ARCHAEOLOGICAL EVIDENCE FOR INFANTICIDE IN ROMAN BRITAIN:

FACT OR FALLACY?

by

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Introduction

Infanticide is the killing of unwanted offspring within the first week of life, often carried out by drowning, suffocation, or exposure. Exposure refers to the practice of abandoning an infant, either in a private or public space, with the assumption that the infant will either perish or be adopted by another family. Exposure was a prolific practice in antiquity, where other avenues of reliable contraception were not widely available, and where abortion posed massive risks to the pregnant woman's life (Grubbs, 2014). Tertullian (c. 155 - 240 AD), an early Christian writer from Carthage, shared his perspective on this act: 'you expose them to the cold and hunger, and to wild beasts, or else you get rid of them by the slower death of drowning' (Tertullian, [1869]). Although it is apparent from historical literature that exposure and infanticide were practiced, it is unclear how often they occurred and what happened to the remains of the victims. The term 'exposure' is derived from the Latin word 'expositio' which roughly translates to 'offering up' or 'putting out,' and has been suggested to relate better to the modern English word 'exposition' (Wilkinson, 2013). While a large portion of those infants who were exposed would have died, historical evidence shows that at least a few were adopted by other families as slaves or adoptive children if the household had no heirs (See: Pliny the Younger, [1762] and Suetonius, [2015]).

The study of infanticide in antiquity is an important topic in anthropology because it pertains to notions of personhood, specifically the personhood of a group of individuals that have often been overlooked by historians and archaeologists. Archaeologists did not begin to show an interest in the archaeology of women and children until the later twentieth century and tended to focus mainly on the experiences of the male elite (Gowland, 2001). In essence, these infants are individuals that had no agency of their own, but their remains serve a purpose in understanding familial relationships in Roman Britain as well as understanding overarching societal values. Another reason why the topic of infanticide is important is because there is still an ongoing debate among archaeologists as to whether the archaeological 'evidence' of infanticide is sound or whether it can be explained by other means. It is particularly difficult to definitively prove a case of infanticide because the death can occur in ways that does not leave evidence on the skeleton, especially since historical texts suggest that exposure was the common method for disposing of unwanted infants. I have decided to focus on Roman Britain in particular because there are numerous historical documents that reference infanticide and exposure as socially

acceptable practices, under specific circumstances, in Roman society and there are multiple archaeological sites in Britain where archaeologists have argued that the perinatal remains found at the site are representative of infanticide, which has led to the assumption that this practice was widespread in Roman Britain.

My research will integrate a range of historical texts, examinations of burial contexts, and analyses of osteological methods to create a reference text for archaeologists who wish to conduct examinations of and draw conclusions from neonatal (newborn) remains that are dated to the Roman period in Britain. This will be achieved by providing historical documents to determine laws and attitudes towards exposure and outright infanticide, examining Roman texts on obstetrics and child-rearing, exploring normative burial practices for Roman infants, and identifying the most applicable and accurate methods of age estimation on neonatal skeletons. My overall aim is to aid researchers in generating further insights into familial relationships in Roman Britain, in particular the treatment of infants, without deferring to sensationalism based on preconceptions of past societies. I hypothesize that infanticide will not appear frequently in the archaeological record because the infants in question were often left out in the open to eventually die. This environment would make it easy for taphonomic processes to degrade their remains or for animals to access their remains and scatter them, thereby removing their remains from the archaeological record. Additionally, infants who had been victims of infanticide would not have received a socially normative burial, therefore I reason that their remains would be located in seemingly 'random' areas (Millett and Gowland, 2015). I believe that a number of the studies where researchers have made the claim of infanticide could provide alternative explanations if further examined. Additionally, I suspect that some of the methods of osteological analysis employed to make the argument for infanticide may reveal shortcomings in their applicability to this specific problem. More specifically, I expect that large comparative and sample data sets will be required to conclusively determine infanticide, and that cases with one or few infants will remain ambiguous.

The Case for Roman Infanticide in the Archaeological Record

The reason that infanticide has become a topic of interest in the archaeological investigations of Roman-British sites is due to the fact that a number of these sites have revealed large quantities of infant skeletal remains. The most vocal proponent of the infanticide theory is Dr. Simon Mays, a human skeletal biologist for Heritage England and committee member of the Society for the Study of Childhood in the Past (Mays, n.d.). His research on this topic has received a considerable amount of public attention, which is part of the reason why I believe it is important to critically address these claims. Dr. Mays has written two articles outlining his arguments in favour of an infanticide interpretation, which are summarized here:

Poundbury, Ancaster, Winterton, Rudston, Old Winteringham, and Thistleton

estimated gestational age	Romano-British settlements/villas	Romano-British cemeteries	Wharram Percy medieval churchyard
26–28	1	0	1
29–31	1	0	2
32–34	1	2	6
35–37	13	12	14
38–40	52	46	10
41–43	8	16	10
44–46	1	7	12
47–49	1	3	6
total	78	86	61

Table 1 - Distributions of perinatal infant ages at death. (Mays, 1993, p. 884)

The article "Infanticide in Roman Britain" by Dr. Simon Mays (1993) addresses the interpretation of infanticide in Roman Britain as an explanation for finding infant burials outside of recognizable cemetery sites or 'religious' areas, usually in villas and settlement sites. Mays explains that ethnographic evidence suggests that in many societies infants had different burial rites than older individuals and that interpretations of infanticide on the basis that the interments were outside of cemeteries and 'religious' areas are somewhat unjustified. He uses infant remains excavated from the churchyard of the medieval village of Wharram Percy, North Yorkshire to compare the age distributions between Roman-British and Medieval populations. The Roman-British sites selected were two cemeteries (Poundbury, Dorset and Ancaster, Lincolnshire), two villas (Winterton, Lincolnshire and Rudston, Humberside), and two

settlements (Old Winteringham, Humberside and Thistleton, Leicestershire). These specific sites were chosen because they all revealed a considerable number of perinatal infant burials (Table 1), and the original age estimations were done using the Scheuer et al. (1980) regression equations or the data on long bone lengths was adequate for Mays to make age estimates using the regression equations of Scheuer et al. (1980). The age distributions of the Roman British sites and the medieval site showed differences, with the medieval site reflecting that of modern infant age-at-death distributions. The age distributions of the Roman British sites are similar to those observed in a study by Smith and Kahila (1992) from a late Roman sewer at Ashkelon, Israel, which Smith and Kahila believe suggested infanticide. Mays concludes that the infants at the Roman British sites were also likely victims of infanticide.

Yewden Roman Villa

The article "Perinatal infant death at the Roman villa site at Hambleden, Buckinghamshire, England" written by Mays and Eyers (2011) presents the interpretation of infanticide at another Roman-British site. Mays and Eyers investigate the age at death distribution of infants buried at the Yewden Roman villa, which has yielded the largest quantity of infant burials of any Roman-British site. The site was excavated in 1912 and yielded 97 infant burials, mainly from a yard on the north side of the villa. The general period of use for the villa was between the mid 1st to the late 4th century AD, indicating that the burials accumulated over the span of up to 280 years. When taken out of storage, the infant remains were in their original packaging and had approximate ages at death listed on the labels. Analysis was done on the dental remains of 6 of the individuals for an unpublished PhD thesis, which revealed that none of the teeth had neonatal lines, suggesting that the infants were stillborn or died within 14 days of birth. Neonatal lines are the result of irregular enamel deposition in the period immediately after birth (Smith and Kahila, 1992; Lewis and Gowland, 2007). Only thirty-three of the infant skeletons had one or more long-bones preserved well enough for age estimation using long bone lengths. Mays and Eyers used the regression equations of Scheuer et al. (1980) and Sherwood et al. (2000) because they were generated from two reference samples with very different age distributions, which would mitigate the potential for the age distribution of the study population to mimic that of the reference populations. The other aging method that they employed was a Bayesian approach, based upon the data of Scheuer et al. (1980) and Sherwood et al. (2000).

Results showed that the Hambleden age-at-death distributions were clustered closely around the bone lengths which have been established to correspond with a full-term infant. The Hambleden data was found to resemble the age distributions of the late Roman sewer in Ashkelon and contrast with the more widely dispersed medieval Wharram Percy distribution. Similar patterns of age distribution for the Hambleden data were found using both the Scheuer et al. (1980) and Sherwood et al. (2000) methods. Mays and Eyers highlight that this pattern was not only seen in the age estimates constructed using the regression methods, but also in the raw bone measurements and Bayesian analysis. Since only 35 of the original 97 infant remains could be located in the site archive, there is a possibility that the age distribution may not be representative of all the burials, but Mays and Eyers believe that this is unlikely because it would indicate selective retention of perinates. Another possibility is that the excavated site was used mainly for the burial of perinates, with slightly younger and older infants being buried elsewhere. Since the perinatal age distribution resembles that of other Roman sites in Britain, this explanation would have to apply more broadly, which Mays and Eyers believe is improbable because they state there is no written evidence of this practice. They further state that there are no obvious explanations as to why the age distributions of natural deaths should be clustered around 38-40 weeks in antiquity, as high numbers of deaths among pre-term and slightly older infants would also be expected.

Additionally, they reference a study of perinatal mortality in modern Americans which showed that even though mortality rates were higher in disadvantaged communities, the distributions of age-at-death were more widely dispersed. Mays and Eyers state that the perinatal age distributions from many archaeological sites do not show a considerable peak around 38-40 weeks, which indicates that the age distributions of perinatal infant remains from antiquity generally resemble those of modern perinates. They conclude that the study, in conjunction with past studies of perinates from Roman-British sites, suggests that infanticide may have been a regular practice in Roman Britain.

How Can We Test the Accuracy of This Interpretation?

Roman Texts

Historical texts related to Roman attitudes towards infants and infanticide are limited, and most of the evidence we do find focuses on the perspective of the male elite, which is not representative of the entirety of the population of the Roman Empire, nor the women that were in charge of infant care, who left little written evidence themselves (Gowland et al., 2014; Dasen, 2011). The applicability of these perspectives to Roman Britain are questionable as it was on the margins of the Empire, but they do highlight the many different and often contradictory ways that infants were perceived. It also gives us the opportunity to consider how the archaeological evidence contrasts with these perspectives, and how we can use the historical evidence and archaeological data in tandem to further our understanding of Roman infancy (Gowland et al., 2014). In the Latin literature, there is no specific word for baby, the closest terms being '*infans*' and '*infantia*', having the literal translation 'not speaking', which appear by the end of the first century BC alongside the new terms '*bimus*' or '*bimulus*', meant to refer to a two-year old child (Gowland et al., 2014; Dasen, 2011). We should not assume, however, that the introduction of these terms meant a change in perspective towards young children, but perhaps a change in understanding of the stages that comprise childhood (Dasen, 2011).

The newborn child enters into society through a series of phases, which fit closely with the rites of passage outlined by Arnold van Gennep (1909), comprised of separation, liminality, and reincorporation. The first phase, separation, occurs when the child is born and is examined by the midwife. The second phase, liminality, is maintained throughout the eight to nine days post-partum, before the child is given a name and social identity, where the father holds the right to reject the child (*patria potestas*) for various reasons such as illegitimacy or physical defects (Dasen, 2011). It has been argued that the father could even choose to abandon the child if it was born a female; however, Dionysius of Halicarnassus states that the mythical Laws of Romulus, that allegedly comprised Rome's 'ancestral constitution', oblige the father to raise all male children and at least the first-born daughter, and not kill any children under the age of three except those that were deformed and even then, "These he did not forbid their parents to expose, provided they first showed them to their five nearest neighbours and these also approved." (*Roman Antiquities* 2.15.2). The Laws of Romulus were clearly a construction meant to communicate social morals and should not be taken as literal Roman law (Harris, 1994; Shaw, 2001). Greek philosopher and Roman citizen Plutarch (c. 46 – 119 AD) explains that before the newborn child loses its umbilical cord, it "is more like a plant than an animal" (*Roman Questions*

288C). This idea may have made it easier to rationalize the death of a newborn child, be it by natural causes or by infanticide. Additionally, Cicero (c. 106 – 43 BC) writes that, "If an infant in the cradle dies, [the survivors] ought not even utter a complaint." (*Tusculan Disputations* 1.39). The reality of the situation is somewhat more complex, as we can see from Plutarch's letter to his wife after the loss of their own child.

Plutarch's daughter Timoxena, the namesake of his wife, died at the age of two while he was away in Greece. He describes his daughter as mild, generous and of good temper, recounting the times that she offered her nurse's breast to other infants and to her toys, '…dispensing in her kindness what bounty she had and sharing her greatest pleasures with whatever gave her delight.' (*Moralia* 608D). Plutarch praises his wife for not displaying outward grief at the loss of their child and reminds her to take joy in the memories they have of Timoxena and not to shut themselves off to wallow in depression. He remarks that the attendants of his daughter's funeral were surprised that his wife did not appear to be in mourning, and that he is proud of her reserved, virtuous nature, unlike that of the 'pernicious' women who visit them and '…came from the world outside with wailing and screaming, as if they were in very truth adding "fire to fire."' (*Moralia* 610C). He observes that, 'most mothers, after others have cleansed and prettied up their children, receive them in their arms like pets; and then, at their death, give themselves up to an unwarranted and ungrateful grief, not out of good will toward them — for good will is rational and right — but because the combination with a little natural feeling of a great deal of vain opinion makes their mourning wild, frenzied, and difficult to calm.' (*Moralia* 609E-F). Plutarch explains to his wife that Timoxena has moved into a state where she no longer feels pain, that she knew very little and that she found pleasure in the little things, and that they should not mourn for the things she had not yet experienced, because she had never given thought to them, therefore she could not be deprived of them. He conceptualizes her soul as a bird trapped in a cage; if the soul has been in the body for a long time then its becomes tamed by life, but his daughter's soul had only been caged in her body for a short amount of time and then set free by higher powers, so it may easily 'proceed to its natural state' (*Moralia* 611D-F). He concludes his letter by recalling the laws of Rome:

> It is rather in our ancestral and ancient usages and laws that the truth of these matters is to be seen; for our people do not bring libations to those of their children who die in

infancy, nor do they observe in their case any of the other rites that the living are expected to perform for the dead, as such children have no part in earth or earthly things; nor yet do they tarry where the burial is celebrated, at the graves, or at the laying out of the dead, and sit by the bodies. For the laws forbid us to mourn for infants, holding it impiety to mourn for those who have departed to a dispensation and a region too that is better and more divine. And since this is harder to disbelieve than to believe, let us keep our outward conduct as the laws command and keep ourselves within yet freer from pollution and purer and more temperate. (*Moralia* 612A-B).

It is clear from this letter that there was a socially dictated 'correct' way to react to the loss of an infant, which was very different from the commonly observed actions of mothers in mourning. Both Plutarch and Cicero highlight and rationalize this ideal, which explains why so much of the written evidence refers to infants and young children in a detached manner.

The infant was not given a social identity until the naming day, *dies lustricus*, which occurred eight days after birth for girls, and nine days for boys. (Plutarch, *Roman Questions* 288B-E; Macrobius, *Saturnalia* 1.16.36). The child was given an individual name, a praenomen, and the *nomen* of its *gens*: 'a group of families in ancient Rome who shared a name and claimed a common origin.' (*Oxford Dictionary*). We know little about the specific events that occurred on the *dies lustricus*, but sacrifices, purification rituals, and family gatherings have been mentioned in various Roman texts. Part of the reason for postponing the naming day was because of the high infant mortality of the time; Plutarch explains that naming proceeds after the seventh day as the seventh day is dangerous for newborns, and in most cases the umbilical cord falls off on the seventh day (Dasen, 2011). Further evidence suggests that an infant was not understood to obtain full personhood until they had teethed, or possibly not until they could walk and talk; but once the child was considered to be a person they would be incorporated into their role in society (Gowland, 2001). Soranus, a Greek physician from Ephesus, provides a glimpse of what early life would have looked like for a Roman newborn, in his midwife training handbook, *Gynaecology*. Written in the second century CE, *Gynaecology* instructed midwives on how to prepare for delivery of the infant, how to deliver the infant and how to care for the infant, and although it is the most detailed example of Roman infant care, it was almost certainly directed towards elite families. The average Roman mother didn't necessarily have the time or ability to

read, and most likely relied on the knowledge of her community rather than medical texts. We cannot know the extent to which Roman-British childbirth and childcare practices would have followed the guidelines laid out by Soranus, but it does allow us to examine the Roman understanding of obstetrics and attitudes towards newborns (Dasen, 2011).

Soranus explains that childbirth took place at home, with the help of female relatives, friends, slaves, and neighbours. After the baby had been successfully delivered, the midwife would then make a gesture to announce the sex of the infant. She places the newborn on the ground and carefully examines its fitness in order to determine whether the infant was "worth rearing" (*Gynaecology* 2.5[10]). In this examination, the child should cry with suitable strength and be "perfect in all its parts, members and senses: that is ducts, namely of the ears, nose, pharynx, urethra, anus" must be clear from obstruction. Additionally, the mother should have been in good health during her pregnancy, the child should be born after a gestational period of close to nine months, and the infant's nerves should be in proper working order such that they respond to light pressure. Unfortunately, Soranus does not make mention of what happens to an infant not "worth rearing", but it seems likely that it would have been exposed. The entire body is investigated with care, understanding that the newborn is particularly fragile, to make sure that no abnormalities were present. The Romans were particularly concerned with physical abnormalities, going back to the Republican period, and it was believed that a newborn infant with severe physical abnormalities was a sign of divine wrath that would threaten the entire community (Dasen, 2011). While some historical sources imply that all disabled infants would be disposed of, often by throwing them into the sea, other sources show that children with physical defects were accepted into the community (See: Pliny, *Natural History* 7.68-69).

Once the child was accepted into the family, it would receive its first bath. The first bath was an important social marker, because this type of care implied that the child had been viewed as viable and that the relatives could begin to welcome the infant into the community and familial group. Additionally, this would be the first time that the child was introduced to its life on earth through contact with water, one of the main elements. The remaining remnants of uterine life were washed off, and the vernix caseosa was gently rubbed with fine salt, as suggested by Soranus (*Gynaecology* 2.6a[13]). The midwife then squeezed out the mucus plugging the infant's nose, cleaned out the mouth and ears, and dilated the anus to encourage the

evacuation of meconium (Dasen, 2011). For the first day or two after birth, the infant would only be fed honey boiled in water, as this food had heavenly associations, and as Soranus believed, "Its whole body is full of maternal food which it ought to digest first" (*Gynaecology* 2.7[17]). After several days, the baby would then be introduced to the milk of its mother or nurse. It was believed that breastmilk was strongly affected by what the nurse or mother ate, and if an infant fell sick, the wetnurse would be put on a diet thought to be appropriate in correcting the disease of the child (*Gynaecology* 2.4[57]).

Celsus (c. 25 BC – c. 50 AD), a Roman encyclopaedist, offers us much insight into the fragile health of Roman infants in his book *On Medicine*. He explains that children are hot, moist, less sturdy than adults, and that they must be treated mildly, stating: "Indeed, in general children ought not to be treated like adults. Therefore, as in any other sort of disease, we must set to work with more caution in these cases" (*On Medicine* 3.7.1B). Common treatments used on adults such as bloodletting, purging and vomiting must not be used on children, and surgery should only be done as a last resort. The only medicine that was suitable for regular, direct application to the infant would be preparations with honey, which were used to soothe mouth ulcers (Dasen, 2011). Furthermore, Celsus highlights several reasons why the infant mortality rate was so high in this period, explaining that children are more susceptible to specific illnesses that can quickly become fatal. Certain common and usually harmless disorders, such as canker sores, could become lethal to breastfeeding infants when they covered the mouth, uvula, and throat, and impeded the ability to receive adequate nutrition (*On Medicine* 6.11.3). Diarrhea was another danger underlined by Celsus which could cause death, all the way up to the age of ten, although more frequent in younger individuals (*On Medicine* 2.8.30).

Thus far we have explored Roman texts pertaining to the social perceptions of infants and guidelines on their care, but what do other historical texts tell us about infanticide and exposure in particular? Firstly, we should consider whether infanticide and exposure were the only options to dispose of an unwanted child. Soranus mentions several measures that can be taken to avoid unwanted pregnancy in the section "Whether One Ought to Make Use of Abortives and Contraceptives and How?" in *Gynaecology* (1.19[60]). He suggests that it is preferable to employ contraceptive measure rather than abort a pregnancy, and that an abortion should only take place if the uterus cannot accommodate a healthy pregnancy. He advises that sexual

intercourse should be avoided during times that were suitable for conception, and that the woman should hold her breath and pull away slightly while the man ejaculates, so that the semen does not travel deep into the uterus. Post-coitus, she should immediately get up, move into a squatting position, sneeze, and thoroughly wipe her vagina and may also choose to drink a cold beverage. In order to further aid in preventing fertilization, Soranus suggests that the woman might smear the opening of the uterus with olive oil, honey, cedar resin, or sap from a balsam, alone or in combination with white lead. He explains that all of these topical contraceptives are clogging, cooling and antihemorrhagic, and cause the uterus to close before sexual intercourse, which blocks semen from entering the uterus. If a pregnancy has already occurred, Soranus recommends rigorous exercise to separate the embryo, the use of diuretics that can also stimulate menstruation, consumption of wine, long and warm baths, the use of poultices and injections of oils, or bathing in a decoction of linseed, fenugreek, mallow, marsh mallow, and wormwood. Additionally, he lists several vaginal suppositories which would induce abortion. While it is assured that many women across the Roman Empire would have known of natural contraceptives and abortives without having read Soranus, very few of these methods would have been guaranteed to be effective, and many could pose a major risk to the woman's life. Child-exposure may have been preferable because it also allowed for them to choose the sex of offspring that they desired to keep (Harris, 1994).

A range of texts make small allusions to the practice of exposure in the Roman Empire, suggesting that it was widely and commonly exercised. In fact, the topic of exposure is brought up by almost every Greek and Roman author of the second and third centuries; in some cases, within Roman adaptations of the 'New Comedy' of Hellenistic theatre, and other times as a means to emphasize the purported savagery of pagans by Christian writers such as Justinian and Tertullian (Harris, 1994; Shaw 2001). Not only did exposure allow control over the number of offspring in a family, but it also provided a source for slave labour. When infants were exposed, it appears that it would have been carried out by women or slaves (Harris, 1994; Grubbs, 2014). Harris (1994) suggests that the motivations behind exposure can be divided into four categories: (1) disability or deformity, (2) illegitimacy, (3) poverty, and (4) evil omens. We have previously discussed that although several texts blatantly state that infants with physical anomalies would have been disposed of, Pliny the Elder also provides us with examples of individuals who were raised despite their physical disabilities. Illegitimacy, however, appears to have been a major

concern for Roman fathers. Men were not known to be present during childbirth and it is for this reason that some men were fearful that their wives would try to trick them (Dasen, 2011). Roman jurist Ulpian (c. 170 – 228 AD) describes in legal texts that when paternity was in dispute, the mother had to give birth in a room with one guarded door, surrounded by female relatives from both her own family and her husband's so that the child's rights are protected, and the mother could not substitute her child for another (*D* 25.4.1.10 in Dasen, 2011). The exposure of illegitimate babies was a major plot point in many New Comedy plays, but we do not know the extent to which this was a favourable practice in reality (Harris, 1994). It is not premarital sex that is the cause of these illegitimate pregnancies in New Comedy, but rape which then leads to the desire to expose the infant. In reality, this kind of pregnancy would have likely been disguised by a quick marriage, and the infant would only be exposed if the father could not or would not marry the mother and claim the child as his own (Grubbs, 2014). Evidence suggests that the babies of widows or divorcees were more often exposed. Caius Melissus, a grammarian during the Augustan period, was exposed by his parents 'in consequence of quarrels between them', suggesting that this was succeeded by their divorce (Suetonius, "Lives of Eminent Grammarians XXI").

Plutarch briefly mentions 'that the poor do not bring up their children' due to the fear that without a proper upbringing, they will have a poor childhood, and they cannot tolerate passing their poverty onto their children (*De amore prolis* 5). This is most likely Plutarch's interpretation, and probably has more to do with the poor not having the means to supply their children with what is needed to sustain a healthy life. Harris (1994) infers that, "This exaggeration probably presupposes a substantial amount of exposure of healthy children among the author's contemporaries." which I am hesitant to agree with, because regardless of whether the child was physically healthy at birth, it would be difficult to maintain the child's health without the economic means to do so, and the parents may have desired to spare their child from future hardship. Appian (c. 95 AD – c. 165 AD), a Greek historian with Roman citizenship like Plutarch, also mentions that a source of suffering for the poor prior to 133 BC was their 'inability to bring up their children' (Harris 1994). It is, however, important to consider whether this was merely the assumption of two elite Greek men living in Rome, or a reality for Romans living in poverty. More convincing is the lecture given by the Roman stoic philosopher Musonius (c. 25 AD – c. 95 AD) on the question of whether every child that is born should be raised. Musonius

explains that the 'lawgivers', whose role it was to determine what is good and bad for the Roman people, rewarded citizens who had many children and penalized women for having abortions or being childless. He follows the question of how poor men can provide for their many children if they have no means of doing so by quoting Homer: "Even as a bird carries to her unfledged young whatever morsels she happens to come upon, though she fares badly herself—" and Musonius reasons that men are smarter and stronger than birds and therefore if birds can provide for their young, then 'the plea of poverty' is 'unjustified'. However, Musonius is more disgusted by the elite members of society who choose not to raise their later-born children to allow their surviving children to inherit more wealth, as he believes that brothers are more of a blessing than money (*Fragments* – Lecture XV).

Harris (1994) identifies a position taken by the Roman historian and politician Tacitus (c. 56 – c. 120 AD) that is particularly telling about the state of child-exposure in Rome during the first century AD:

> No one in Germany finds vice amusing or calls it 'up-to-date' to seduce and be seduced. Even better is the practice of those states in which only virgins may marry, so that a woman who has once been a bride has finished with all such hopes and aspirations. She takes one husband, just as she has one body and one life. Her thoughts must not stray beyond him or her desires survive him. And even that husband she must love not for himself, but as an embodiment of the married state. To restrict the number of children, or to kill any of those born after the heir, is considered wicked. Good morality is more effective in Germany than good laws are elsewhere." (Tacitus *Germania* 19)

Not only does Tacitus highlight the anxieties of marital infidelity among Roman men through the example of the morality of German women, but he also identifies the difference between what is legally forbidden and what is socially forbidden. Regardless of whether there were laws in place during this period in the Roman Empire that specifically forbade infanticide and exposure, the practice was bound to be carried out if enough people considered it to be socially acceptable and the driving factors behind it remained. Tacitus also wrote this text closely around the time that *alimentia* was implemented in Italy (Harris, 1994). The imperial government, as well as some private citizens, implemented public foundations known as *alimentia* that provided an allowance for families to support their children, much like modern-day child benefit payments (McGinn

2013). Pliny the Younger explained the reasoning behind *alimentia* as follows: "while enormous rewards and comparable penalties motivate the wealthy to raise children, there is only one way to encourage those less well-off — a good emperor." (*Panegyricus* 25-28). As we can see, not only were efforts made to detract elite members of society from abandoning their offspring, but those in the poorer classes of society were rewarded for raising their children. Despite Musonius' remark that the poor should make sacrifices to provide for their children, it is clear that poverty as a driving force for infanticide and exposure was apparent to the government and that they recognised the requirement for economic assistance.

Child-exposure was not made officially illegal in the Roman Empire, as far as we know from the textual evidence, until 374 AD by the Christian emperor Valentinian. It was prior to this criminalization, however, that mounting disapproval towards pagan practices was fostered among the early Christians of the Roman Empire. As quoted in the introduction of this thesis, the Christian writer Tertullian was already making his abhorrence of the act of child-exposure publicly known by the end of the 2nd century AD, almost two hundred years before the practice was criminalized. The imperial government was clearly making efforts to discourage exposure, so why did it take so long for it to become a crime? Unfortunately, there is no overt answer to this question. Harris (1994) suggests that previous emperors were too prudent to expect that such a long and widely practiced method of family planning could be eradicated through judicial law, much like Tacitus implied. It could have been the case that the prevalence of exposure had decreased in the preceding decades, especially since emperor Constantine had legalized the sale of free-born children into slavery in 313 AD. Since exposed infants had comprised a considerable portion of the slave population, the demand was already in place and it would be much more reasonable to sell an unwanted child rather than expose or outright kill them. This was by no means a simple policy change, in fact this choice went explicitly against a fundamental principle of Rome that 'no price can be set on the head of a free person', which likely made its implementation somewhat contentious. Evidently, despite Constantine's efforts, child-exposure remained a ubiquitous practice as shown by a section of Firmicus Maternus' *Mathesis*, written in the final years of Constantine's empire, dedicated the exposure of infants. Valentinian's decision to make both exposure and infanticide a capital offense was clearly just one avenue to impose his religious ideologies on the Roman people, and certainly does not

guarantee that the practice declined considerably or was extinguished in the subsequent centuries of the Roman Empire (Harris, 1994).

Archaeological Evidence of Infant-Specific Mortuary Practices

While we have discussed the writings of Roman elite males at length, the archaeological context of infant remains can aid us in understanding what was actually taking place in ordinary people's daily lives at the time. Firstly, it's important for us to understand what a normative mortuary treatment was for an infant in Roman Britain so that we can determine what a deviant burial might be in this case. It has been frequently noted that neonatal infant remains are very rarely found in formal cemeteries dated to the Roman period in Britain, which is believed to indicate that burial within a cemetery was not common practice for this age group (Millet and Gowland 2015). The term neonate (otherwise referred to as newborn) pertains to the interval of life encompassing birth to 4 weeks old, which overlaps with the term perinate that refers to the period of approximately one month before birth to one month after birth (Gowland et al., 2014; "perinatal, adj."). It is important to make a distinction between these two terms as they are sometimes used interchangeably in the archaeological literature, but their differences are crucial in making interpretations as to the potential causes of death (Gowland et al., 2014). Infant burials within cemeteries were not a common practice until later in the Roman period in Britain than the burials examined by Mays (1993), although they are still under-represented in the archaeological record. We will be looking at general trends in the archaeological context of infant burials, as well as several specific sites in order to paint a picture of what might be a pattern of age-specific mortuary practice. One very important aspect to keep in mind is that by exploring the mortuary treatments of infants, we are viewing the evidence of adults' interactions with the infant. This allows us to examine adults' perceptions of infants, as well as the nature of the relationship between parent and offspring.

Generally speaking, regardless of location, infant burials were carried out very simply, with little ceremony, usually in a shallow pit with few or no accompanying items. When grave goods did accompany a burial, they were primarily comprised of animal bone, pottery and coins (Moore, 2009). Cremations of infant remains in the Roman period are rare and it appears to have been a custom not to cremate young infants, as Pliny the Elder reveals that children who had not

yet had their teeth erupt were not cremated (*Natural History* 7.72). Additionally, unlike older individuals, it was deemed acceptable to bury very young children within city boundaries, because their bodies were not seen as polluting forces (Lindsay, 2000). Those who died before the *dies lustricus* were not viewed as having impure souls, and therefore would not turn into vengeful ghosts that would transmit misfortune onto the living (Dasen, 2011; Gowland et al., 2014). This could explain why there is evidence of child burials in the Forum and on the Palatine in Rome, which have been dated to the 7th century BC at the earliest. According to Dionysius of Halicarnassus, in the early years of Rome, Roman citizens were permitted to bury the deceased within the city limits and their homes, however this practice was replaced by extramural tombs and cemeteries. Pliny the Elder additionally states that intramural burial was forbidden for older individuals, but was the custom for young infants, especially under eaves (Gowland and Chamberlain, 2002). Contrarily, Cicero recounts that only those who had achieved great accomplishments in life were allowed to be buried within the city, and that burial or cremation within city limits was prohibited by Decemviral law. Thus, the exception made for young children is evidently related to the perceptions of when an infant became a full member of society, thereby obtaining a social identity, as well as the condition of the soul through the life span (Lindsay, 2000; Gowland et al., 2014; Moore 2009). The liminal perception of young infants was not only recognized in the province of Roman Italy, as infant burials of individuals less than six months old in settlements, villas, within homes, and along internal and external walls have been located in Roman Britain, as well as in Roman Gaul (Dasen, 2011; Gowland, 2001). Furthermore, older infants are rarely present in assemblages from settlements, which suggests that they were afforded a different mortuary treatment, perhaps by inhumation within a cemetery or cremation (Gowland et al., 2014).

As reviewed by Moore (2009), neonatal burials within settlements were a common practice in Europe long before the Roman Empire. Evidence of the practice spans back as far as the Neolithic and Bronze Age periods, and neonatal burials within domestic buildings appear to be associated with ancient Greek and Italian sites. Neonatal burials have also been located within settlement areas dated to the Middle Iron Age in Britain, usually buried within a shallow pit that was cut into strongholds or ditches that were associated with structural foundations. The practice of interring young infants within ditches continued into the Roman period. To further understand the trend of infant burials within domestic contexts in Roman Britain, Moore (2009) generated a

database of 261 infants found buried in domestic contexts across the country from published and unpublished archaeological site reports. Many of the burials were from sites in the Midlands and southern counties as these were the most populated and frequently settled areas of Roman Britain. The sites were mostly comprised of rural contexts (83.5%) which encompassed farmsteads, villas and centrally clustered settlements. The estimated ages of the infants ranged from 29-30 gestational weeks to three years old, with the largest percentage of infants (75.9%) being perinates and neonates. The fact that the majority of the burials in domestic contexts were of perinates and neonates is a strong indicator that this represents a mortuary practice specific to this particular age group and offers an alternative explanation for the tight age clustering observed at the 'infanticide' sites. Most of the burials were dated to the fourth century AD, however the earliest came from a mid-first century AD context and the latest was from the early fifth century AD.
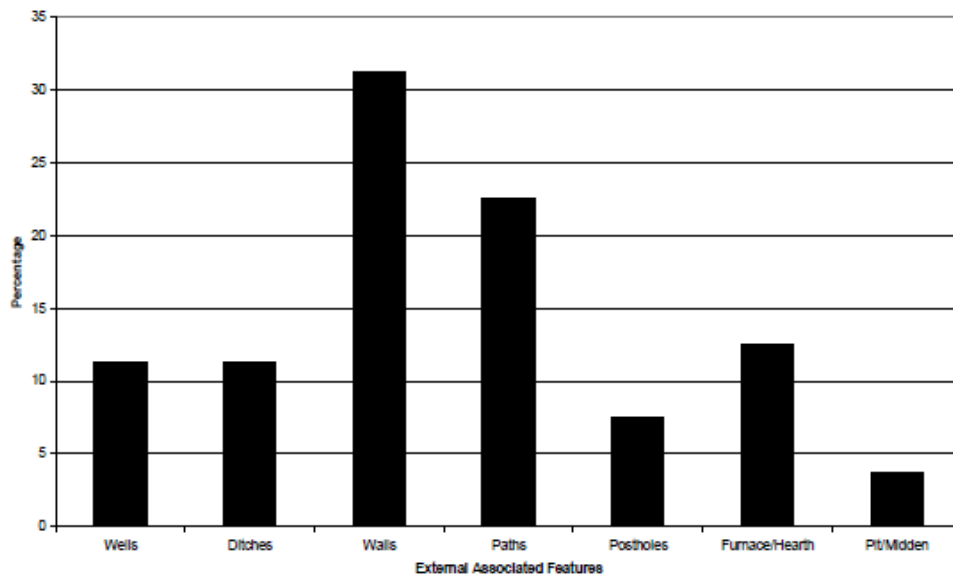

Figure 1 - Proportions of infant burials associated with the various non-domestic external features such as wells, ditches, post holes, pits and furnaces (n=80) (Moore, 2009, p. 43)

The common positioning of the body (75%) was in a flexed position, with the elbows and knees bent outwards, within a shallow pit. Other burial treatments were inhumations within stone or tile coffins (16.7%), also known as cists, or burial within a rectangular cut grave (7.8%). One infant was found buried in a traditional coffin, underneath a paved path entrance into the northern area of a villa, however this infant was older in age (between 6-12 months). In order to

analyze the spatial distribution of the infant burials, Moore (2009) divided the burials into two groups, one from within domestic structures (68.2%), and the other consisting of infant burials from within the immediate vicinity of domestic buildings (32.6%). Results showed that 52.2% of the burials from within domestic structures were located underneath the floors of what appear to be general purpose rooms, and other burials were found within agricultural buildings, storerooms and workshops. Interestingly, Moore (2009) identified two locations that had not been previously described in the literature: burials within kitchens/food preparation areas (9.5%) and bath suites (5.6%). The most common locations for infant burials external to domestic buildings were adjacent to the domestic building (27%), within the yard next to the domestic building (52.9%), and next to or within porticos or sheltered paths (10.6%).
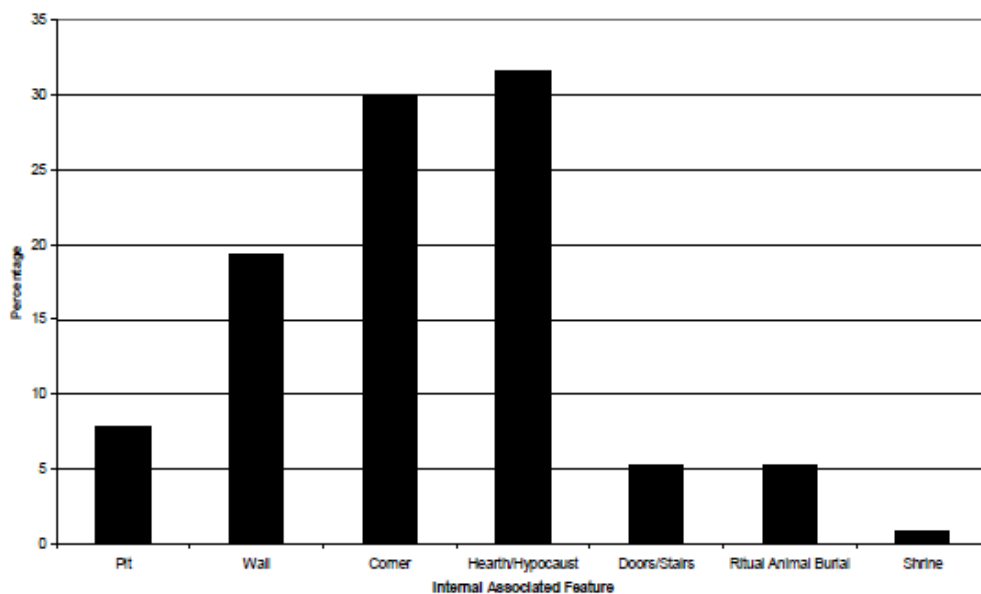

Figure 2 - Proportions of internal infant burials associated with features of a primarily domestic use (n=114). (Moore, 2009, p. 44)

Due to the variety of areas that infants were buried within the domestic sphere, it is difficult to formulate a single explanation or interpretation as to why they were buried there. Additionally, as Moore (2009) and Millet and Gowland (2015) mention, the fragility of infant bones in combination with inconsistent soil composition and post-depositional processes across the sites, means that the infant remains comprising the database may only be a fraction of the true number of infant burials originally deposited at the sites. The diversity of the burials and their association with different features within a domestic context likely indicates a complex

sequence of choices determined by both personal and functional motivations. In some cases, it may have been practical to bury an infant in the yard area outside of the home simply because it was a quick and easy method of disposal. On the other hand, it may have been symbolic to bury an infant near or within the home so that the deceased infant stays connected to the family by proximity, both physically and spiritually (Moore 2009; Millett and Gowland 2015). Moore (2009) suggests that perhaps burial within certain rooms in the house could express where the infant was born or where it had died. Furthermore, the home would have also represented the social sphere of the infant and would be a fitting place for a burial in an area familiar to the infant (Gowland 2001). Many of the burials seem to have elements associated with ritual activity, such as 'repetitious' burials with two or more infants buried in opposite corners of the same room with the same mortuary treatment. The ritual aspects of these burials may represent a belief or superstition that was not documented in the historical texts that we have available to us. Of the infant burials in the dataset, 45.3% with ritual elements were associated with what are presumably foundation burials. Foundation burials are inhumations of whole or partial infant remains within the foundation of a structure which marks the establishment of a new building or the initiation of a new phase of use.

Burials that were situated next to both internal and external walls may have been a symbolic act of protecting the infant. The condition of an infant's soul was viewed as in between the world of the living and the spiritual realm due to their position on the margins of life, which might have led adults to believe that the infant's spirit was vulnerable to evil forces and therefore burying them in corners or with structural features surrounding them could protect them from malicious forces. Another theory that Moore (2009) suggests is that the walls would have kept the restless soul of the infant that was unable to pass into the underworld contained. The textual evidence that infant souls were perceived as being less attached to the body because they had only just entered the world of the living makes this line of reasoning less plausible in my opinion. Infant burials are also often located near hearths, the symbolic heart of the household, and other places associated with heat such as ovens, not only in Roman Britain but also in sites dated as far back as the Upper Paleolithic (Moore, 2009; Händel et al., 2015). This positioning may have acted as another way of protecting the infant and keeping it at the centre of the household, and to symbolically keep it warm. The main connecting aspect of these various burial locations within the domestic sphere is that some were places that could be perceived as

liminal, whereas other locations were considered core areas of the home. Paths, walkways, porticos, doorways, and stairs can all be considered as liminal spaces that allow people to transition from one area to another.

In a critical review of Mays' (1993; 2011) arguments for infanticide in Roman Britain, Bonsall (2013) examined a collection of sixty-nine infant remains aged less than one year old from the sites of Carfax, New Road, Victoria Road, Andover Road, and Chester Road dated to the Roman-British period in Winchester, the fifth largest town in Roman Britain. The majority of the burials are dated to the third and fourth centuries AD, and very few of the burials contained grave goods, which as we know is typical for infant burials during this period. Bonsall applies the regression equations of Scheuer et al. (1980), as well as Sherwood et al. (2000) for comparison, to calculate the age of the infants using long-bone lengths from the femur, the same analysis methods used in Mays (2011). As Bonsall highlights in this article, in archaeological contexts it is almost impossible to distinguish between natural causes of death and infanticide from skeletal remains because the typical methods of infanticide (drowning, starvation, and exposure) leave no skeletal lesions, nor do many developmental or genetic defects. This is why, as seen in Mays (1993), researchers must search for indirect evidence of infanticide.
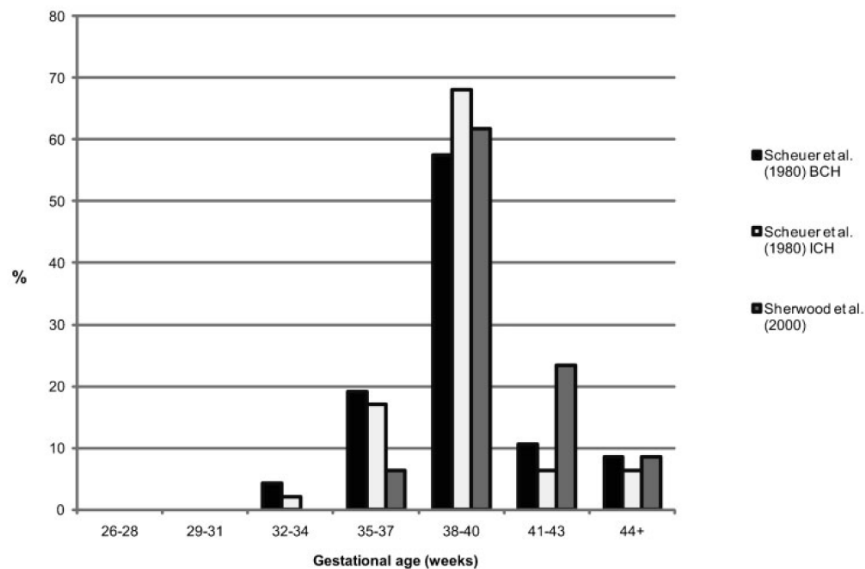

Figure 3 - Age distribution of Winchester infants, based on femoral length, calculated using the BCH and ICH regression equations of Scheuer et al. (1980) and Sherwood et al. (2000). (Bonsall, 2013, p. 80)

The results of Bonsall's analysis showed similar age distributions to the Roman British sites where the conclusion of infanticide was based upon age clustering around the birth period. Some of the infant remains that Bonsall examined were also buried in cemeteries, and also show clustering around the perinatal period but they were given similar mortuary treatment to older individuals, excluding grave goods. If these infants were indeed victims of infanticide, it then poses further questions as to why they were buried in a formal cemetery, which is already a very rare occurrence. The burials examined by Bonsall that were located in ditches, which could be interpreted as casual disposal sites, were afforded similar burial rites to older individuals buried in cemeteries, with some of the infants buried in coffins and two buried with pottery vessels, suggesting that effort, intention and care was put into their burial. Although ditches at a first glance appear to be locations of surreptitious burials because the ground has already been disturbed and it could be a convenient manner of disposing of a corpse, as we can see from both Moore (2009) and Bonsall (2013), they are not uncommon places to find infant burials and could be considered normative burial treatment for perinates and neonates.

As I have illustrated, a major issue with the diverse mortuary treatments of young infants in Roman Britain is the difficulty in identifying a simple, straightforward normative burial practice. In their discussion of the Yewden villa burials Mays and Eyers (2011) state:

> A further possibility is that for some reason, the excavated area at Hambleden was used for burials of mainly full-term infants, with most slightly younger or older ones being buried elsewhere. The Hambleden perinatal age distribution resembles those produced from other Roman sites in Britain (Mays, 1993), so for this to be an explanation it would have to apply more generally, with interment of pre-term foetuses and infants dying in the first few weeks of life in ways which have left no trace archaeologically. We know of no evidence that this sort of burial selection process was carried out in the Roman World.

However, as we have seen from the evidence thus far, this statement is not true. To further prove that there does appear to be a burial selection process specifically for full-term infants, Millett and Gowland (2015) analysed 22 infant burials from excavations of the Roman roadside settlement of Shiptonthorpe, Yorkshire and 45 infant burials from excavations of the Roman sites from Hayton, Cumbria.

Age	Shiptonthorpe inhumations	Shiptonthorpe cremations
<26 gestational weeks	0	0
26–28.9 gestational weeks	0	0
29–31.9 gestational weeks	0	0
32–34.9 gestational weeks	0	0
35–37.9 gestational weeks	0	0
38–40.9 gestational weeks	14	0
41–43.9 gestational weeks	1	0
44–46.9 gestational weeks	0	0
>47 gestational weeks	0	0
Uncertain (infants)	7	0
9–12 months after birth	0	0
Child	0	2
Adult	2	3
Total	**24**	**5**

Table 2 - Summary of the burials from Shiptonthorpe. (Millett and Gowland, 2015, p. 176)

The largest number of infant burials at Shiptonthorpe were located in Trench 3, which was a single domestic area that was occupied during the second to fourth centuries AD. The majority of the infants in this grouping were estimated to have died at 38-40 gestational weeks (Table 2), calculated using the Scheuer et al. (1980) method, fitting with the age clustering pattern described by Mays. Analysis of the spatial patterning of 11 burials attributed to Phases 4 and 5 (early to mid-fourth century AD) showed a deliberate pattern, wherein each infant was buried in a small pit within the domestic area. Eight of the eleven infants were estimated to be aged between 38-40 gestational weeks, with a grouping of seven infants located near the eastern end of a main domestic building, another infant buried underneath the main hearth, one placed near a wall to the south, and two beside the northern extension of the building, near a waterhole.

The burials from Hayton were excavated from two sites, Burnby Lane, a domestic area occupied from the mid-late Iron Age to the fourth century AD, and Glen Garth/Plough Inn, which is comprised of a domestic area and a cemetery in use from the late Roman period to the early Middle Ages.
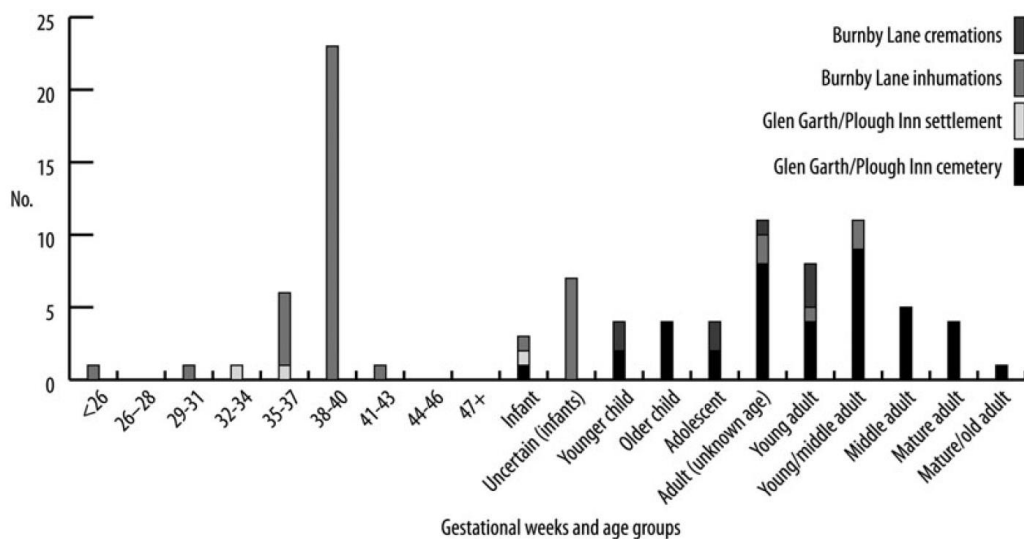
Figure 4 - Age-at-death of burials from Hayton. (Millett and Gowland, 2015, p. 179)

The burials from Burnby Lane included 41 infants that showed a strong age clustering around 38-40 gestational weeks (but broader than Shiptonthorpe), and the burials from Glen Garth/Plough Inn included three from the domestic area and one from the cemetery of which none were identified as neonatal infants. The Glen Garth settlement excavation was carried out under less-than-ideal conditions, which might explain the small number of infant burials found at this site, however the excavators at Shiptonthorpe and Burnby Lane employed an excavation strategy that focused on uncovering all areas that were initially identified as post-holes, which likely explains the high recovery rate. Millet and Gowland (2015) suggest that the difference in age distributions found between Burnby Lane and the Glen Garth/Plough Inn is direct evidence for distinct mortuary treatment on the basis of age, based on the fact that the domestic burials were primarily neonatal, and the cemetery burials were primarily adults. Of the three cremation burials that were located at Burnby Lane, two of the urns contained double burials, each comprised of an adult female and a child (respectively 2-4 years old and 6-8 years old), and at Shiptonthorpe two cremation urns contained multiple individuals, one comprised of two adults and a child, and the other of an adult and a child. This evidence further echoes the statement made by Pliny that children were not cremated until their teeth had erupted and most likely explains why none of the cremation urns contained infant remains.

24

The Burnby Lane site is particularly interesting due to its long period of occupation, which allows us to observe infant burials throughout the entirety of the Roman period in Britain. Six infant burials, aged between 38-40 gestational weeks, were discovered in the phase of the Burnby Lane site dated to the early to mid-Roman period clustered around the northern end of a large domestic building, both inside the building and externally adjacent to it. In the phase dated to the mid-Roman period, two groupings of infant burials were located, one group situated nearby the infant burials attributed to the early to mid-Roman period and the other group located to the east of a different domestic building. Both groups were individually comprised of four infants, with three infants aged 38-40 gestational weeks and one infant aged 41-43 gestational weeks in the first group, and three infants aged 38-40 gestational weeks and one infant of unknown age in the second. In the phase attributed to the Late Roman period, the infant burials were not as tightly clustered together, but they continue to follow the locational patterning of the earlier periods. Three of the burials were close to a bath house, of which one of the infants was aged 41-43 weeks and the other two younger than full-term, suggesting that there may be an association between the bath house and the unborn infants, which was perhaps because they had not received their first bath which symbolically integrated them into the family unit. Another seven infant burials associated with the late-Roman period were located around the eastern and southern walls of a stone building, which is believed to be a domestic structure. Six of the infants were aged 38-40 gestational weeks and one was only 37 weeks. Overall, Burnby Lane shows a clear pattern of neonatal burials close to or within domestic structures, in line with the burial patterns outlined in Moore's (2009) database. Unlike the burial of adults, there was no observed pattern in the orientation and positioning of the body, and the graves were simple small pits with no inclusion of what could be definitively identified as grave goods.

What we have yet to discuss is the appearance of infant burials in temple and ritual contexts, which unfortunately adds some complexity to the interpretations we have made thus far. There is a substantial amount of evidence for ritual deposits of infant and animal remains in Romano-Celtic temples, as well as similar deposits at villa sites (Moore, 2009). For example, the Roman temple complex at Springhead, Kent revealed what appear to be votive infant burials dated to the second century AD, their bodies crouched in postholes at all four corners of the temple, representing free standing posts with several of the postholes also containing horse and

ox skulls (Scott, 1991). Other Romano-Celtic temples sites, such as those at Uley and Colchester, are known to have votive pit deposits that contain offerings such as tools, weapons, jewellery, vessels and animal bones (See Ellison, 1980; Crummy, 1980). Scott (1991) argues that ritual activities at Roman villa sites are often overlooked, but that there are many animal burials found at these sites that were seemingly granted votive treatment and they are often accompanied by infant remains. At the site of Star, for instance, sheep and pig bones were deposited in pits in the corners of rooms, in a similar fashion to some of the infant burials we have previously discussed. One of the pits contained comingled sheep and human skull bones, and another contained comingled sheep and human infant remains. Similarly, at the site of Barton Court Farm, three neonatal burials alongside the skulls of two dogs and one sheep were discovered, all of which were dated to the Late Roman period. Even when not directly buried with animal remains, Scott asserts that infant burials at villa sites are often located near animal burials and agricultural processing features such as 'corn driers'. Scott also suggests that hearths fall into the category of agricultural processing tools, although I believe this is too straightforward an assertation, as hearths are symbolically more complex due to their conception with the heart of the home. Interestingly, the ninety-seven infant burials at Hambleden - the site discussed in Mays and Eyers (2011), were located in an area nearby many 'corn driers', as well as the infants at Barton Court Farm, perhaps indicating an association between these features and the burials or perhaps merely a coincidental placement of the burials near a common agricultural processing tool.

From the second century AD onwards, villa sites began to show a marked contrast between private living areas and public guest areas through the incorporation of porticos, walkways and courtyards, as well as the addition of large domestic and agricultural farmhouses (Scott, 1991). 'Corn driers' were built in and around farmhouses during this period for the production of beer, which would be sold for profit. One theory outlined by Scott (1991) is that the burial of animals and infants in areas associated with agricultural features may be related to the concept of fertility, and that these burials acted as offerings to invoke the successful processing of agricultural products which were important avenues of financial revenue for the residents of the villa. Scott suggests that these ritual behaviours indicate a revitalization movement of a society that had been oppressed by its Roman colonizers by integrating traditional pre-Roman beliefs and myths with the new symbols and material culture of the

Roman Empire. Furthermore, as it is accepted that women were the ones responsible for burying infants, burying them in association with agricultural features may have been a manner of gaining control over the male-dominated sphere of commerce and agricultural production through fertility ritual. Although this is an interesting hypothesis, it is a highly speculative one, as we cannot know for sure whether this was truly a fertility ritual or whether these agricultural processing features were simply placed in the yards where infant burials are frequently found. It is highly possible that infant burials in the yard and courtyard areas of the domestic sphere may have instead represented informal infant cemeteries (Moore, 2009).
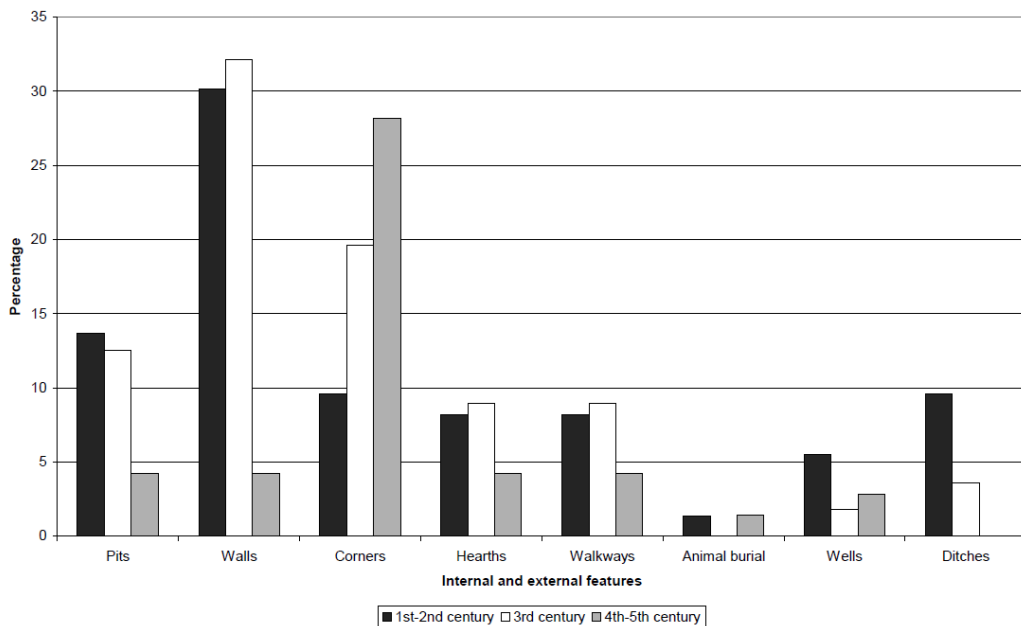

Figure 5 - Proportions of infant burials through time associated with the various internal and external features (n=200). (Moore, 2009, p. 40)

There is, however, a slight transition of the spatial distribution of infant burials seen in both Moore's (2009) dataset (Fig. 5) and the Burnby Lane site. According to Moore's dataset, although infants were primarily buried within or next to domestic buildings throughout the entirety of the Roman British period, there is a notable shift from interments in the yards and courtyards to interments in agricultural structures, work halls and workshops during the fourth century AD. Another noticeable change in the dataset is a decline in burials within pits, postholes and ditches. Furthermore, Moore (2009) notes that the incidents of infant burials in room corners increased from the Early Roman period at 9.6% to 28.2% in the Late Roman period, although the concordance of burials with sources of heat remained continuous. In the Late Roman phase at

Burnby Lane, the typical locations of infant burials did not change, but the burials were spread further apart. The reasoning behind these changes in spatial distribution is not clearly evident, but they all appear to occur during the Late Roman period, indicating that there may have been a cultural shift during this period that influenced the mortuary treatment of young infants. Moore (2009) suggests that the shift represents a narrower focus on burying infants in the domestic sphere during the later Roman period, which I believe may be indicative of a desire to keep the deceased infants even closer to the home. In tandem with the evidence that villas became increasingly private spaces from the second century AD onwards, perhaps the importance of the home as the centre of the household, which did not include the yards and courtyards outside of the domestic building as they were potentially viewed as more public areas. Further archaeological investigations that focus on the changes in the spatial distribution of infant burials at Roman British sites with a long history of occupation may reveal a clearer pattern in the trends of mortuary behaviour between the mid-Roman period and the late. Additionally, the association of infant and animal remains in villa and temple contexts is definitely an area where further research may provide additional insights on the ritual connotations associated with infants and infant burials, especially those within temple complexes.

To further understand how the sites examined in Mays (1993) and Mays and Eyers (2011) fit into this pattern of mortuary behaviour or whether they deviate from the other sites we have discussed, we must consider their individual contexts. Firstly, we will explore the two cemetery sites outlined in Mays (1993), Ancaster and Poundbury, as cemetery contexts are the least common places to uncover perinatal remains. The cemetery at Ancaster, which was in use between the third and fourth centuries AD, was excavated between 1964 and 1973 and unfortunately there were some storage issues with the skeletal remains that resulted in mixing of identification numbers between the graves of infants and adults. Additionally, there were eight cases where the cranial and post-cranial material are from different individuals. Of the 327 skeletons excavated from the cemetery, 243 were adults and 84 were juveniles, with 29% of the juvenile category being comprised of perinates. The second largest percentage of juveniles died between the ages of 3-4, potentially reflecting the age at which children here were weaned. This suggests that the most vulnerable ages for juveniles in Roman Ancaster were the birth period and the weaning period. In one of the graves, two neonates were buried together and are potentially

twins. As twin births are known to be more dangerous for both the mother and the children and can result in additional post-partum complications, these neonates may have died of natural causes during birth or shortly after. This site shows a spatial distribution pattern of juvenile and neonate burials in groups, perhaps suggesting that certain areas of the cemetery were dedicated to child burials or that children were dying in short successions, perhaps due to epidemics, and were buried in the available areas of the cemetery. It is more likely that these areas were dedicated for child burials, as a cluster of neonatal burials were found in one of the excavation trenches. Another noteworthy burial is that of a female with a neonate, which could indicate that this was a mother-infant pair that both died during childbirth, though they could also have been interred in the same grave for convenience. Based upon the analysis and distribution of non-metric traits, which are known to be hereditary, it does not appear that individuals were buried in family plots at the Ancaster cemetery (Cox, 1989). From this evidence, it appears unlikely that these neonates were victims of infanticide because they were given burials within a formal cemetery in areas of the cemetery where other juveniles were buried.
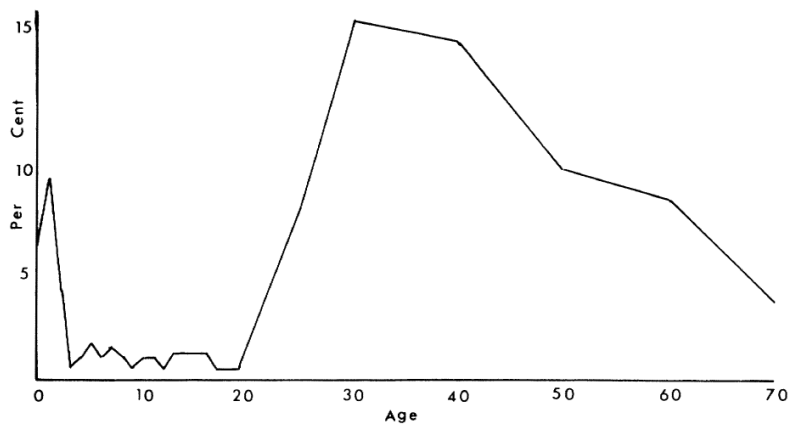

Figure 6 - Demographic profile of the cemetery sample from Poundbury. (Molleson, 1989, p. 30)

The Poundbury Camp cemetery provides an invaluable quantity and quality of human skeletal remains from the Roman British period. The cemetery was in use from the first century AD until the end of the fifth century AD at the earliest and is possibly one of the earliest Christian cemeteries in England (Molleson, 1989; Molleson and Cox, 1988). The main part of the cemetery is believed to have been the primary burial location for individuals who lived in the Roman town of Durnovaria in the late-Roman period, with the majority of burials taking place within the span of 50-100 years, during the late fourth and early fifth century AD. Unlike

Ancaster, there is no evidence of burial location on the basis of age or sex, but the graves tend to cluster within their rows, suggesting that perhaps there were family grave plots. Additional evidence of shared non-metric traits between individuals in these groupings further supports the hypothesis that these were family burial plots. Of the 1200 skeletal remains excavated from the site, less than 1/3 were juveniles, representing roughly 400 juvenile individuals. Five of the infants died during the fifth or sixth gestational months and were buried in different parts of the cemetery, indicating that they most likely did not all die during the same period. One of these five infants was buried in the same grave as an older infant, with comingling of their remains. Another eight probable pre-term infants were located, however only one of them was buried in the main cemetery. This evidence suggests that miscarriages and stillbirths were not often interred in formal cemeteries. 107 individuals were identified as perinatal and at least 62 of the 107 individuals were neonatal, all belonging to the period of the earliest burials at the site. It appears that neonates were only buried in the cemetery during early use of the site, as during other periods of use there is a notable absence of neonatal remains. As there are a considerable number of neonatal remains at this site but they only comprise 6% of the sample, it could be interpreted that there was a low mortality rate. This seems unlikely however, as infant mortality rates remained consistently high until the mid twentieth century. Another explanation is that there was a low birth rate for this population (Molleson, 1989). This explanation is more plausible because as we have seen from the Roman texts, a considerable effort was being made by Roman officials and writers to encourage Roman citizens to have as many offspring as possible. Additionally, this may be the result of some of the infants in the community not receiving a cemetery burial.

A particularly interesting case at Poundbury is that of a neonate with cutmarks on the neck, shoulder and hip. This individual was located in a grave in the eastern area of the cemetery alongside nails, indicating burial in a coffin, flint, tile, burnt limestone fragments, animal bones, and pottery. The body was placed in supine position; however, it was clear from the arrangement of the skull as well as several other skeletal elements at the pelvis that the body had been dismembered prior to burial. The inferior articular process of the right neural arch of the third cervical vertebrae had a clean cut through it, without causing any damage to the neural arch of the fourth cervical vertebrae, as well as a cut across the humeral head, and severing of the right femur at the proximal end. The baby was also large in overall size for a neonate, which led

Molleson and Cox (1988) to believe that these cutmarks were indicative of an embryotomy. Embryotomy is the dismemberment of a fetus in order to remove it from the birth canal of the mother, when natural delivery is impossible, in order to save the mother's life. It is known from Soranus' Gynaecology Book IV that embryotomies were carried out if a fetus did not respond to manual extraction due to its size, death, or impaction and he emphasizes the need to take care of the mother even if the infant dies. Removal of the fetus was done using hooks if it remained alive or not severely impacted, but if it had already died then the fetus would be removed by amputating the shoulder. Soranus further explains that if the head is too big or if the fetus has hydrocephalus, then the head should be split open to empty fluid or the head should be crushed with the hand. As a last case resort if all else fails due to a large overall body size, the jugular vein is cut so that the blood can be drained, and the body deflates. He warns that each part should be cut off as it presents itself due to the danger of leaving parts of the fetus within the uterus (*Gynaecology* 4.11[63]). The cutmarks on the cervical vertebrae of this neonate would have occurred when the jugular vein was cut, and the cuts at the shoulder and hip are consistent with dismemberment of the limbs for removal. What this case highlights to us is that Roman medical practices were known and in practice in Roman Britain by at least the fourth century AD, with a similar case of putative embryotomy occurring at the Yewden Roman villa dating between the first and fourth centuries AD (Mays et al. 2014). Another point to consider is that even though this infant died during childbirth and had to be dismembered to be removed from its mother, the family still chose to bury the infant in a formal cemetery and did not merely dispose of the remains.

From analysis of the remains of older infants (under the age of 12 months), Molleson (1989) discovered that many of the infants had very poor health. Most did not show adequate growth and exhibited poor mineralisation of the bones, with many showing gross bone pathologies. The presence of extensive periostitis or cortical hyperostosis, both inflammatory reactions of the periosteum due to infection, occurring in at least 24 individuals during a time where they should have been nursing, thereby receiving nourishment and protection from disease (Desai and Jones, n.d.; Molleson, 1989). When compared to a modern sample of limb bone lengths from infants, the femur lengths of the Poundbury infants fell below the smallest measurements of modern infants of the same estimated age, with some of the infants showing little growth from the size they should have been at birth. Both the signs of disease and arrested

growth in these infants indicates that they were not being properly nursed and perhaps were weaned too early. Another explanation is that there were high levels of dietary lead in the water or food consumed alongside breastfeeding, as high levels of lead have been identified in the bones of both the juveniles and adults at Poundbury. Due to their small size, children are especially vulnerable to lead poisoning which can cause failure to eat and failure to absorb adequate nutrients. The overall impressions from this cemetery are a population with low fertility and high infant mortality, as well as sick and poorly nourished children (Molleson, 1989).

Next we will examine the villa sites of Rudston and Winterton; unfortunately, I was unable to access the human remains report for Winterton, but we will discuss the layout of the villa. The initial report on the human remains found at Rudston was published in 1980 and includes the analysis of six adults, one juvenile, and nineteen infants (Bayley, 1980). Two of the adult skeletons were identified as female and four male, with the females dying between the ages of 17 and 25 and the males dying older (35-45, 30-35, 30-40, 25-30), raising the possibility that the female individuals died during or shortly after childbirth (Scott, 1999). Age estimation on the infants was done using standard development of the dentition and from the temporal and sphenoid bones. The smallest infant was preterm, followed by two perinates on the smaller end of the size scale and four on the upper end. The next largest were two infants aged between 0 and 3 months, and the largest was aged between 3 and 6 months (Bayley, 1980). The long bone lengths were recorded in the report, which allowed Mays (1993) to apply the Scheuer et al. (1980) method to generate his own age estimations. Unfortunately, the report does not provide any information on the locations of the infant burials, however Scott (n.d.) notes that three of the infant burials were located under Building 2, with two placed next to the east wall and the other close to the north wall of the smallest room in the structure. Both Winterton and Rudston, northern villas which date from the early first to fourth centuries AD, have infant burials in and around walls, whereas villas in the south tend not to show this type of burial until the fourth century AD, excluding temple sites (Scott, 1990). From the information we do have, this site appears to follow the pattern of the other villa sites we have previously discussed.

The Winterton villa is comprised of a main house, a probable detached bathhouse, and two aisled houses. The aisled houses are thought to have been used both as a domestic area and for stabling cattle and storing farming equipment. Building A appears to be comprised of cattle

stalls as well as a living space for the cattle rancher. At some point in the third century AD, Building A was replaced by a larger aisled house, with several walls of the original building on the west end left intact. The new building seems to be split into a partially domestic area and a functional farming area. In both this building and the other aisled house, dated to the second phase of occupation, are stone corn drying kilns. On the north side of the Building A, domestic rooms were converted into is believed to be a granary. Building D contains an attached bath house, a large central hearth in an open hall space, and a small deposit of carbonized grain, which suggests that this was also an area used to dry corn. Three circular structures were located underneath the buildings dated to the late second century AD, but there are no associated ritual artifacts, and they are unlikely to represent shrines/temples. Circular huts are a distinctive feature of Iron Age British settlements and it is likely that these earlier buildings were replaced sometime during the Roman conquest of Britain (Stead, 1966). There was no discussion of the infant burials as the information on the site was detailed in an interim report and it is possible that they had not been discovered yet. From the information I was able to locate on the burials at Winterton, the remains were comprised of six adults and 26 infants (Denston, 1976; Scott, 1999). Six of the infants were potentially of fetal age (between 6-9 gestational months) and the rest of the infants were no older than 3-4 months, according to the preliminary report on the human remains (Denston, 1976). Although we do know that some of the burials were intramural, it would have been useful to find information on their spatial distribution and potential association with hearths and corn driers in order to examine whether the pattern identified by Scott (1991) fits with the evidence at this site.

I will not be examining the settlement sites of Old Winteringham and Thistleton because I could not find adequate data on the context of the infant burials, as the data was either unpublished or inaccessible. The only information I could locate pertaining to the infants at Old Winteringham states that there were approximately twenty-two infants, the vast majority aged between birth to 3 months, and two approximately 6 months old (Denston, 1976). I believe that Mays (1993) should have provided brief site descriptions in his analysis of the age distributions of the sites, as their context is incredibly important in determining the likelihood of infanticide. The assumption that these are cases of infanticide based solely on age distributions and that they were located at Roman-British sites does not provide enough contextual evidence to explain why

they were interred in cemeteries, villas, and settlements and not merely disposed of in refuse pits if infanticide was a widely accepted practice (Bonsall, 2013).
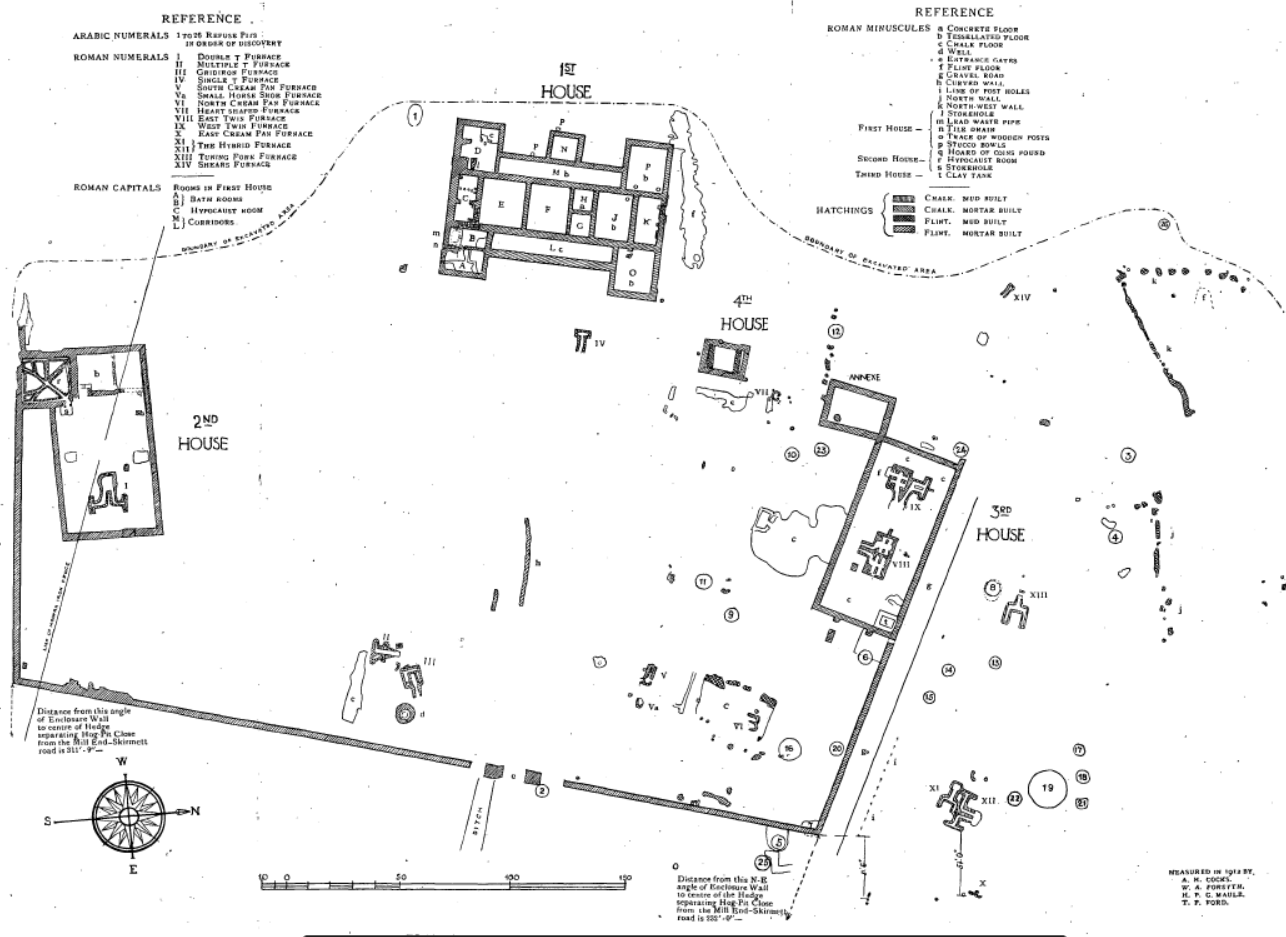

Figure 7 - Plan of the Romano-British Homestead at Hambleden, Bucks. (Cocks, 1917, p. 141)

The Yewden Roman villa site analysed in Mays and Eyers (2011) was in use from roughly the mid-first century AD until the end of the fourth century AD (Cocks, 1921). As mentioned earlier, this location has revealed the largest quantity of infant burials of any Roman-British villa site. The site was excavated in 1912 and yielded 97 infant burials, mainly from the yard on the north side of the villa. We can see in Fig. 7 that the north side of the villa contains the 3rd house as well as several furnaces and a number of refuse pits. Additionally, as mentioned earlier, Scott (1991) identifies that there are a number of 'corn driers' located near the burials, which are identifiable on the map as furnaces and are suggested to be grain drying floors in the original report (Cocks, 1921). Attached to the south-west corner of the 3rd house is a workshop,

identified here as the Annexe. An extensive deposition of 'small finds' were discovered in the yard on the north side of the 3rd house, which is suggested to be the oldest part of the site. There had originally been a north wall at the boundary of the yard, but it had been mostly removed by the Roman period of occupation. A considerable portion of the 3rd house was occupied by two large furnaces and the remnants of a clay water tank was located in the northeast corner. Just outside of the house, between the east wall and north wall was a flint floor originally belonging to a small shed, and below the flint floor was a gravel floor, potentially of an earlier shed. Underneath the gravel floor was a pit filled with heavy building materials, a small number of pottery fragments, and the skeletons of three adults and two juveniles. This pit appears to represent an unceremonious disposal of human remains, with heavy building materials heaped on top. Other fragmentary remains of five adult skeletons were found to the east of centre in Room C of the 1st house, one individual in the stoke-hole of the hypocaust in the 2nd house, one in a V-shaped ditch, one in a pit, and one 3 feet southeast of a tuning-fork furnace. Of the 97 infant burials found littered across the yard to the north of the 3rd house, most were neonates, with the occasional inclusion of an older infant. The majority of the infants were buried in a bundle, likely wrapped in cloth, so that the head was placed centrally with the knees above it, although occasionally the infants were laid out in supine position. Although the majority of the infant burials were in the yard, one was located in a pit to the southwest of the 1st house (the main domestic area) and another was buried in the small yard of the cottage affixed to the 2nd house (a workshop or barn) (Cocks, 1921).

On occasion, a second infant was placed in a grave already occupied by another infant burial, leading Cocks (1921) to believe that 'these interments took place secretly, after dark'. This statement is purely speculative, as there were also double burials at the Poundbury and Ancaster cemeteries, and double burials are not uncommon in the archaeological record. Out of the 97 infant burials a portion were lost in storage, and only 34 perinatal infants were of a level of preservation permitting further analysis by Mays and with the inclusion of three other burials (approximate ages 1, 2, and 6 years) in the sample. This raises the question of whether the sample was truly representative of the age distribution of burials at the site. It would however mean that there was selective retention of perinatal burials, with older infants buried elsewhere, although it has been noted that perinatal skeletons are often better preserved than the skeletons of older infants (Molleson, 1989; Mays 1993; Gowland et al., 2014). The presence of infant

cemeteries, such as the one at Barton Court Farm referenced in Scott (1991), suggests that the Hambleden villa also had an informal infant cemetery that was in use for a portion of the site's occupation. Furthermore, we do see similarly high numbers of perinatal burials in the other studies, even when infants of younger and older ages are included in the sample which suggests that neonatal mortality rates were high across Roman-Britain. From Mays' (2008) site report, it does appear that efforts were made to identify more infant burials at Hambleden because "although 37 burials is potentially sufficient to justify the types of analyses discussed… any further burials obtained from future excavations would clearly strengthen the statistical basis of any conclusions from the study of the remains", but they seem to have been unsuccessful. It should be considered that the accumulation of 97 infant burials over approximately three centuries averages about one death every three years, which is not an astonishing mortality rate considering the high infant mortality rate during the Roman period (Gilmore and Halcrow, 2014).

Similar to one of the infants in the Poundbury cemetery, an infant at Hambleden was found with perimortem cutmarks on the proximal end of the right femur, a location consistent with embryotomy. The infant was accorded the same burial as the other infants at the site, suggesting that this was the normative burial rite for this age category at the villa. The age at death for this infant was approximately 35-37 weeks according to the Scheuer et al. (1980) method, indicating that the neonate was delivered prematurely. The dentition was examined to locate a neonatal line, but none could be found, indicating that the infant was stillborn or died within roughly 14 days of birth. The location of the cutmarks indicate that the child was a breech birth, with the legs obstructing the birth canal, and it is possible that the infant was already deceased when delivered. This suggests that the inhabitants of the Hambleden Roman villa had access to advanced medical care or at least a functional knowledge of obstetrics (Mays et al., 2014).

Assessment of the Osteological Analysis Methods and Comparative Sites

The principles of estimating juvenile age at death are based upon a well documented sequence of the growth and development of the bones and teeth, which allows for fairly precise and accurate estimations in mostly complete skeletons. Studies of juvenile development have

demonstrated that there is variation in the timing of skeletal development between males and females, with females generally more skeletally mature than males of the same age. Sex estimation is problematic for pre-pubescent non-adults due to a lack of sexually dimorphic skeletal markers, therefore age estimates for male and female juveniles must be combined, which produces wider age ranges. Age estimations based on bone size assume that chronological age directly influences height and body size and therefore bone length and bone size. Skeletal growth is influenced by heredity, disease, nutrition, and the uterine environment, and individuals who do not receive adequate nutrition are inclined to exhibit slower rates of bone growth, reduced bone mass, and delayed skeletal maturity (Devlin and Bouxsein, 2012; Buckberry, 2018).

The skeletons of juveniles from archaeological populations are less healthy than those individuals who survived into adulthood and are therefore more likely to exhibit delays in growth and maturation. Furthermore, using modern growth standards to estimate age in archaeological populations usually underestimates the age of juveniles, therefore age estimates using long bone lengths should be derived from a population that closely matches that of the target population, both environmentally and temporally. However, bone growth does appear to be more constant across populations for individuals less than one year old because they rely on breastmilk for nutrition, thus age estimations from long bone lengths are more accurate for fetuses and infants than for older children (Buckberry, 2018).

Scheuer et al. (1980)

The Scheuer et al. (1980) method of age estimation was created to test whether perinatal age could be predicted using limb bone length, using data from two samples. The first sample comes from the Bristol Royal Hospital for Sick Children (BCH) and is comprised of the measurements from X-rays of the ossified shafts of the femurs of 17 individuals, and the femur, humerus and radius of 16 fetuses and neonates from both sexes, between the ages of 27 to 46 gestational weeks. The second sample is from the London University Institute of Child Health (ICH), and is comprised of measurements from radiographs of the ossified shafts of the femur, tibia, humerus, radius and ulna of 29 male and 36 female live fetuses between the ages of 24 to 40 gestational weeks.
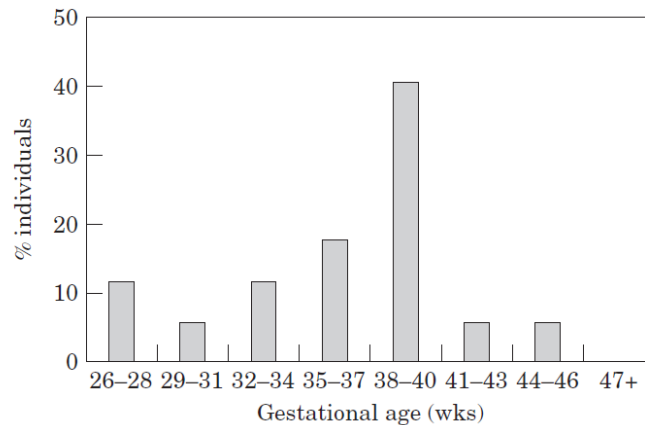
Figure 8 - Age distribution of the Scheuer et al. reference sample. (Gowland and Chamberlain, 2002, p. 678)

Statistical age regression equations were applied to the measurements of each of the bones from the BCH dataset, both as raw data and as logarithms, and showed close correlation between age and limb bone length. Equations were also applied to test the reliability of the regression equations and were applied to the limb bones of a fetus from Phylakopi on the island of Melos dating to the 2nd millennium BC, a fetus from a Greek Bronze Age settlement at Knossos, Crete, and two fetuses from a Roman-British cemetery at Longthorpe. Scheuer et al. (1980) highlight that the regression equations were computed from limited data, that there is always some doubt to the reliability of metric data taken from radiographs of premature fetuses, and that observations made upon the development of north-west European fetuses should not be assumed to be universal throughout time and space.

To critically assess the assumption of infanticide based on age distribution made by Mays (1993) using the Scheuer et al. (1980) method, Gowland and Chamberlain (2002) identify the biases of this method and apply a Bayesian statistical approach to reassess the age estimations of near 400 infants from numerous Roman sites across England. It should be noted that dental development is considered to be the most reliable method for age estimation in juveniles, however there were not adequate amounts of recovered teeth, due to the small size of the tooth buds at birth, from these excavations to do so. Long bone growth is more sensitive to environmental influences than dental development, however the greater preservation of these elements as well as the stark differences in growth between age categories provides a more useful manner of estimating age at death for perinates. Gowland and Chamberlain (2002) argue

that the Scheuer et al. (1980) method is not reliable due to the phenomenon of 'age mimicry', in which the age distribution of a target population is biased by the age structure of the reference sample. Additionally, Carneiro et al. (2016) demonstrate that reference models of Scheuer et al. were the least accurate and most biased out of four models used to calculate fetal age from long bone lengths and suggest that this technique may not be suitable for younger fetuses. Therefore, using this method to determine the age distributions of the infants in Mays (1993) produced an exaggerated peak around the perinatal period.
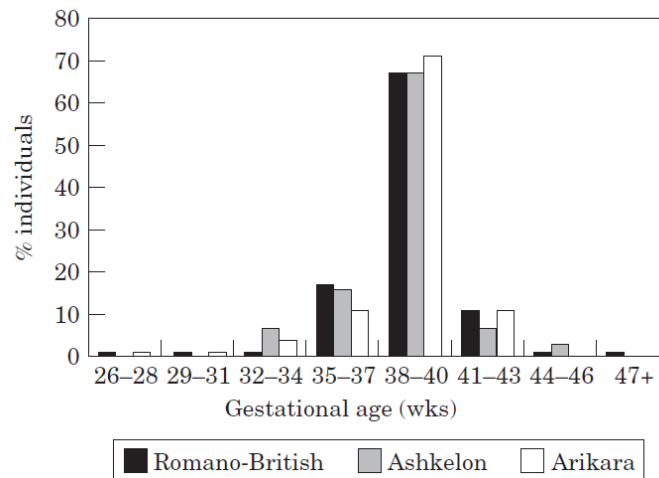

Figure 9 - Age distributions of perinatal archaeological samples from Romano-British sites, Late Roman Ashkelon, Israel and the native American Arikara population. (Gowland and Chamberlain, 2002, p. 678)

Gowland and Chamberlain (2002) demonstrated that three geographically distinct archaeological sites all appeared to mimic the significant neonatal peak when gestational age was estimated using the Scheuer et al. (1980) method (Fig. 9). They then created a sample of long bone shaft lengths from 396 infants from 19 archaeological sites (villas, settlements, and formal cemeteries) dated to the Roman British period, with the inclusion of measurements from a further 181 perinatal infants from various museum skeletal collections across Britain. Measurements were taken from both left and right elements of all long bones except for the fibula and averaged to eliminate the bias of asymmetrical growth. Gowland and Chamberlain (2002) state that there are three situations where the age structure of the reference sample will not affect the age distribution of the target population: (1) there is a perfect correlation between chronological age and the skeletal age indicator; (2) the reference sample and the target population have the same age distribution; (3) the reference sample has a uniform age distribution. There are no skeletal

age indicators with a perfect correlation to chronological age and because the age structure of the target population is unknown, its concordance with the reference sample cannot be determined. Therefore, Gowland and Chamberlain (2002) decided to create a reference sample with a uniform age distribution using uniform probabilities across the age categories. They used data from approximately 400 individuals with known age and long bone length from living fetuses, live births, still-births, and perinatal deaths, which showed close agreement in variation. They did not include femur lengths from ultrasounds because the measurements were found to differ anatomically from the other measurement techniques. While there were not equal numbers of individuals represented in each age category, by applying Bayes' theorem to the dataset and incorporating prior knowledge of the mortality risks for each age category from the 1958 British perinatal mortality survey, the probability of age given long bone length can be determined without bias from the reference sample.
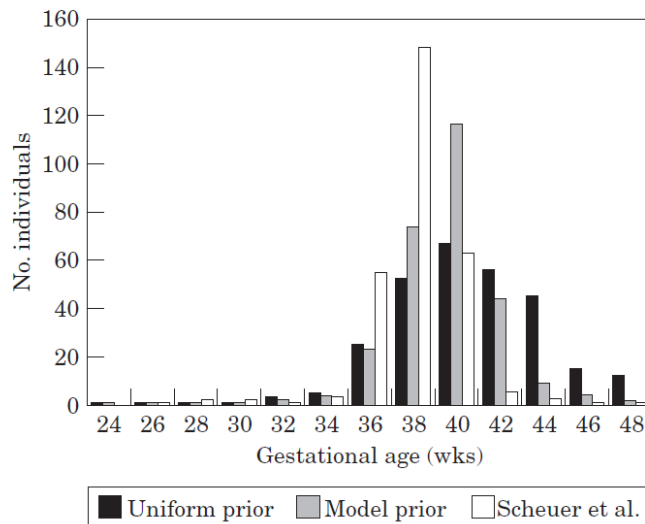

Figure 10 - Comparison of the age distributions of archaeological sample, obtained from femur length using model priors, uniform priors, and the Scheuer et al. (1980) method. (Gowland and Chamberlain, 2002, p. 683)

As shown in Fig. 10, neither the uniform nor model prior probabilities of the age distributions of the Roman-British archaeological sample show a strong peak at the birth period like that of the Scheuer et al. (1980) method, which is particularly interesting since the model prior incorporated a higher probability of death at the birth from the perinatal mortality survey. Natural infant mortality statistics have illustrated the pattern that it is normal to have a peak in deaths around the birth period, which was probably true for Roman Britain as well (Millett and Gowland, 2015). This analysis shows that a broader distribution is generated when a larger number of individuals from the neonatal period are included in the reference sample and suggests

that error margins should be included in age estimates from long bone lengths to allow for variation from the mean (Buckberry, 2018). Gowland and Chamberlain (2002) argue that the age distribution from Roman-British sites is similar to the expected natural perinatal mortality when stillbirths, perinates, and neonates are given similar mortuary treatment. The low number of individuals in the younger gestational age categories can likely be explained by poor preservation and the exclusion of these fetuses from the same burial contexts. Overall, the revised age distribution appears to include fetuses of six gestational months up to infants as old as 2 months. This suggests that while infanticide may have contributed to some of the deaths at the Roman-British sites, it was not to an extent that it had a larger impact on the distribution of mortality rates. Since all of the age estimations of the infants examined in Mays (1993) were calculated using the Scheuer et al. (1980) method, all of these sites show an exaggerated peak between 38-40 gestational weeks.
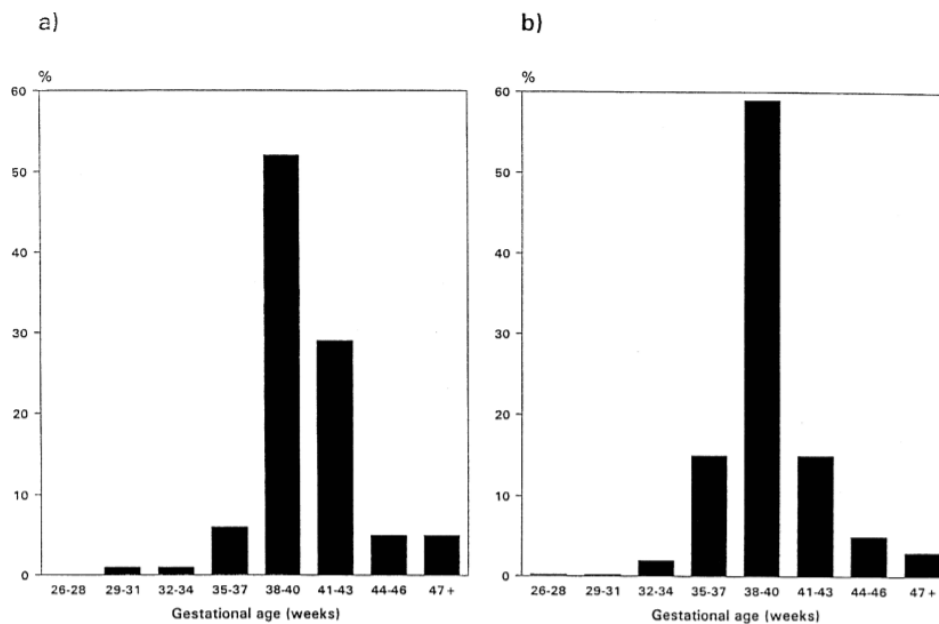

Figure 11 - Estimated perinatal age distributions for the archaeological data of Mays. (a) Roman infants aged using the equations of Sherwood et al.; (b) Roman infants aged using equations of Scheuer et al. (Mays, 2003, p. 1697)

While Mays (2003) did recalculate the age estimations for these sites using the Sherwood et al. (2000) method, the age distribution still showed a fairly pronounced peak at full-term (Fig. 11), but the ages produced by the Sherwood et al. (2000) method tended to be older by about 1 week. Although it is not a profound difference, it does affect the conclusion of infanticide. Since

infanticide would have occurred at the time of birth or very shortly after, this explanation does not account for why a considerable number of the infants seem to have died several weeks after birth. A high percentage of infant deaths at birth and several weeks following birth can be explained by the vulnerable condition of neonates, especially if they are not receiving adequate nutrients, proteins, and calories from breastmilk or if they had a poor uterine environment.

Sherwood et al. (2000)

The aim of this study was to compare a large number of both osteologic and anthropometric measures to test their efficacy as fetal age estimators for fetuses between 15 and 42 weeks gestational age. Sherwood et al. (2000) additionally examine the efficacy of fetal age estimators on pathological fetuses by testing their estimated ages against the known chronological ages, as studies have suggested that patterns of symmetrical and asymmetrical growth disruptions are associated with identifiable pathologies. A sample of 522 fetuses were examined and only included in the final sample if there was a detailed pathologist's report and history of maternal health. The chronological gestational ages for the fetuses were based upon accurate reports of the mother's last menstrual period and if this was not known they were excluded from the final sample. Multiple births were also excluded from the final sample. Of the one hundred and thirty-six fetuses that met these requirements and were included in the final analysis, 72 were identified as spontaneous abortions resulting from intra-uterine infection or acute placental-cord compromise and comprised the control group. The remaining 64 fetuses were classified as abnormal and placed into groups depending on their pathologic condition. The pathologic conditions identified were Trisomy 18 (n=8), Trisomy 21 (n=15), Turner's syndrome (n=8), miscellaneous chromosomal anomalies (n=6), anencephaly (n=6), spina bifida (n=6), renal dysgenesis (n=4), and chronic uterovascular insufficiency (n=11).

Eight anthropometric measurements were obtained from the fetuses via x-ray: arm length, from tip of the elbow to tip of the middle finger; leg length, from the upper margin of the patella to the sole of the foot positioned at 90º to the lower leg; foot length, from heel to tip of longest toe; crown-rump length, from the vertex of the skull to the lowest point of the buttock; head circumference, measured at the level of the orbital ridges anteriorly and the occiput posteriorly; abdominal circumference, measured at the level of the umbilicus; body weight, measured to the nearest gram; brain weight, which included cerebral hemispheres, cerebellum, pons, and medulla

oblongata, measured to the nearest 0.1g. Prior to regression analysis of each of the measures, the effects of maternal age, number of previous pregnancies, and fetal sex were examined to determine if they significantly influenced fetal growth. None of these factors were found to significantly influence the growth of the fetuses in this study. Fetal age was then regressed for each of the osteologic and anthropometric measures, and each variable was tested for linearity. The skeletal measurements were found to provide the strongest correlations with age, with the femur, tibia, and ulna identified as the best predictors of gestational age. To examine the effects of various pathologies on age determination, estimates of bias and inaccuracy were calculated for each of the groups of pathologic fetuses. The greatest bias and inaccuracy was found among fetuses with chronic uterovascular insufficiencies, which showed a strong tendency for under-aging, with most of the estimates showing a bias of 3 to 4 gestational weeks. Many of the pathologic conditions examined in this study can be difficult to diagnose from skeletal remains, suggesting that inaccuracies in age estimation may be introduced in cases where the fetuses cannot be karyotyped to identify chromosomal anomalies.
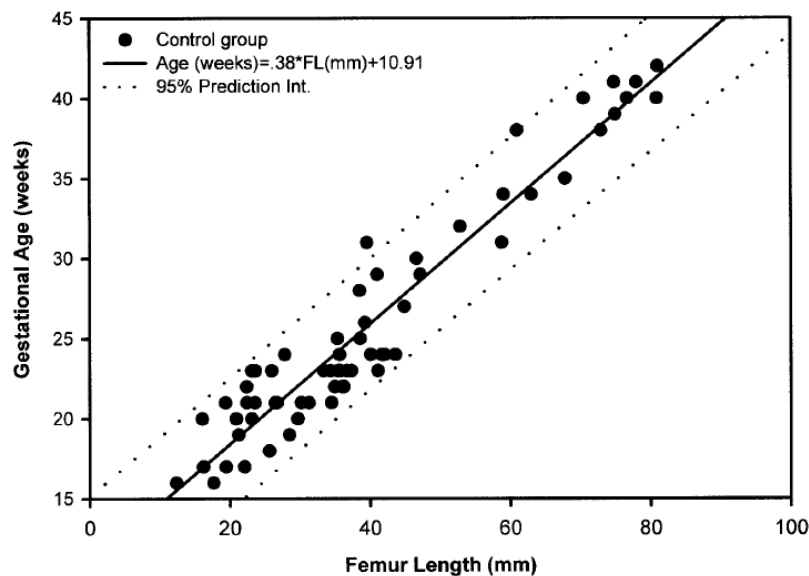

Figure 12 - Regression on femur length provides an example of a linear prediction model. (Sherwood et al., 2000, p. 310)

Sherwood et al. (2000) highlight the need for confidence intervals for each age estimate due to individual variation and note that even the best age estimator, femur length, results in 95% confidence intervals of ± ~4 gestational weeks (Fig. 12). This demonstrates several uncertainties in the age estimations calculated in Mays and Eyers (2011). Firstly, the higher the confidence in

a point estimate is, the wider the interval will be, thereby a smaller interval of standard error would produce less confidence in the point estimate. If we consider that the age estimates made by Mays and Eyers (2011) using the Sherwood et al. (2000) method include a standard error of ± ~4 gestational weeks, then the infants categorized as full-term could be chronologically aged anywhere from 32 gestational weeks to 4 postnatal weeks. Secondly, since stillbirths could comprise a portion of this category, they may have died from any one of the pathologies mentioned in this article which might not be identifiable from the skeleton. Every one of the pathologies examined in Sherwood et al. (2000) was found to introduce inaccuracies in the aging of fetal remains and we cannot know for sure if Mays and Eyers' (2011) sample was affected unless each individual was karyotyped. However, karyotyping requires a sample of fresh viable cells and a minimum of 5-10% of the cells in the sample must contain the abnormality for it to be detected, therefore this cannot be applied to archaeological remains due to degradation of the DNA post-mortem (Sampson and McGuire, 2014).

Roman Ashkelon

The Late Roman-Byzantine site of Ashkelon in Israel is another example of infant age distributions being used as a proxy for identifying infanticide in the archaeological record and is used for comparison in both Mays (1993) and Mays and Eyers (2011). The infant remains were located in a sewer underneath a bathhouse, in use from the 4th to 6th centuries AD, and totaled close to 100 individuals. The infant bones were comingled with animals bones, potsherds, and coins but were in a good state of preservation, which Smith and Kahila (1992) interpret as indicating that the infants were deposited in the sewer when the soft tissues were still present, shortly after death. They also suggest that this indicates a 'callous' attitude towards the disposal of the infants, as compared to a nearby burial of an infant in a jar, dating to the Byzantine period. Smith and Kahila (1992) reason that they cannot be stillborn infants because of the large number of remains in the sewer, and that if they are all neonates then the assumption of infanticide can be made. To estimate the ages of the infants, they used long bone length, dental development and the appearance of neonatal lines in ground sections of the teeth, and additionally recorded any pathologies and staining of the tooth germs. The minimum number of individuals represented in the assemblage was evaluated by identifying the maximum number of any specific bone, with right and left sides recorded independently. The long bone lengths of the Ashkelon infants were

compared to pooled long bone lengths of recent fetuses and neonates of known age, as well as samples of infant remains from various archaeological sites. The stages of dental development were determined by measuring the crown height of the deciduous tooth buds and comparing them to modern measurements taken by Deutsch and Peer (1982).

Ground sections of the first upper central deciduous incisor tooth buds were examined using light microscopy and revealed no presence of neonatal lines. A large number of the tooth buds were stained a dark-red brown colour, and a microprobe of ground sections from two of the stained teeth revealed that the external layer of enamel and dentine had absorbed high quantities of iron oxide, but no staining was present on the bones. Smith and Kahila (1992) suggest that this staining might represent breakdown products of haemoglobin, which were released through bleeding in the mouth during death, potentially from asphyxiation. Other than the tooth staining, no pathologies were recorded. The authors suggest that all of the infants were approximately the same age, as the long bone measurements showed little variation in length and the dental development was comparable to that of modern neonates. They conclude that these infants were victims of infanticide, as normative mortuary treatments of infants in Israel, as far back as the Late Neolithic, are represented by burials with adults or individually in pots. Furthermore, Faerman et al. (1998) suggest that the bathhouse above the sewer at Roman Ashkelon acted as a brothel in the "red-light" district and that the infants in the sewer were the unwanted offspring of sex-workers.

Several authors have highlighted issues with the conclusions drawn by Smith and Kahila (1992) and Faerman et al. (1998), as well as the problems with comparing the infants from Roman Britain to the infants at Roman Ashkelon. Gilmore and Halcrow (2014) point out that the long bone length measurements show that the sample represented perinates, preterm fetuses, and post-neonatal infants and not solely perinatal infants as Smith and Kahila (1992) claim. Another issue with Smith and Kahila's (1992) interpretation is that while post-mortem tooth staining has been shown to be related to cases of asphyxiation, it can also occur in damp environments and when certain fungi are present. Additionally, while it is possible that the infants entered the sewer from the bathhouse, it is also possible that they were deposited in the sewer from a number of other street openings and the section of the sewer under the bathhouse was merely an area where debris accumulated (Gilmore and Halcrow, 2014). The assertion by Faerman et al. (1998)

that the bathhouse functioned as a brothel is purely speculative and doesn't explain why the sex-workers would have chosen to give birth in a small bathhouse. Furthermore, Abu-Mandil Hassan et al. (2014) suggest that the Yewden villa at Hambleden also represents a brothel, despite evidence of high-value artifacts suggesting that the villa was a wealthy farmstead, mirroring the interpretation made by Faerman et al. (1998) for Ashkelon. Overall, the evidence suggests that the Ashkelon sewer is a site that represents possible infanticide rather than probable infanticide (Gilmore and Halcrow, 2014). Millett and Gowland (2015) advise that relying on the parallels between two archaeological sites at different ends of the Roman Empire is unwise, as there was a significant difference in the mortuary practices and religious beliefs of these Roman provinces, and there is distinct evidence for the special mortuary treatment of infants associated with long-held traditions of child sacrifice in Israel. As Gilmore and Halcrow (2014) assert, the contexts of the sites and the deposition of the infant remains are entirely different, and the only linking factors between them is their location within Roman provinces and the large number of infant remains.

Wharram Percy

The infant skeletons from the medieval churchyard of Wharram Percy, in the Yorkshire Wolds, were used as a reference sample in both Mays (1993) and Mays and Eyers (2011) to demonstrate an age-at-death distribution from an archaeological population that reflects that of modern infant mortality rates. The earliest structures at the church date to 950-1050 AD and the church reached its maximum boundaries by the early 14th century. Wharram Percy is representative of a very standard parish church for this area of Yorkshire (Harding, 1996). Roughly 15% of the skeletons excavated from the medieval portion of the churchyard were infants, which Mays (2004) interprets as suggesting that the infant mortality rates may have been fairly low for this population, whereas other medieval sites have shown proportions as high as 40%. This is unusual, as we would expect higher infant mortality rates in antiquity than in modern populations, however, there are several factors that may have contributed to the low proportion of perinatal burials at medieval Wharram Percy (Scott, 1999; Gilmore and Halcrow, 2014).

Firstly, unbaptised or unwanted infants may have been buried outside of the churchyard, however stillbirths and unbaptised infants appear to be represented. Secondly, the tiny bones of

neonatal infants are easily missed during excavation if techniques such as sieving through a fine screen mesh or flotation are not employed to recover small items and may result in the underrepresentation of younger infants. Thirdly, the differences between pagan Roman and medieval Christian mortuary practices and their conceptions of infants must be considered in interpreting the representation of infant burials at specific sites (Gilmore and Halcrow, 2014). Mays (2004) suggests that because the infants at Wharram Percy were shown to have breastfed until 18 months of age, they may have had stronger immune systems and would have possibly avoided consumption of contaminated foods. However, once the juveniles at Wharram Percy reached the age of two, their growth began to fall behind that of modern growth rates and by the age of 14 they had only reached the height of a modern 10-year-old (Mays, 2004). The arrests in growth of the children buried in the Wharram Percy graveyard suggest that they were dealing with continued systemic stress throughout childhood, therefore I believe it is unlikely that the overall health of the population contributed to the low infant mortality rates, unlike modern Western countries. Differences in the quality of maternal health, environment, and diets of infants have the capacity to greatly affect the infant mortality rate of a population and make it problematic to determine what a natural infant mortality rate would have looked like in antiquity (Lewis and Gowland, 2007; Gilmore and Halcrow, 2014).

The main issue with attempting to calculate mortality rates from archaeological populations is that the data concerning the entirety of the population does not exist for comparison. Furthermore, it is often difficult to assign a precise date of deposition for individual burials, therefore we are viewing burials that may have taken place over the span of decades to centuries. In reality what we are calculating is the number of individuals in each age category that are represented in the sample dated to a general time period, in this case the medieval period. This means that the distribution of age-at-death within a skeletal population is better understood as a reflection of life expectancy. Consequently, a large number of infants in a cemetery sample suggests that many infants were being born during this period and not necessarily that parents were less able to raise their children at this time (Lewis and Gowland, 2007). Contrarily, the leading causes of death may change in response to changes in the social and environmental conditions across time. For example, the comparison of infant and child mortality rates between the Iron Age and Roman periods in Dorset, Britain showed that cultural stressors affected the risk of disease and death in these populations (Gilmore and Halcrow, 2014). At Wharram Percy,

the majority of infants (19.6%) buried in the cemetery died between 34 and 35 weeks, which suggests that there was a mortuary tradition here that accorded the same burial rites to stillborn and unbaptised infants as baptised individuals. Thus, the age distribution at Wharram Percy reflects what is expected from natural infant mortality rates because the population buried in this cemetery appears to have been given similar burials regardless of age (Lewis and Gowland, 2007). This makes the age distribution at Wharram Percy problematic to compare to the Roman British sites because we know that individuals were accorded different burial rites based on their age in Roman Britain, which makes it unlikely for us to find a sample where all age categories are represented.

Conclusion

As we have seen from the archaeological data, determining whether infanticide was practiced at a specific site, or even across sites, is incredibly difficult. Even in cases where the contextual evidence seems to suggest infanticide, such as Roman Ashkelon, closer examination of the archaeological material can often introduce more questions than it does answers. A major problem with trying to identify infanticide in Roman Britain is the lack of clear information we have about the mortuary traditions surrounding young infants. Positioned in a liminal state on the borders of life, Roman infants had the capacity to understood by adults in their society in a variety of ways, which makes interpreting their burials, without contemporaneous texts to guide our understanding, quite a puzzle. What the Roman texts do tell us about infants is equally as confusing because although antiquarians would have us believe that Romans regarded their infants in quite a callous manner, personal testaments from grieving parents and archaeological evidence that contradicts the written evidence tells us a different story. From infants buried in the home to the inclusion of neonatal infants in formal cemeteries, we see that there was no single 'correct' way to respond to the death of an infant. What we see are reflections of individual choices, motivated not only by the relationship between adults and infants but also by their living environment and their individual and collective roles in society. While some parents may have been used to losing newborn babies because of their fragile condition and may have even practiced infanticide to improve the lives of their living children, others may have been

devastated by the loss of a dearly anticipated child. Just as today, individual responses to death and mourning are widely varied and influenced by a variety of factors.

We are also limited in our interpretation of the archaeological evidence by the osteological analysis methods we have available to us. The most accurate method of age estimation for perinates and neonates is the neonatal line. Unfortunately, it is often unavailable to us because it relies on the presence of tiny tooth germs which are easily lost and require extensive, fine-scaled excavation techniques to recover. Consequently, we must rely on measurements of the long bones to estimate age, however even the most precise and accurate methods using long bone lengths do not provide enough confidence to definitively identify whether an infant died immediately after birth. Additionally, congenital defects and taphonomic processes that result in bone shrinkage may skew the age estimation to appear younger than it truly was. Due to the numerous risks that influence the survival rate of neonatal and post-neonatal infants, as well as the overall high mortality rate of pre-industrial societies, we have to be cautious in interpreting infanticide from high perinatal mortality rates alone. What we must be careful not to do as archaeologists is to fall into the trap of sensationalism. Occasionally our desire to observe evidence of phenomena recorded in the written literature makes us biased to focus only on the evidence that fits what we want to see. While it can be helpful to make generalizations and identify patterns in past societies, it can also hinder us from seeing alternate lines of evidence that elucidate just how truly complex the human experience of life is.

In the introduction, I hypothesized that infanticide would not appear frequently in the archaeological record because the most common method of infanticide was exposure. Being left out in the open would make it easy for taphonomic processes to degrade the infant's remains or for animals to access their remains and scatter them, thereby removing their remains from the archaeological record. What the historical texts revealed to us is that child exposure played a considerable role in providing a population of slaves as well as adoptive children and many infants would have survived exposure. Had they died from exposure or another form of infanticide they would not have received a normative burial, which appears to have been a shallow burial nearby the home or occasionally in a cemetery, and would have likely been discarded like waste in a refuse pit or sewer. I have demonstrated that the evidence from all of the studies where researchers have made the claim of infanticide can also be interpreted in other

ways, as none of the suggested evidence of infanticide is definitive. I believe that further examination of Roman British sites with infant burials, especially those with a large number, will help us understand the normative mortuary traditions pertaining to young infants. The patterns of spatial distribution of infant burials identified by Moore (2009) provide a good starting point and the addition of more sites to the dataset will further elucidate variations across the Roman period. Examining the individual contexts of archaeological sites is of equal importance, as the associated artifacts can provide clues as to the population who occupied the site, what their health was like, what medical knowledge they had available to them, how wealthy they were, what kind of lifestyle they had, etc., which would influence their attitudes towards the young members of their society. In order to improve the issues concerning the peak in mortality we see around the birth period, improvements must be made in the precision of age estimation techniques and we must integrate the data on variations in perinatal mortality rates both spatially and temporally so that we may generate a more accurate 'natural' mortality rate for historical populations that had decreased sanitation and fewer medical interventions than modern populations.

References

Abu-Mandil Hassan, N., Brown, K. A., Eyers, J., Brown, T. A., & Mays, S. (2014). Ancient DNA study of the remains of putative infanticide victims from the Yewden Roman villa site at Hambleden, England. *Journal of Archaeological Science*, *43*, 192–197. https://doi.org/10.1016/j.jas.2013.12.017

Bayley, J. (1980). (rep.). *Rudston Villa - Human Bone Report*. Retrieved from https://research.historicengland.org.uk/Report.aspx?i=405&ru=%2fResults.aspx%3fp%3d1%26n%3d10%26t%3drudston%26ns%3d1

Bonsall, L. (2013). Infanticide in Roman Britain: A Critical Review of the Osteological Evidence. *Childhood in the Past*, *6*(2), 73–88. https://doi.org/10.1179/1758571613z.0000000007

Buckberry J (2018) Techniques for identifying the age and sex of children at death. In: Crawford S, Hadley DM and Shepherd G (Eds.) *The Oxford Handbook of the Archaeology of Childhood*. Oxford: Oxford University Press

Carneiro, C., Curate, F., & Cunha, E. (2016). A method for estimating gestational age of fetal remains based on long bone lengths. *International Journal of Legal Medicine*, *130*(5), 1333–1341. https://doi.org/10.1007/s00414-016-1393-5

Celsus, A. C. (Ed.). (1935). Book VI. In *On Medicine* (Vol. II, pp. 257–259). essay, Loeb Classical Library. https://penelope.uchicago.edu/Thayer/E/Roman/Texts/Celsus/6*.html.

Cicero, M. T. (2005, February 9). *Cicero's Tusculan Disputations*. Project Gutenberg. https://www.gutenberg.org/files/14988/14988-h/14988-h.htm.

Cocks, A. H. (1921). VII.—A Romano-British Homestead, in the Hambleden Valley, Bucks. *Archaeologia*, *71*, 141–198. https://doi.org/10.1017/s0261340900008699

Cox, M. (1989). The Humans Bones from Ancaster. *London: Ancient Monument Laboratory, Report 93/89*. https://research.historicengland.org.uk/Report.aspx?i=4056&ru=%2fResults.aspx%3fp%3d1%26n%3d10%26t%3dThe%2bhuman%2bbones%2bfrom%2bAncaster%26ns%3d1.

Crummy, P. (1980). The temples of Roman Colchester. In *Temples, churches and religion: recent research in Roman Britain, pt 1* (pp. 243–283).

Dasen, V. & Rawson, B. (2011). Chapter 18: Childbirth and Infancy in Greek and Roman Antiquity. In *A companion to families in the Greek and Roman worlds* (pp. 291–314). essay, Wiley-Blackwell.

Denston, C. B. (1976). The Human Remains. In I.M. Stead, *Excavations at Winterton Roman villa and other Roman sites in north Lincolnshire* (pp. 290-300). London: HMSO.

Desai, P. K., & Jones, J. (n.d.). *Caffey disease: Radiology Reference Article*. Radiopaedia Blog RSS. https://radiopaedia.org/articles/caffey-disease-1.

Deutsch, D. & Peer, E. (1982). Development of enamel in human fetal teeth. *Journal of Dental Research* 61,1543-l 55 1.

Devlin, M. J., & Bouxsein, M. L. (2012). Influence of pre- and peri-natal nutrition on skeletal acquisition and maintenance. *Bone*, *50*(2), 444–451. https://doi.org/10.1016/j.bone.2011.06.019

Dionysius, of Halicarnassus. (1950). *The Roman antiquities of Dionysius of Halicarnassus*. HathiTrust Digital Library. https://catalog.hathitrust.org/Record/001181669.

Ellison, A. (1980). Natives, Romans and Christians on West Hill, Uley: interim report on the excavation of a ritual complex, first millennium AD. In *Temples, churches and religion: recent research in Roman Britain, pt 1* (pp. 305–328).

Embryotomy. Dictionary.com. https://www.dictionary.com/browse/embryotomy.

Faerman, M., Kahila Bar-Gal, G., Filon, D., Greenblatt, C. L., Stager, L., Oppenheim, A., & Smith, P. (1998). Determining the Sex of Infanticide Victims from the Late Roman Era through Ancient DNA Analysis. *Journal of Archaeological Science*, *25*(9), 861–865. https://doi.org/10.1006/jasc.1997.0231

Gilmore, H. F. and Halcrow, S. E. (2014). Sense or Sensationalism? Approaches to Explaining High Perinatal Mortality in the Past. In *Tracing childhood: bioarchaeological investigations of early lives in antiquity* (pp. 123–138). essay, University Press of Florida. https://search-ebscohost-com.login.ezproxy.library.ualberta.ca/login.aspx?direct=true&db=e000xna&AN=656621&site=ehost-live&scope=site.

Gowland, R. (2001). Playing Dead: Implications of Mortuary Evidence for the Social Construction of Childhood in Roman Britain . *Theoretical Roman Archaeology Journal*, (2000), 152. https://doi.org/10.16995/trac2000_152_168

Gowland, R. L., & Chamberlain, A. T. (2002). A Bayesian Approach to Ageing Perinatal Skeletal Material from Archaeological Sites: Implications for the Evidence for Infanticide in Roman-Britain. *Journal of Archaeological Science*, *29*(6), 677–685. https://doi.org/10.1006/jasc.2001.0776

Gowland, R. L., Chamberlain, A., & Redfern, R. C. (2014). On the brink of being: Re-evaluating infanticide and infant burial in Roman Britain. *Journal of Roman Archaeology*, *96*, 69–88. https://dro.dur.ac.uk/19299/.

Grubbs, J. E. (2013). Infant Exposure and Infanticide. In R. Bell, J. E. Grubbs & T. G. Parkin (Eds.), *The Oxford Handbook of Childhood and Education in the Classical World* (pp. 83–

107). essay, Oxford University Press. https://search-ebscohost-com.login.ezproxy.library.ualberta.ca/login.aspx?direct=true&db=nlebk&AN=657627&site=eds-live&scope=site.

Händel, M., Salcher-Jedrasiak, T. A., & Fladerer, F. A. (2015). Putting Gravettian hunters' behaviour under the microscope: The case of hearth 1 at Krems-Wachtberg. *Quaternary International*, *359-360*, 280–291. https://doi.org/10.1016/j.quaint.2014.06.015

Harding, C. (1996). Wharram Percy (North Yorkshire) : topography and development of the churchyard. *Supplément à La Revue Archéologique Du Centre De La France*, *11*, 183–191. https://www.persee.fr/doc/sracf_1159-7151_1996_act_11_1_980.

Harris, W. V. (1994). Child-Exposure in the Roman Empire. *Journal of Roman Studies*, *84*, 1–22. https://doi.org/10.2307/300867

Lexico Dictionaries. (n.d.). *GENS: Definition of GENS by Oxford Dictionary on Lexico.com also meaning of GENS*. Lexico Dictionaries | English. https://www.lexico.com/definition/gens.

Lewis, M. E., & Gowland, R. (2007). Brief and precarious lives: Infant mortality in contrasting sites from medieval and post-medieval England (AD 850–1859). *American Journal of Physical Anthropology*, *134*(1), 117–129. https://doi.org/10.1002/ajpa.20643

Lindsay, H. (2002). Death-Pollution and Funerals in the City of Rome. *Death and Disease in the Ancient City*, 164–184. https://doi.org/10.4324/9780203452950-19

Macrobius, A. A. T., & Kaster, R. A. (2011). *Saturnalia. [electronic resource]*. Harvard University Press. *EBSCOhost*, search.ebscohost.com/login.aspx?direct=true&db=cat03710a&AN=alb.7107948&site=eds-live&scope=site.

Mays, S. (n.d.). *Dr Simon Mays*. University of Southampton. https://www.southampton.ac.uk/archaeology/about/staff/sm7.page.

Mays, S. (1993). Infanticide in Roman Britain. *Antiquity*, *67*(257), 883–888. https://doi.org/10.1017/s0003598x00063900

Mays, S. (2004). Human Osteology at Wharram Percy: Life and death in a medieval village. *Conservation Bulletin*, (45), 22–23. https://historicengland.org.uk/images-books/publications/conservation-bulletin-45/cb45full/.

Mays, S. (2008). (rep.). *Romans in the Hambleden Valley Project*. Retrieved from https://www.yumpu.com/en/document/read/39576962/romans-in-the-hambleden-valley-project-unlocking-

Mays, S., & Eyers, J. (2011). Perinatal infant death at the Roman villa site at Hambleden, Buckinghamshire, England. *Journal of Archaeological Science*, *38*(8), 1931–1938. https://doi.org/10.1016/j.jas.2011.04.002

Mays, S., Robson-Brown, K., Vincent, S., Eyers, J., King, H., & Roberts, A. (2014). An Infant Femur Bearing Cut Marks from Roman Hambleden, England. *International Journal of Osteoarchaeology*, *24*, 111–115. https://doi.org/doi:10.1002/oa.2232

McGinn, T. A. J., Bell, R., Grubbs, J. E., & Parkin, T. G. (2013). In *The Oxford handbook of childhood and education in the classical world* (pp. 341–362). essay, Oxford University Press. https://web-a-ebscohost-com.login.ezproxy.library.ualberta.ca/ehost/ebookviewer/ebook/bmxlYmtfXzY1NzYyN19fQU41?sid=727c0e13-5f08-478e-aaa6-ddea1d859ce9@sdc-v-sessmgr01&vid=1&format=EB&lpid=lp_341&rid=0.

Millett, M., & Gowland, R. (2015). Infant and Child Burial Rites in Roman Britain: a Study from East Yorkshire. *Britannia*, *46*, 171–189. https://doi.org/10.1017/s0068113x15000100

Molleson, T. I. (1989). Social implications of mortality patterns of juveniles from Poundbury Camp, Romano-British Cemetery. *Anthropologischer Anzeiger*, *47*(1), 27–38. https://doi.org/10.1127/anthranz/47/1989/27

Molleson, T., & Cox, M. (1988). A Neonate with cut bones from Poundbury Camp, 4th century AD, England. *Société Royale Belge D'Anthropologie Et De Préhistoire*, *99*, 53–59. http://biblio.naturalsciences.be/associated_publications/anthropologica-prehistorica/bulletin-de-la-societe-royale-belge-d-anthropologie-et-de-prehistoire/bibliographic-references/ap-099-1988/ap99_53-60.pdf.

Moore, A. (2009). Hearth and Home: The Burial of Infants within Romano-British Domestic Contexts. *Childhood in the Past*, *2*(1), 33–54. https://doi.org/10.1179/cip.2009.2.1.33

"perinatal, adj." *OED Online*, Oxford University Press, March 2021, www.oed.com/view/Entry/140958. Accessed 18 March 2021.

Pliny, the Younger. (1762). *The epistles of Pliny the Younger. [electronic resource] : Translated from the original Latin. With explanatory notes. In two volumes.* . printed by A. Donaldson and J. Reid. For Alex. Donaldson.

Pliny, the Elder. (1855). *Pliny the Elder, The Natural History John Bostock, M.D., F.R.S., H.T. Riley, Esq., B.A., Ed.* Perseus Digital library. https://www.perseus.tufts.edu/hopper/text?doc=Plin.%2BNat.%2Btoc.

Plutarch. (1936). Roman Questions. In *Moralia* (Vol. IV, pp. 153–155). essay, Loeb Classical Library. https://penelope.uchicago.edu/Thayer/E/Roman/Texts/Plutarch/Moralia/Roman_Questions*/E.html#102.

Plutarch. (1959). Consolatio Ad Uxorem. In *Moralia* (Vol. VII, pp. 575–605). essay, Loeb Classical Library. penelope.uchicago.edu/Thayer/E/Roman/Texts/Plutarch/Moralia/Consolatio_ad_uxorem*. html.

Rufus, G. M. (n.d.). *Fragments - Lecture XV*. TheStoicLife.org. https://sites.google.com/site/thestoiclife/the_teachers/musonius-rufus/lectures/15?authuser=0.

Sampson, B., & McGuire, A. (2014). Genetics and the Molecular Autopsy. *Pathobiology of Human Disease*, 3459–3467. https://doi.org/10.1016/b978-0-12-386456-7.06707-1

Scheuer, J. L., Musgrave, J. H., & Evans, S. P. (1980). The estimation of late fetal and perinatal age from limb bone length by linear and logarithmic regression. *Annals of Human Biology*, *7*(3), 257–265. https://doi.org/10.1080/03014468000004301

Scott, E. (n.d.). A villa in its Romano-British context. Case study: Beadlam, Yorks. *Https://Eleanorscottarchaeology.com/Beadlam-Roman-Villa*.

Scott, E. (1990). A critical review of the interpretation of infant burials in Roman Britain, with particular reference to villas. *Journal of Theoretical Archaeology*, *1*. https://eleanorscottarchaeology.com/hardtoaccess-articles.

Scott, E. (1991). Animal and infant burials in Romano-British villas: a revitalization movement. *Sacred and Profane: Proceedings of a Conference on Archaeology, Ritual & Religion, Oxford, 1989*, (32), 115–121. https://eleanorscottarchaeology.com/animal-and-infant-burials-in-romanobritish-villas-a-revitalisation-movement.

Scott, E. (1999). 9: Infant Burials in Historical Periods. In *The archaeology of infancy and infant death*. Archaeopress.

Shaw, B. (2001). Raising and Killing Children: Two Roman Myths. *Mnemosyne*, *54*(1), 31–77. https://doi.org/10.1163/15685250151099463

Sherwood, R. J., Meindl, R. S., Robinson, H. B., & May, R. L. (2000). Fetal age: Methods of estimation and effects of pathology. *American Journal of Physical Anthropology*, *113*(3), 305–315. https://doi.org/10.1002/1096-8644(200011)113:3<305::aid-ajpa3>3.0.co;2-r

Smith, P., & Kahila, G. (1992). Identification of infanticide in archaeological sites: A case study from the Late Roman-Early Byzantine periods at Ashkelon, Israel. *Journal of Archaeological Science*, *19*(6), 667–675. https://doi.org/10.1016/0305-4403(92)90036-3

Soranus, of Ephesus. (1991*) Soranus' gynecology*. Baltimore: Johns Hopkins University Press. http://hdl.handle.net/2027/heb.04290.0001.001.

Stead, I. M. (1966). Winterton Roman Villa: An Interim Report. *The Antiquaries Journal*, *46*(1), 72–84. https://doi.org/10.1017/s0003581500062892

Suetonius, T. C. (2015). *Lives of Eminent Grammarians*. Wilder Publications, Inc.

Tacitus, P. C. (0AD). *Germania*. Tacitus' Germania. https://facultystaff.richmond.edu/~wstevens/history331texts/barbarians.html.

Tertullian. (1869). Chapter 15. In *Ad Nationes* (Vol. 1). essay, T & T Clark.

Gennep, A. van. (1960). *The rites of passage*. University of Chicago Press. EBSCOhost, search.ebscohost.com/login.aspx?direct=true&db=cat03710a&AN=alb.4832650&site=eds-live&scope=site.

Wilkinson, D. (2013). Exposure and Infanticide in Ancient Rome. *Death or Disability?*, 105–107. https://doi.org/10.1093/acprof:oso/9780199669431.003.0008