semite). The theoretical and methodological rationale for this work has been examined more thoroughly, in the companion article to this one, and the reader is referred to it for further details (Brukner 1998).

The research has three components; data collection, evaluation of mortuary remains and social analysis. For an archaeologically based social analysis, evidence useful for economic and social descriptions and explanations was imperative. The main social phenomenon for which archaeological and osteological indicators need to be obtained include health care, gender/age/class based distinctions in burial practice, burial rite variations over time and the relationship of burial to settlement features. In conjunction with demographic models the research also examined the homogeneity of the population, sex/age ratios, and at the degree of metric and non-metric variation in skeletal remains— around the city, over time, and viz. distribution, density and numbers.

In order to provide a foundation for social analysis, an examination of the skeletal remains and mortuary inclusions for evidence putatively indicative of social activity was planned: to aid description and interpretation, and the differentiation of various communities in the city and its environs. Evidence of disease, trauma, lifestyle, work and gender was sought, and an attempt was made to identify, where possible, the location, condition, state of preservation, time and place of discovery for all indications of individual human deaths and burials. These indicators include cremation, inhumation, sepulchral stones, cremation pits, and burial artefacts without skeletal remains such as coffins and urns. It was important to know when, where, how, with what inclusions, and in what orientation people were buried, and the interpretative „value” of the material once collected: looking at its potential for current and future social research.

The research required a clear delineation of the data relevant to the illumination or directly indicative of social factors. To determine which information would be useful, the work of current archaeologists was studied, utilised where it could be justified, and amended to where theoretical and methodological concerns required. To evaluate the scattered, uncollected and partially recorded mortuary remains found over the last 400 years a computer database was developed to store and quickly manipulate the large amount of data that was generated in this analysis. Database software was sought that best combined being user-friendly, inter-system compatibility, long term viability, and ease of administration. There was also a concern to ensure that the information be readily available to the public and other archaeologists, and that it be statistically rigorous.

The research conducted in York examined how the social, temporal and material appearance of a community can be defined, and how beliefs and activities uniquely marked material production, burial rites and the landscape. These are particularly difficult to answer for the Roman provinces, because of the rarity of context relevant epigraphy or literature for most places and times – apart from upper class rural Italy or the larger provincial urban centres – and because of the paucity of high quality Romano-British mortuary data for comparative purposes. It does not help that few British Romanists have bothered to ask questions along these lines, or to incorporate recent innovations in the archaeological study of the social past.

What then are the essential differences, that can be used to identify and distinguish between communities? To what degree are mortuary artefacts sensitive to often very subtle social differentiation across Roman period societies? Is it possible to distinguish between mortuary remains, or to use them to identify different communities within Roman society, in a way that would allow us to say something meaningful about them, even where only the slightest differences might exist? Is it even possible to make direct links between what appears in the grave and a social behaviour? What can be done to address the relative lack of high quality data? Turning to the mortuary excavations and social analyses of other Romanists, and the current concerns of academic and professional archaeologists within the region also provided a way to begin to address these questions.

2.1 Objectives

The research goal was, and is, to collect and present the mortuary data considered relevant to current mortuary questions, in consideration of the theoretical concerns over the quality and integrity of the material evidence and the data that are created from it. The primary focus on skeletal remains recognised that other artefact types have been, and continue to be, thoroughly examined. It is a reaction to the exclusive (over)use of these other types to provide links to social systems and behaviours. The third goal is to evaluate the potential of the collected mortuary evidence for its statistical veracity, its utility for answering social questions, and to discover its inadequacies.

The rationale for the research is found in its linkage to larger social research questions which are themselves clearly dependant on archaeological, and specifically, burial study. This work was and remains a long step away from the monumentalist and technological fixations predominant in current Romano–British archaeology. It attempts to collect the material remains of Roman period communities and to examine them for what they can and might tell us about individuals, communities of people and their relationships together. These are not common interests in Romano–British burial studies and consequently the field has been deprived of much interesting or useful social analysis. Very little social or demographic analysis has been done with the human or material remains of the two largest and most recent cemetery excavations in the city, and none at all with the many individual and small group mortuary discoveries recorded over the past 30 years. As a whole, the skeletal and mortuary remains that exist, have been poorly publicised and been left relatively unexamined.

The purpose of the research was to enhance and facilitate current and future research into the mortuary and settlement features of Roman period York. In the short term it aimed to tidy up and centralise an extensive but disparate and uncoordinated series of finds from the last 35 years. In providing a forum for the continual collection of information it was hoped that substantive and reliable demographic and social information might be generated for further and higher levels of social and cultural analysis. It was also a minor but important step in the direction of providing more and readily available information to the general public, via the public access and display allowed through the City of York Archaeologist. The project was also intended as a demonstration of the degree to which post–graduate academic work at an MA level, when linked to the wider non–academic community, can not only meet academic expectations but exceed them by providing necessary and useful support to working archaeologists.

2.2 Methodology

The research method chosen was a refined form of a simple hermeneutical model. In this case a particular commonly asserted hypothesis (i.e., the utility of cemetery remains for social analysis), was examined by a variety of new lines of evidence, including that derived from the ongoing collection of data. These were continually fed back into the research process, and in so doing refined and sometimes fundamentally altered the original model (i.e., a new hypothesis of the utility of cemetery remains for social analysis). Then starting from the new hypothesis the process was repeated several times, and continues today: constantly drawing on the ideas of others and the data that continues to be collected. There has been no attempt to prove the utility of any of the indicators, such a course being considered futile, only an attempt to identify those aspects of the surviving mortuary remains that can still be somehow quantified, qualified, or recorded, and that it is thought „may” possibly be useful in a larger synthetic analysis. It is only in the attempt to utilise the collected materials in some larger synthetic analysis, that has proven to be beyond the possible scope of this par-

ticular project, that we might learn of the practical utility of the collected data: remembering that this evaluation ought to be conducted in consideration of various perspectives.

The research grew out of a theoretical examination of what data are considered relevant for social analysis and to archaeologists currently working in this field and region, and a thorough literary and archival search. Throughout the course of research the work of other archaeologists, particularly those studying skeletal remains, has been carefully filtered and incorporated into the methodology, goals and data. The new lines of evidence in this study were derived from a continual dialogue with the changing patterns of data, with the insights of other archaeologists, historical documentation, demography, sociology, anthropology and gender analysis. All of the above took place during the selective collection of the greatest possible extent of data, based on the abovementioned considerations, to produce a malleable, accessible and expandable database, hopefully of the greatest possible utility for social analysis, with an appropriate placement within the archaeological community.

The focus on mortuary artefacts and skeletal remains of Eboracum draws on excavated and literary sources from within the current administrative boundaries of the York City Council. While the administrative area of the City is arbitrarily defined, it is inclusive of the mortuary remains that have been regularly associated with the city's ancient environs by antiquarians and archaeologists for the last 400 years. It is also inclusive of all of the known major 'cemeteries' in proximity to Eboracum. It is not known if this area corresponds to the intake area for the cemeteries of Eboracum, nor to what might have been roughly defined as the municipal limits of the town, nor to the fortresses administrative *territorium*. The area is also much less than the 20 Roman-mile radius which some Roman burial clubs (known to have existed in Eboracum) considered the limit of their in-town service area (Shelton, 1988). As a starting point, however, the area is large enough to include a great many burials, with the caveat that they might not be adequately representative of the ancient living population, which had an active and intentional part in the social, cultural, political and economic life of the city, and that may have lived, died and been buried quite some distance from the urban centre.

The mortuary remains for the inventory, survey and analysis are derived for the most part from the RCHM Inventory of Roman period remains, published in 1962 and inclusive of all known prior documented archaeology and other publicly available activity. Subsequent to the RCHM Inventory no comprehensive evaluation of Eboracum's mortuary finds has been compiled or analysed. What has been discovered, and reported publicly, are largely found in the papers of the Yorkshire Philosophical Society, the publications of the York Archaeological Trust and the reports provided to the York City Council Archaeologist by various private archaeological firms. A partial review has been completed of the RCHM's references, which were culled from a large number of public journals and newspapers, site reports and antiquarian publications. As many corrections as possible were made to the RCHM Inventory where it was seen to differ from the original sources.

2.3 Elements of a Modern Mortuary Research Agenda

The largest collection of mortuary remains from York, one of the largest in the UK, was excavated in the 1960's under the direction of Leslie P. Wenham (1968). The skeletal analysis was primarily concerned with description, and focused on identifying the numbers of individuals, sex ratios, age at death, stature/physique, disease, injury and, so-called, 'abnormalities' and 'racial affinities'. While a useful source of data the study does not meet the best publication standards and a great deal of potential information from the excavation is lost. Because the research was not designed to analyse community identity or social behaviour, it is not particularly useful for developing any criteria for the use of skeletal remains in social analysis. A more rigorous and sophisticated analysis of Roman period mortuary remains, by far, was carried out under the direction of D.E. Farewell and T.L. Molleson (1993), at Poundbury, Dorset in the 1960's and 1970's. They analysed sex, age, date, pathology (disease, trauma, lifestyle and work), physique, post-mortem treatment (orientation, layout, body rites), post-mortem disturbance (robbing, degradation) and context. Their multivariate analysis was used for demographic modelling and to identify and describe status, health, social composition, subsistence practices, childbearing, farming activity, population density, cemetery usage and gender differentiation (cf.. Appendix 1).

They compared the excavated burial population of Poundbury to well studied modern western populations (usually with regard to dentition and physique), and to those societies thought to share a social and cultural resemblance to the peoples of Roman Poundbury. From these comparisons they attempted to deduce explanations for the social behaviours and structure of the once living community represented by the buried population. Despite serious concerns about the validity of applying modern population characteristics to the study of populations of the past, their work was by far the best starting point for identifying the skeletal elements important for social study, and for generating comparisons and more complex social descriptions, and in establishing a case study of Romano-British population features to contrast with my own and other mortuary research. The work of the archaeologists at Poundbury also proved useful for the development of the pathological categories used in the Human Remains Database.

Apart from mortuary excavations, archaeologists have long pointed to the need for more research in rural, northern and western England, to redress an imbalance that currently favours the south and east of the island: the area of greatest population, wealth and land development. Philpott (1991:2-5) advocates for more landscape and spatial studies, with a greater focus on stratigraphy, isolated (non-cemetery) and unfurnished burials. He also notes the need for greater consistency and standardisation in the recording of grave size, depth, inclusions, skeletal positioning and orientation. Grave and skeletal orientation is considered particularly important to social analyses because it is thought sensitive to change in social behaviours and ethnicity (Kendal, 1982: Rahtz, 1978).

However, this link remains unproved, and this popular and widely accepted proposition, ought to be approached critically.

The size and composition of Roman settlements can be inferred from mortuary studies, with the development of an exhaustive chronological, social and demographic survey and model of the buried population. Such surveys and models might allow for an approximation about population size, stability and social divisions: crucial basic elements in the demographic analysis of any living population (Dr. Young, pers. comm.). Town growth and its spatial relationship to the cemetery landscape has long been neglected and its analysis will aid our understanding of the placement of cemeteries, their proximity to settlements and roadways and their value to the community. We can begin to deal with the issue of social differentiation, gender, role (soldier, civilian), age and health, when we look at the question of who was buried, where, and under what conditions.

It is generally assumed that inhumation replaced cremation, in the western provinces of the Empire, by the 3rd century AD. Both rites are thought to have co-existed for some time within the same cemeteries with little if any segregation. The perceived change to inhumation is thought to have originated in the upper classes in the 2nd century and spread down through the social classes (Wenham, 1968: Jones 1981). All mortuary analyses need to consider this dynamic, not in presuming its occurrence, but in evaluating whether, when and how it occurred, taking particular care to examine for synchronic variation in rites, as opposed to simple diachronic changes.

Municipal government archaeologists and archaeological contractors are concerned about the location of possible cemeteries—across the landscape and in their depth and density (J. Oxley, pers. comm.). Large-scale cemetery studies across the landscape can contribute significantly to the rapid evaluation, by construction companies, of time, cost and resource needs for specific locations and projects, in and around ancient cities. There is also a concern over the dating and cultural identification of these remains in order to quickly access their significance and the practical aspects of their preservation or destruction.

Collectively, many Romanists are concerned about how grave areas were identified, bounded and sub-divided at the time of burial; whether some areas were restricted to certain families, social groups or divisions based on social factors; the number of bodies and graves needed to obtain a statistically representative set of evidence; the links between landscape and burial practice; and the prevalence of burials inside Roman city walls. There are a multiplicity of general and context specific questions that can be asked in mortuary analyses, and those listed are just a small sample.

3 Selected Data from the Human Remains Database

The bulk of the research work was the collection of information from skeletal and non-skeletal mortuary remains considered relevant to a holistic social analysis of the community of Eboracum, and important for the research and work interests of archaeologists in York. The documentary sources which provided information for the data base were limited to those available in the York City and York Archaeological Trust archives, the University of York and York City libraries, and the Royal Commission on Historical Monuments inventory of York. It was, however, as extensive and thorough a collection as possible given the level of access to information. The information is broken down into categories derived from traditional descriptions of burial remains, or 'mortuary categories'. These are discrete events and locations, of individual human death, and its accompanying events. These events range from what may have been simple environmental exposure and decay to elaborate formal burial and monument placement. These events are assumed not only from skeletal remains, but also from the coffins, urns and sepulchral stones, that are often found separate from any human remains, and that are considered indicative of human burial.

Using the database, as it existed on September 21, 1997, I have constructed a number of correlations of the various categories of collected data: presented below.

Sex	Number	% of Total
Possibly Male	3	0.7
Probably Male	23	5.7
Male	261	64.3
Total Likely Male	287	70.7
Possibly Female	8	1.9
Probably Female	13	3.1
Female	98	24.3
Total Likely Female	119	29.3
Total Sexed Remains	406	100.0

Table 1: Quantity of Sexed Skeletal Remains

Date	75-125	125-175	175-225	225-275	275-325	325-375	375-425	Total
Burial Style								
Cremation	7	15	16	3	1	—	—	42
Presumed Cremation	—	1	—	—	—	—	—	1
Total Cremations	7	16	16	3	1	0	0	43
Inhumation	3	13	13	8	6	26	6	75
Presumed Inhumation	3	—	—	—	—	—	2	5
Total Inhumation	6	13	13	8	6	26	8	80
Total Dated Burials	13	29	29	11	7	26	8	123

Table 2: Quantity of Remains by Burial Style and Calendar Date

Age	Male (% of Age)	Female (% of Age)	% of Total
0- 3	2 (67%)	1 (33%)	3 (0.8%)
4-12	6 (75%)	2 (25%)	8 (2.0%)
13-18	18 (78%)	5 (22%)	23 (6.7%)
19-39	163 (73%)	61 (27%)	224 (65.0%)
40-60	50 (83%)	10 (17%)	60 (18.0%)
„Adult“	18 (72%)	7 (28%)	25 (7.3%)
Total	257 (75%)	86 (25%)	343 (100%)

Table 3: Quantity of Aged Remains by Sex

Height (m)	Female	Male
1.30-1.39	—	4
1.40-1.49	8	2
1.50-1.59	28	9
1.60-1.69	5	68
1.70-1.79	2	44
1.80-1.89	—	3
Average Height	1.55m	1.67 m

Table 4: Quantity of Male and Female by Height

Table 1 presents the 406 human remains that were sexed and their percentage representation of the total sexed population. The total number of males far exceeds females by a ratio of 4 to 1. Note that proportionately far fewer male skeletons were ambiguously sexed.

Table 2 presents the 123 tentatively dated human remains cross-referenced to burial style. The dates are the „Standardised „ dates created from the raw published data. 68% of dated remains cluster in a 150 year block between 125–225 AD and 325–375AD which gives the data an insurmountable bias for generalised social analysis.

Table 3 presents the 343 human remains for which we have age and sex information. There is a 3 to 1 sex ratio. This imbalance does not vary to any great extent between age groups. The only exception is the 40–60 year old category where the imbalance increases to 5 to 1.

Table 4 presents the human remains for which we have sex and height information. The average height is 1.55m for women and 1.67m for men. The average height is not unadjusted for age differentials in the buried population and should not be taken as representative of a real average for the living population.

Table 5 shows the major illness, trauma and lifestyle related bone alterations found in the buried population. Degenerative diseases account for 52% of the total among the whole diseased population, while dental diseases are proportionately far higher for females than males.

Table 6 shows the prevalence of certain pathologies by age group. Defined socially these groups are infancy (0–3), childhood (4–12), puberty (13–18), early adulthood (19–39) and late adulthood/aged (40–60). The table shows distinct differences in the prevalence of different pathologies by age group.

Pathology	Unknown Sex	Male	Female	Total
Joint Degeneration	1	3	4	8
Fused Vertebrae	2	2	3	7
Spinal Osteo–arthritis and Arthropathy	3	26	5	34
Other Osteo–arthritis	—	6	2	8
Total Degenerative	6	37	14	57
Caries	2	4	7	13
Abscesses	1	5	3	9
Hypoplasia	—	1	1	2
Total Dental	3	10	11	24
Fractures	—	13	2	15
Perforations	—	4	—	4
Incision Injuries	—	1	—	1
Total Trauma	0	18	2	20
Cribræ Orbitalia	—	—	1	1
Squatting Facets	—	1	3	4
Tumours	—	1	—	1
Hallux Valgus	—	1	—	1
Total Other	0	3	4	7
Total Pathologies	9	68	31	108

Table 5: Instances of Bone Altering Diseases by Sex

Table 7 shows the total numbers of all mortuary categories. Inhumations far outnumber cremations. But the group burials are believed to have contained up to 13,000 remains (RCHM 1962, 97). While this can no longer be corroborated the numbers are very high. They add considerably to the number of potentially discovered materials and reduce the number of in situ mortuary remains in the archaeological resource around York as a whole, which we must eventually rely upon to fill out our analysis.

Pathology	0-3	4-12	13-18	19-39	40-60
Joint Degeneration	—	—	—	2	1
Fused Vertebrae	1	—	—	—	4
Spinal Osteo-arthritis and Arthropathy	—	—	—	17	16
Other Osteo-arthritis	—	—	—	5	—
Total Degenerative	1	0	0	24	21
Caries	—	1	2	6	3
Abscesses	—	—	2	3	4
Hypoplasia	—	—	1	—	—
Total Dental	0	1	5	9	7
Fractures	—	—	—	4	10
Perforations	—	—	1	1	2
Incision Injuries	—	—	—	1	—
Total Trauma	0	0	1	6	12
Cribra Orbitalia	—	—	—	4	—
Squatting Facets	—	—	1	—	—
Tumours	—	—	—	1	—
Hallux Valgus	—	—	—	—	1
Total Other	0	0	1	5	1
Total Pathologies	1	1	7	44	41

Table 6: Instances of Bone Altering Disease by Age Group

Mortuary Category	Numbers
Inhumation	673
Presumed Inhumation	70
Total Inhumation	743
Cremation	118
Presumed Cremation	21
Total Cremations	139
Presumed Other Burial	42
Total Presumed Burial	42
Total Individual Burials	924
Cremation Group	15
Inhumation Group	22
Burial Group	6
Total Group Burials	43
Total Mortuary Categories	967

Table 7: Numbers of Burials and Burial Groups

4 Evaluation

The quantitative and qualitative syntheses possible with the compiled mortuary evidence of Eboracum, which far exceeds that presented here, can provide details of aspects of the mortuary and social practices and behaviours of the Roman population. It aids the evaluation of the evidence for its potential uses in future research and demonstrates evidential gaps which limit the possibility for answering certain research questions. A considerable amount remains to be done but, having completed the bulk of the analysis arising from the research questions, some evaluation of this research, and of the process as a whole is possible.

4.1 Data Collection, Presentation and Access

Several considerations were kept in mind when considering how and with which of the many commercially available software packages the mortuary database would be constructed. The primary concern was that the database be very user-friendly, utilise standard English, and that the necessary operating software be easy to access. Major technical concerns included the use-life of the software, ease of use for later researchers, compatibility with other major database software, ease of formatting and data entry, and low cost.

The Paradox for Windows (Version 5.0) database software was perceived as the best possible balance between all of the abovementioned criteria. It allows for standard English entries, is commercially available and was thought, at the time, to be compatible with many other systems (including Microsoft Access, dBase, Oracle and Informix). Primarily it was readily available „free-of-charge“ (apart from a whopping great tuition fee) from the University of York Computer Services. It is able to import and export data from and to spreadsheet packages such as Lotus 1–2–3, Quatro-Pro and Excel. It has proven reliable, sturdy, relatively „glitch“ free, and easy to learn. An attribute of inestimable utility is that the system is also simple enough to run on the smallest laptops in the field, demonstrated to me over some weeks of field work in Ontario. One major drawback is the transfer of data to „International“ versions of Microsoft Access running in non-standard Latin scripts, which contain different language parameters that prevent data transfer. The problem is solved by first transferring the Paradox data into an English version of Microsoft Access and then to the non-English version. The Human Remains Database is currently running on the far superior Microsoft Access database—unfortunately unavailable to Masaryk University—and all future work with it will be done using this software.

The hope for long term administrative support, public and professional access, was resolved by John Oxley, Archaeologist for the City of York Council. Mr. Oxley arranged for the storage and ongoing administration of the database, as part of his City Council work, and for the city's Sites and Monuments Record. The database will be accessible in a read only format to any archaeologist, students, or other interested party, for research and general interest queries. The matter of access for commercial purposes is yet to be resolved and has raised

many interesting questions of the right of „access to information”, and responsibility of academic institutions to protect intellectual property rights while providing public access to „knowledge”.

Most site reports of Roman period excavations, even modern ones, provide minimal pathology and contextual analysis and are generally biased towards ‘interesting’ remains such as tombs, the odd sepulchral stone, and diagnostic artefacts. This has resulted in a large gap in the current database, especially for the period prior to 1950, that can probably never be adequately filled. This leaves a permanent statistical skew for synthetic studies of the buried population. Therefore any study of pathology must be restricted entirely to those remains for which specific data on these factors has been provided. Unfortunately, this effectively cuts the size of the analysable buried population contained in the database by two thirds.

There are a number of weaknesses in the sources of the collected evidence. Much of what has been published is derived from questionable source documents, many of which are themselves secondary or even tertiary records, and so subject to an unknown but presumably quite high degree of error. A quick check of the RCHM’s sources has revealed that up to 60% of its information deviates substantially from the original sources. A large portion of the originally observed material remains were noted but not recorded in any detail. Even where more information is record much of the actual material has been lost or destroyed, and can not be re-examined nor interpretations made from it corroborated.

The documentary sources for the database were limited by modern political geography. While providing extensive information, the exclusive use of these sources, has biased the collected evidence towards the boundaries of the modern city of York and its environs, and is not necessarily inclusive of the total area of the ancient city and its environs. An unknown quantity of possibly important evidence remains to be collected from the areas adjacent to modern York, and incorporated into the database.

As of September 22, 1997 there were 967 mortuary objects in the database, including 743 inhumed and 139 cremated remains, far more than is generally considered the minimum number for a statistical viable study of a living population. There are about 450 known extant skeletal remains, higher than that considered to be the necessary minimum for demographic projections and analysis. The data is however of dubious statistical utility, especially for demographic projections. The original ratios of social phenomena such as class, age, sex, working groups are unknown, and it is not possible to reconstruct these ratios from the current burial evidence alone: because we can not say to what degree it is truly representative of the living population, if at all (Dr. Young, pers. comm.).

4.2 Evaluation of Mortuary Remains

The key methodological problem was identifying which material evidence is useful for social analysis. There has been minimal explicit discussion of this question in the archaeological literature, let alone any comprehensive analysis of the particulars. Often the links made between an object or other archaeological phenomena, and social structures or behaviours remain entirely speculative. While at times well considered, as in the case of the analysis of the Poundbury excavation, there is significant controversy over the utility of the indicators, their medical basis and their social interpretation.

The identification and interpretation of objects, beyond such trite observations as their general cultural–historical period, are uncertain. In the absence of established criteria and evidential standards, it is thought sufficient, for the present, to judiciously collect what evidence is commonly considered to be of use—no matter how speculative—as a starting point. The information derived from these criteria can be amended as necessary, in light of future theoretical and methodological considerations. Obviously some of the information may not be useful and may be discarded, while other information may need to be selected for and collected. In the end all of the interpretations made from the collected evidence must be subject to rigorous cross-checking by lines of evidence provided by from sources of data.

Turning to the evidence compiled in the data base it must be noted that in almost all of the categories, the sources are haphazard and unreliable, and the quantities of evidence generally scanty. That said the examination of the collected data is instructive and can perhaps provide a glimpse into the social life of Roman York. At the very least the synthesised data shows us the way to new and interesting research.

The overall sex ratio of the examined buried population is approximately 4 males to 1 female. When correlated with age (Table 3) the sex ratios remain unbalanced, ranging from 3:1 to 5:1. But in all instances the source of information are suspect, especially for sex, and the absolute numbers for the age categories are far too small to provide meaningful detail of the living population. Even where the sexed remains for an age group are substantial in number, the sources and their representivity remains suspect. In general the absolute numbers by age group and sex are very small and must be considered susceptible to large statistical error.

Burial styles and their changes through time are intriguing (Table 2). The data shows an absolute decline in cremations, as inhumations increase. But a closer look suggests that inhumations are relatively steady across the Roman period, apart from the period 325–375AD. This is not a result generally expected in light of the belief that inhumations increased over time in absolute numbers relative to the number of cremations. The peak around 325–375 AD is best explained as the effect of the large number of Trentholme Drive dates on the statistics, the majority of which are dated to this period. Cremations are rarely dated with precision and archaeologists generally rely on the truism that they

concentrate to the 1st and 2nd centuries. Much of the pottery can not be dated with precision, leaving only absolute dating methods, such as thermoluminescence and radio-carbon measurement, testing to which I have found no reference in Romano-British studies.

Turning to age (Table 3) we can see that there is a sharp imbalance in the buried population between the middle age ranges (19–39) and the young. There are a number of explanations for this phenomena, such as, the presumed predominance of the 19–39 year age group serving in the Legion, and the inward migration of large numbers of young adults. However, it is also possible to explain this pattern as the result of an unrepresentative sampling of the living population, due to selective burial practices, the effect of a bias in the finding of skeletal remains (which for many reasons miss many of the young), and the result of less than professional anthropological examination. Only with greater numbers of sexed and aged remains will this be possible to clarify.

Height measures (Table 4) show that most women were between 1.5 and 1.6 metres and men between 1.6 and 1.7, an almost insignificant difference of 1 cm. It is interesting to note however that males occupy the shortest and tallest categories, suggestive of a heterogeneity in the population among males, and a relative homogeneity in the female population. As previously mentioned the average height is not unadjusted for age differentials in the buried population and should not be taken in any way as representative of a real average for the living population.

Pathological data (Tables 5 and 6) provides an interesting pattern of sexual and age differentiation. The most prevalent condition visible in the buried population is one or more forms of osteo-arthritis. It is predominant in men, women, and 19–60 year olds. Traumas are proportionately three times higher amongst men than women, while dental disease is three times higher amongst women than men. „Squatting“ facets occur in 0.03% of the female population and 0.003% of men. The 19–39 and 40–60 age groups evidence the most disease and trauma. It is interesting to note that only the 13–18 year group evidences hypoplasia and cribra orbitalia, indicative of malnutrition.. Remembering the aforementioned interpretative concerns, the pathological evidence does suggest that children within the buried population did not have a very stress full life and that it is not until adulthood that work, lifestyle and disease related bone alterations are significant factors in the buried population. It also suggests that early childhood malnutrition led to early death.

There has been no absolute dating of any of the Eboracum mortuary remains, and all of the date ranges remain essentially speculative. They are usually generated by assumptions made of the date ranges of burial styles-based on non-British historical documentation and on ceramic typologies—which are considered accurate though at times they remain difficult to associate with adjacent buried remains. A few are based on coin evidence but this is also dubious when you consider the high degree of cross-cutting, disinterment and poor record keeping. It is difficult to associate the few dateable artefacts with immediately adjacent mortuary materials, let alone those that are father away as many studies attempt.

4.3 Possibilities for Social Analysis

Considered independently, the evidence presented has only the most limited significance for the social analysis of the living population of Eboracum, without significant augmentation. It is essential to have a clear understanding, or at least a strong indication, of the relative proportions of the social strata, the size of the population over time and the degree of inward and outward migration. Without these details the use of the data generated from the buried population can not be directly associated to the living population and a demographic model can not be generated. In the absence of hard figures generated from direct observations of the living populations, such as a census, we can only estimate the population size, change and proportions: and so only *estimate* a demographic model.

It is still possible to study the data generated from the buried population, and to generate a multiplicity of patterns, models and conclusions. But it must be remembered that these patterns are as much, if not more, the product of our sources of data, historical accident in excavation and other human biases, and not inherent in the social patterns of the past. Therefore the initial patterns that have been drawn out can not be construed as meaningful analyses of the living population. Without significantly more data and external evidence it is not possible to substantively or meaningfully attempt to decide whether or not any of the models, patterns or conclusions represent a close approximation of the real society.

As the absolute numbers of collected burials increase the analyses generated will become an increasingly accurate approximation of the living population. If the population of York can also be approximated (by non archaeological means), for any or all periods, then we could also determine how close our demographic models may be to reality, based on the ratio of analysable mortuary remains to the known living population. The lower that ratio, the greater would be the accuracy of our demographic models. But this sort of brute force approach to demographic analysis of the once living population can not succeed without far more skeletal remains than are now available.

5 Recommendations

5.1 Mortuary Research in York

Future studies must examine for a number of critical factors explored in this paper. It is essential to obtain detailed information about bone condition, skeletal measurements, body wraps, containers, graves and structures, when excavating and to record them in publication. The depths of human remains and artefacts below the modern and Roman surfaces, along with the height above sea level („AOD”), spatial information about orientation, the distance to the nearest other mortuary remains and Roman landscape features and the national cartographic references („NGR’s”) are essential. It is also important to provide

detailed and comprehensible maps indicating the cardinal directions, authorship, date, common surface features and scales: the absence of which in far too many reports is incomprehensible to the author. It is also essential to provide the storage location, codes and processing details of all artefacts and human remains.

Any and all possible information should be provided even within the smallest watching briefs, evaluations, or accidental finds. Often many small rescue operation reports and watching briefs did not provide detailed summaries, let alone analyses, of the reported finds human and mortuary finds, in York. Since 1960, over 100 human remains were recorded in these reports, and in the apparent absence of large scale cemetery excavations in York, their cumulative affect is, and will probably continue to be, of enormous importance to future mortuary research of the Roman period population.

In publications it is especially important to provide simple cross-referencing of the mortuary remains and data, to avoid mis-interpretation and waste of time. There ought to be explanations of dating and sexing methods, comments of the excavators, the conditions of the remains, details of inclusions and inscriptions. It would be worthwhile and a sign of good practice to provide information about find dates, the organisations and people responsible for various the aspects of the field and laboratory work. These can be of importance when follow-up research, such as this dissertation, is undertaken.

While adequate excavation and reporting standards are enforced by city and county archaeologists, they should be a standard component of all archaeological efforts. The discipline should not have to rely on the raising of government standards and the use of legislative force to ensure that the highest professional and research standards are cultivated and practised. But where this is not the case then this author advocates for a severe tightening of excavation, evaluation and reporting standards for human and mortuary remains.

The social boundaries of Eboracum were surely larger than the collected evidence represents. The extension of data collection beyond the modern York city area is vital, if we are to begin to more fully understand the extent of the cities social boundaries. Future research should include the area at least up to 20 Roman-miles from the city walls, commensurate with the limitations imposed by some burial clubs for their services. This would close a major gap in the evidence. Rectifying it would entail the collection of data from multiple and overlapping administrations around York—a very large and time consuming project—which was found too great an undertaking for the initial phase of research.

Partially as a response to the concerns of archaeologists engaged in the study of Roman period York, this research provides a starting point for a more particular and well-grounded examination of the community of Eboracum and its social relations. It is hoped that this research will be considered as but one part of such a social analysis, in conjunction with other non-mortuary material remains, careful ethnographic analogy, judicious use of historical documentation (including epigraphy) appropriate to the time, place and society. In the long run this project may provide the foundations for an analysis of social identity, based on firm empirical grounds, that can be developed into an ethnographic survey of

some sophistication. This work must however be cross-examined by comparison with other lines of evidence, possibly including contemporary cemeteries from other Roman *colonia*, contemporary non-mortuary material remains from Eboracum, and especially to any synthetic epigraphic and documentary studies. It is hoped that this might include a comparative study of the Vale of York and the Valley of Moravia, two settings whose development before, during and after the Roman period, bear some remarkable similarities and perhaps also some instructive differences.

Any future mortuary records must be systematic, comprehensive, cross-referenced and consistent (in language usage, categorisation of data and numbering systems). As many excavations have taught us, careless numbering and cross-referencing can destroy the utility of even the most comprehensive and methodological skeletal studies, when the link between the material remains and its descriptions can no longer be found. Records should also include full references to source literature and authorship, details of laboratory procedures, the location of all of the extant remains (with archive numbers) and all of the stages of analysis used to make synthetic interpretations from age, sex, stature and pathological data.

5.2 Future Romano-British Mortuary Research

The imbalance in current excavation and research that favours the south-east of England and urban cemeteries, is obviously disadvantageous to Roman period studies and much more work, such as this effort, needs to take place in rural areas and to the North and West of England and the Midlands, to continue to redress the imbalance (cf., Philpott, 1991). Further landscape and spatial studies, with a greater focus on the details of stratigraphy, for isolated (non-cemetery) and unfurnished burials is essential. As Philpott this author believes that burial study can and ought to examine questions about the composition of military garrisons, social status, regional origins, social continuity into post-Roman times and the early Christian period. Future work needs to remain consistent with previous work, and internally. Efforts must be made to consistently record, grave size, depth, inclusion, skeletal position and orientation.

Absolute dating is essential for the accurate dating of mortuary remains. Radio-carbon and thermoluminescence, covering organic and inorganic fired remains respectively, are viable and accurate for the time scale in question. While expensive they may be used selectively with a carefully chosen group of remains to aid the dating of many of the others that can be then dated by analogy. But in the apparent absence of a single scientifically obtained absolute date, for any Roman mortuary site, the whole question of the dating of cemeteries and graves remains an open question.

There is a need to examine more closely the question of how a cemetery is defined and delimited. Their use, growth, spread, period of usage and the size and location of the population they serviced are key issues. The question of the size and composition of many urban settings may possibly be inferred from the

development of an exhaustive chronological, social and demographic survey and model of the buried population, in conjunction with detailed historical study. Town growth and its spatial relationship to the cemetery landscape has long been neglected and its analysis could aid our understanding of the placement of cemeteries, their proximity to settlements and roadways and their value to the community. When looking at the question of who was buried and where, we begin to deal with the issue of social differentiation, gender, role (soldier, civilian), age and health.

How were grave areas identified, bounded and sub-divided? Were there areas restricted to the uses of certain families, social groups or divisions based on any social factors? How does the landscape affect location—high or low burials, sunny or shady side of hills? Does the pattern seen all over the empire of cremations giving way to a preference to inhumation, appear in Britain? What are the sex ratios and why do imbalances appear? With increasing numbers of mortuary remains from a site can we somehow begin to make up for the lack of understanding of the social divisions of Roman society, necessary to understand to create a meaningfully and statistically representative set of data? Are ethnic or regional origins determinable from the available evidence from mortuary and other remains?

Scott notes that modern archaeology consistently relegates women to marginal subservient roles—helper, prostitute and mother with little if any explanation or proof, as does most mortuary research. Most categories of labour and social activity are discussed in terms of male experience, despite a vast body of contrary ethnographic evidence. It is appropriate and useful to study women and gender relations within class structures, ideology, social space, the arts and female material culture. Where women can be shown to have been subordinated then it is necessary to know why and how, if this cannot be demonstrated then it should not be used as the defining social factor for women's roles and position. In either case it is important to re-emphasise the socially constructed and historically specific nature of social behaviour and to take care to differentiate emic patterns from our own modern etic perspectives (1993c:13 and Glossary). The identification of „squatting facets“ is a case in point. Not only is the connection between them and certain forms of labour dubious medically, there is also little justification for its specific association to the gender division of labour seen in modern communities where „squatting facets are found“. That it is sometimes used to suggest that women were the primary care givers „because they are lower“ than men, relative to small children, is pure fantasy.

5.3 Future Romano–British Archaeology

This research has been more than a collection of mortuary data, the creation of a database, and the assertion of the need to look at communities in a holistic social analysis. It has been a practical exercise in archaeological research, plugged in to real world archaeological programmes, needs and theoretical concerns. It has been a lesson in the strengths and weaknesses of Roman–British

studies, and in the range of possibilities to expand and improve upon our work. A more detailed examination of possible directions in future Romano–British studies is provided by the companion piece to this article.

APPENDIX 1:

Supposed Social Indicators Derived from Skeletal Remains

The following is partially derived from Farwell's and Molleson's report on the excavation of the 4th century Roman cemetery at Poundbury Camp, Dorset (1993). The work of others is cited directly, where it appears.

Species

Most human remains are identified as such by sight. This is usually based on any number of readily identifiable human specific bone characteristics. A great deal of fragmented bone material is being excavated and left unidentified, or categorised simply as 'mammal'. This can be overcome, for even the smallest fragments, by the microscopic examination of bones for highly visible osteon patterns. Human osteon patterns are readily distinguishable from other mammalian bone (cf., Chamberlain, 1994: 7).

Sex

The best indicators of sex in adult skeletal remains are thought to be the relative differences of the absolute sizes of certain bones, and non-metric observations of cranial and pelvic features. Neonatals were sexed at Dorset, though controversially, by the relative difference of the sciatic notch, and adolescents were sexed by their teeth. Determining sex is often considered to be a very subjective enterprise, but even where rigorous metrical methods were employed, the results did not prove substantially different from those of visual examinations.

Age

A primary age indicator is the patterning of dental wear, as described by Brothwell (1981). The presence of arthropathies (erosive bone diseases of rheumatic effects, DISH, ankylosis of the sacro–iliac joint, spondylitic changes to lumbar vertebrae, osteoarthritis), hypertosis frontalis (thickening of front of skull), and osteoporosis, are taken as simple indicators of an older population. Pitting of the pre–auricular sulcus and pubic symphysis is said to be evidence of childbearing, and was used to age adolescent skeletons. The relationship of pelvic pitting to childbearing is not clearly established and remains to be proven. Differences in the size, proportions and strength of bones, the state of the epiphyses (attached or detached) aids the identification of relative age differences. They can be used to distinguish between, infant, juvenile, adult and aged (Chamberlain, 1994: 7–9).

Dating

The entire main grave group at Dorset is dated by its proximity and similarity to the very few graves that have coins and grave goods datable in the aforementioned manner. The use of C14 dating is unfortunately minimal. The skeletal remains of Trentholme Drive were similarly dated by Wenham (1968), by looking at ceramic and glass styles, coins and assumptions about the chronological change over time from cremation to inhumation. Dating of late Roman graves was based on the assumption that certain grave styles (shallow, unconfined/stone cists, inhumations, „odd alignment“) correlated to graves of known date, from other commentates. Dating for Poundbury is almost entirely derived from stylistic analysis and ethnographic analogy. These approaches are dubious, resting on untestable analogies or dependent upon highly speculative dating techniques in the first instance. All non-absolute dating methods are highly inaccurate (cf., Renfrew and Bahns, 1996:408). Accurate dating is possible by radio-carbon (c14) testing of bones, and thermoluminescence testing of fired inorganic materials.

Disease and Malnutrition

High concentrations of parasite ova, such as *Trichuris* (whipworm), found in soil from body cavities, ossified blood and hair, is considered harmful to humans, causing prolapse of the rectum, diarrhoea, dysentery and faecal blood. It is thought related to chronic malnutrition in children. Malnutrition and the lack of fresh fruits and vegetables are linked to spina bifida, periodontal disease, rickets, osteomalacia and anaemia, all evidenced in bone changes. Pitting of the palate is a result of chronic vitamin C deficiency. Tooth caries are evidence of a poor maternal diet for individuals in the womb and early infancy. Porotic hyperostosis/porotic lesions on the skull and cribra orbitalia are linked to childhood anaemia, nutrient and vitamin deficiency and parasites. The presence of frontal notches, multiple hypoglossal foramina and ethmoid foramina are said to increase with nutrition stress in the first year of life. Density changes during bone growth is detected in radiographes and is an indication of nutritional stress. Cortical hypertosis and the calcification of ligaments is considered evidence of small pox, while joint erosion and spondylitic growth (fusion of joints) is evidence of long term infection. The consumption of dairy products is presumed from the presence of tuberculosis and brucellosis, though tuberculosis can be caught by other means. While uncommon at Poundbury it was thought that hypoplasia of tooth enamel in adults results from childhood illness.

Trauma

Bone trauma is difficult if impossible to directly relate it to particular events and are often only signs that injury has occurred, and no more. Personal and group combat, falls and body blows can result in the commonly found fractures of radii, ribs and clavicles, cuts, broken noses and frontal bones. Many other

injuries can result, but lack any one to one correspondence with, these activities. Broken noses, radius and frontal bones were however found mostly in Poundbury's male population. The use of ploughs is thought to link to spiral fractures of the tibia and fibula, which also affects mostly men. Where fractures are common to the lower leg and forearms the authors believe the population was rural and engaged in agriculture. Fractures were usually found healed and well aligned, implying use of splints and I believe them to be evidence of the presence of community health care (most people can't splint their own broken arms!).

Work

Work related pathologies include rubbing and eburnation marks on joints; the result of prolonged and repeated pressure on articular surfaces of the tibia, femur and patella with cartilage degeneration that leads to knee arthritis and is common to women at Poundbury. Platycnemia and retroversion of knee leading to medio-lateral flattening of the tibia ('squatting' facets), as well as articular facets of distal articular surface extending onto the anterior surface of tibia at the ankle, are believed to indicate habitual squatting, which may possibly be related to grain grinding. Excessive strain from lifting heavy loads and back packs, are infrequent in Poundbury but are linked to degeneration of the neck and lumbar vertebrae, osteoarthritis in the hips and spine, and capsular lesions at shoulder joints. Cervical injuries can result from load bearing on head and shoulders and jerking movements as with driving carts of ploughing. Degeneration of the medial and lateral end of the clavicle affected 82–85% of men (due to „mechanical stress“) and 50–73% of women, though the latter is not explained as „mechanical stress“. Digging, lifting and injury can result in wrist joint degeneration, rare overall, are concentrated in males. Thumb and joint arthritis, joint and muscle changes are common to all sexes and relate to performing unknown specialised tasks. Hallux valgus or bunions are said to suggest ill fitting shoes.

Lifestyle

The authors postulate that a relatively low occurrence of joint and muscle changes, osteitis, infectious disease, dental carries, gut parasites, along with a larger number of animal related diseases, higher sexual dimorphism and nutritional diversity suggests a low-density rural population with minimal migration (i.e., an Iron Age population). By contrast an urban lifestyle would have a higher risk of infection, more diseases of malnutrition, a reliance on local products leading to Vitamin C deficiency in poor weather, with a larger population in which the chance of finding rare diseases, pathologies and diseases of old age, is higher. Stature is thought to tend to homogeneity in a population with environmental stress and to heterogeneity with large scale inward migration. The wider the variation in stature the larger the region from which the population is drawn and the more selective the inward migration. Minimal skeletal dif-

ferences also suggests lack of social stratification. The researchers think that the relative homogeneity of the Poundbury population suggests minimal migration and long term stability. Bone condition was generally poor, nutritional diseases—like rickets, scurvy and anaemia—parasites, stunted growth, repeated illness, high mortality, sex differentiation in nutrition and abnormal patterns of skeletal changes, where high, and is indicative of the lack of ready availability of food and the specialisation of labour. Sex differentiation of labour is suggested by differentials in joint diseases, fractures and muscle development. All these factors along with the patterns of fractures, degenerative diseases and spinal arthritis in both sexes, as discussed earlier, support the suggestion that Poundbury was an agricultural community of men in „production“ and „labour“ and women in „food preparation“ and „domestic“ duties. It may be more difficult however to substantiate the implication that food preparation and domestic duties are neither production nor labour.

There is evidence that there was a dense living population in the presence of spreading infectious diseases. Poundbury is also thought to be a civilian population at relative peace as surmised from the equal ratio of males to females, children of all ages are present, and there is little evidence of bone injury from fighting. Evidence of the surgical removal of a foetus, thought indicative of the author Soranus's instructions on the removal of a foetus to save a woman's life, suggests a highly sophisticated level of health care, at least for some. Healed and well aligned bones, and the length of post trauma life, given the nature of the traumas are also indicative of the presence of a high level of community health care. The implications are manifold: the social value attached to human life, the valuation of labour versus health care costs, the availability of food resources for unproductive members of the community, the skill of health care practitioners and medical knowledge on the whole.

Large jaws, occlusal wear on surface of crowns and edge-to-edge bite, of adults, suggests a coarse diet. Relative differences within the population over time suggests a differing diet and/or food processing technology, that the authors link to the coming of Roman milling technology and food preparation. The presence of lead is also evidenced by flask shaped long bones, and high opacity of metaphyses in radiographs. Its appearance and distribution within bones suggests high and long term dietary, or environmental, exposure. Lead in bones is said to be associated to lead processing for silver content and from the use of lead in kitchen ware, cosmetic containers and as medicines. The latter is assumed to be the proximate source of lead poisoning, though this remains an unproven correlation.

Post-Mortem Treatment and Degradation

The authors noted the spatial orientation, layout of body (supine, prone, crouched, flexed/extended limbs, regularity, partial/complete bone set), the presence and style of wraps, and pre-burial exposure. X-ray diffraction of long bones showed the presence of gypsum fragments, presumed to come from body

wraps or plaster fills. The authors examined for decay, intrusions, cross-cutting, preservation and the bone position mixing said to result from long distance transportation (cf., Brothwell, 1987). The cross cut of graves. is due to long term use of the same area for burial.

Congenital Factors and Problems

There are many and various congenital abnormalities, few of which are perceptible in the individual when alive. Chronic and progressive joint diseases visible in skeletal remains are not always disabling. Similarities in the appearance of foramen, metopic skulls and mandibular tori, extra cranial plates and odd skull features, along with the presence of hypodontia, microdontia and palatogingival grooves in teeth are all inherited and suggest consanguinity.

Multivariate Analysis

The factors examined and used to describe and explain social phenomena included: age, age at death, sex, dentition, diseases, injuries, hair, grave depth, coffin presence, coffin styles and fittings, orientations, inclusions, animal bones, cremation, inhumation, pottery, hob nails, stature, the presence and location of injury, the frequency of occurrence and spatial relationships of any of the above.

Given the many aforementioned indications of general nutritional inadequacies, and finding that generally Poundbury's skeletons are small for age, of light weight, with low sexual dimorphism, and small male stature, along with the late arrival of puberty and poor teeth the authors suggest that many had a poor diet. The high number of young adult men and women, suggests that infants were buried elsewhere, or that there was migration into the city of the rural young, at a level higher than predicted given the evidence cited earlier. The ratio of youth to adults at 1:2 is lower than the expected 1:1. This is contrary to the model developed by Molleson wherein age and sex ratios differ according to settlement patterns, and subsistence practice, and where urban populations had lots of young moving in. Variation in the numbers of hob nails in the graves was noted across the cemetery, occasionally higher for men if differentiated at all. Mills (1993a:99) suggests that the analysis of age and sex by the number of hob nails is futile, because the number of nails does not correlate to these factors but to the type of shoe. There is no age or sex differentiation in grave depth, occurrence of pottery (Greep, Galloway and Mills, 1993:111), coffins or fittings, spatial distribution across the cemetery, goods or rites or causes of death (indicating that neither war nor childbirth killed many). There was differentiation in the pattern and type of inclusions (apart from the Late Roman period), in the occurrence of lead lined coffins which are found more with females and adults than with males and children (Mills, 1993b:127). Sex differentiation in work is suggested by differing joint diseases, fractures and muscle development between males and females. There was also a difference in male and female growth and age at death. The unequal ratio of types of trauma, diseases and other pathological changes, along with differences in male and female growth and age at death

are suggestive of differential social treatment. The degree and nature of this difference would seem impossible to quantify from the bone evidence of Poundbury, through it might be worth giving this matter further consideration. There are twice as many healed fractures on men as on women, which the authors do not comment on. I also wonder what this might say about the matter of health care for women and of the valuation of injured women by the community.

Status

It is suggested, controversially, that the presence of a trochanteric spicule on the greater trochanter, Poirier's facet of the femur head, and enlarged insertion areas for the adductor longus muscle on the linear aspera are evidence of habitual horse riding. Two were buried in mausolea, and six with lead coffins and plaster packing. It is indirectly implied that horse riding, burial in mausolea, lead coffins, plaster packing, an abundance of quality inclusions is related to high status individuals. Where hair remains, it is thought that combing, styling, colour and oils may be status indicators. The clustering and common patterning of graves around mausolea is thought to be indicative of social stratification.

Demographics

Demographic study depends on establishing the size of the living population, so that it can be compared with the buried population. Without the size of the living population, birth and mortality rates, then life expectancy cannot be determined, nor can the representivity of the cemetery population be established. The authors have presumed that the living population is knowable and in estimating it have produced a demographic model. In doing so they created an age distribution curve of the cemetery group, that was compared to the predicted curve of a „similar“ population to see whether the cemetery group is a „selected group (e.g. soldiers) or a civilian community“. Relative proportions of age groups were established, being indicators of stability or change in population growth. In a similar vein by assuming that the living community was represented in the cemetery group they conclude that the equal number of males and females, and the presence of children of all ages, suggests a civilian population. The low number of children is thought to be due to infertility problems. It must be noted that 'paleodemography' is at best an approximation, and must often rely on a great many speculative assumptions about population, migration and birth and death rates.

Ethnographic Analogy

Throughout the analysis the authors utilise analogies to modern and ancient communities in their comparisons and contrasting of various phenomenon at Poundbury. The presence of children was found in higher than expected numbers, compared to other groups (contradicting the evidence presented by Molleson 1993:214). Modern ethnographic studies are used to correlate the appear-

ance of so-called 'squatting' facets to squatting women and to the relationship of women to children as the primary care givers, because they were lower and more accessible than men, for the children. Fractures common to lower leg and forearm, is understood by ethnographic analogy to relate to rural subsistence practices. Again and again the authors refer to other communities, times and societies, the appropriateness of which can not be ascertained without proper referencing, as such their conclusions are purely speculative.

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