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Bronze Age beginnings: the conceptualisation of motherhood in prehistoric Europe

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Introduction

Researching motherhood in prehistoric periods, for which, by definition, no literary sources exist, may seem like an impossible task, not least because of the danger of projecting recent interpretations onto the past to fill the gaping holes in our knowledge. In recent decades, however, a panoply of scientific methods have become available, which, in combination with thorough archaeological observations and interpretations, can give us new insights into individual identities and demographic characteristics of Bronze Age communities. To separate fact from fiction, we must turn to the archaeological evidence to illuminate gender relations and family structures.

The rich archaeological record of the Bronze Age includes thousands of graves, which are the primary sources to consider. They include both biological information of the deceased individuals and social information: the way bodies were treated after death, how they were placed, and which material objects were chosen to accompany them, gives us insights into values and beliefs of the deep past. Men and women of the period were buried with grave goods that relate to age, gender, status and wealth, as well as individual characteristics, including metal dress fittings and jewellery, weaponry, and tools as well as vessels of ceramic and bronze, intended as containers for perishable provisions for the afterlife.

The transition to parenthood was perhaps the most significant change of identity in past people's lives, and, because of its dramatic effect on the female body,[1] particularly for women. Gender archaeology[2] has brought many advances in understanding the social roles, status and lifecycle[3] of women, but has primarily focussed on making women visible, investigating women's access to wealth and power or their work capacity beyond childrearing. There is, however, a distinct lack of research into how women's lives changed through pregnancy, the event of childbirth and extended periods of childrearing, and how society responded to these changes[4]. Because motherhood is often understood as a natural and inevitable part of a woman's lifecycle, with all women going through the same stages of life, encompassing childhood, adolescence, marriage, childrearing and grandmotherhood, the variability of women's lives in the Bronze Age has not yet been fully explored.

The European Bronze Age

The Bronze Age covers roughly the second millennium BC in most of Europe, although the dating of the beginning and the end of the Bronze Age varies regionally. The beginning of the Aegean Bronze Age is dated to c. 3200 BC,[5] but most of continental Europe, including Britain, France, Iberia, Germany and neighbouring countries suggest a beginning around 2200 BC and an end around 800 BC.[6] The Scandinavian Bronze Age does not begin before 1800 BC and ends around 500 BC. The common use of bronze, the defining characteristic of the Bronze Age, was a technical refinement of copper metallurgy rather than a radical innovation. Yet, the introduction of bronze economy coincided with, and may have triggered,

important social changes[7]. The production of bronze required sourcing the raw materials copper and tin, found in disparate places in Europe, which gave rise to new long-distance exchange networks. Metallurgical knowledge was most likely in the hands of few and led to an increase in craft specialisation. Bronze objects are suitable to accumulate and store as well as to display and distribute wealth. The Bronze Age is thus the period in which social stratification and differentiation became firmly established, and this is increasingly archaeologically visible, especially in funerary rites.

Burial in communal, megalithic tombs, which were common in Western Europe in earlier periods,[8] gave way to the interment of single bodies in individual graves at the beginning of the Bronze Age; this may be tied into a shift from an ideology of place and community to one of individual and personal display. Burial customs thus became formal and standardised, with age and gender as decisive factors for the way in which bodies were buried. Status expression through quality and quantity of grave-goods and grave constructions became an increasing concern at the transition from the early to the Middle Bronze Age. Funerary rites changed from inhumation - with cremations as rare exceptions - to bi-ritual deposition under burial mounds in the Middle Bronze Age, to using cremation almost exclusively in the Late Bronze Age. The number of individuals included in cemeteries also varies throughout the periods, with groups of a few to perhaps several dozen graves most typical for the Early Bronze Age, to cemeteries of thousands of individuals in the Late Bronze Age. Yet, they are spread over several hundred years, which questions how representative even large cemeteries were for the demographics of Bronze Age communities. For many parts of Europe, there are not enough bodies in light of how many houses and settlements are found, suggesting that not all were buried in an archaeologically recognisable way.

The majority of Bronze Age people lived in small-scale settlements and single farmsteads,[9] practised subsistence farming and animal husbandry, and crafted products like textiles and tools for use and exchange. If this sounds idyllic, there is also considerable evidence of conflict, violence and war,[10] for example through traces of injury and trauma on the human skeleton, and the presence of fortified settlements and weaponry. In fact, it is in the Bronze Age that, for the first time in European prehistory, we see the sword as a specialised weapon, solely designed for combat and no longer doubling as a tool. Axes, daggers and knives may be deadly as well, but they have other useful purposes besides fighting. Clearly, some people gained power and prestige at the expense of others.[11]

On the ladder of cultural evolution, the Bronze Age has often been characterised as being composed of chiefly societies[12], somewhat more complex than tribes or a bands, but less complex than states. In a chiefdom, status is ascribed rather than achieved, and the individuals' ranks are defined by their position in the kinship group. This places key importance on an individual's parents. High status individuals, expected to perform heroic deeds, are thought to simultaneously play ritual and religious roles[13].

Archaeological evidence of the Bronze Age also includes traces of ritual practices. Most common are hoards, deposits of a small group of objects. Some appear personalised and resemble weapon or jewellery sets, whereas others comprise many similar artefacts; there are also hoards of raw materials and scrap metals, which lend themselves to profane interpretations. Hoards are frequently found in special, liminal places, e.g. peaks, watery contexts or boundaries between different landscapes and plots of land. A common explanation for the hoarding practice is that the goods were dedicated to gods.[14] It is unclear if bodies buried in unusual ways, such as in settlement pits[15], may be evidence of human sacrifices; many alternative explanations are possible, too. Other evidence for Bronze Age religion is scarce. Outside the Mediterranean, figurative art representing objects, animals,

humans and gods is often absent; exceptions include rock art from Scandinavia[16] and Alpine areas.[17] Stelae from Iberia embody mostly warriors.[18] Middle and Late Bronze Age iconography in Europe is limited to suns, birds and boats on metalwork, perhaps representing the journey of the sun (god?) through day and night, life and death.[19]

Bronze Age Women

Where are the women, and indeed the mothers, in a world full of shiny bronze armour and weapons, as the Bronze Age is often presented? Material evidence for Bronze Age occupations beyond subsistence points to metalworkers, warriors, priests and shamans.[20] The warrior identity[21] was certainly interlinked with male gender ideals, but there is no reason to assume metalworkers and ritual specialists were always male. The grave of an Early Bronze Age woman from Geitzendorf, Austria, for example, included a selection of stone tools employed in metal production, which suggests an identity as a craftswoman.[22]

Women's graves are by no means less well equipped than contemporary men's are. They include jewellery and dress items of bronze, bone, shell, amber and glass, often a combination of different materials with different, striking visual properties. Dress pins, common for both men and women, fastened garments. Textiles[23] in themselves had considerable value; their production from linen and wool was labour intensive, and in the Bronze Age, likely in the hands of women. Remnants of a striped fabric were found in an elaborate Early Bronze Age bronze headdress in Franzhausen, Austria, and textile fragments from the Middle Bronze Age salt mines of Hallstatt give a glimpse of the manifold colours, patterns and textures of textiles. Most of the time, however, only bronze dress fittings, pins, fibulae, bronze rivets and the like, survive in graves. Jewellery includes diadems, rings around the head, possibly hair rings or rings fastened on scarves, necklaces, both solid and composed of spirals, pendants and beads, arm rings, belts and leg rings, finger- and toe rings.

Cemeteries provide an opportunity to study how the biological age of women buried in graves intersects with their dress, jewellery and other items.[24] At the Early Bronze Age site of Prag-Miškovice,[25] Czechia, for example, the graves with the most elaborate stone constructions were those of two young girls at the age of 5 to 8 and 8 to 12; they were buried with only a single bronze pin each. The burial equipment of two girls in their teens, aged 14 to 17 and 14 to 20, was almost identical and included a wide variety of materials. The women were buried with one ceramic vessel each, one bronze dress pin, some hair rings, some bronze spirals worn as necklaces and amber beads; one woman's jewellery further included maritime shells, whereas the other had a perforated ceramic disk under her right knee. At this cemetery, the morphological determination of sex, which is often undetermined in sub-adult individuals, was supplemented by ancient DNA analysis.

At the cemetery of Franzhausen, Austria, girls were buried with the full female costume from the age of about 14,[26] at Gemeinlebarn, Austria, there seemed to be a gradual enrichment with dress components, with bronze rings for girls, to caps for (married?) women.[27] Graves of girls and young women were amongst the richest in the cemetery (and therefore prime targets for grave re-opening and the removal of objects). It appears that in this age group, women were thought to have the most potential, perhaps as marriage partners and mothers, and their untimely death moved the community deeply. Older women, in contrast, are buried with fewer and less diverse artefacts, suggesting that after the conclusion of their reproductive years, women lost their social status. Conversely, it is equally possible that elderly women were valued as grandmothers and keepers of knowledge, but had passed their dress items and jewellery on to their children, e.g. at the occasion of marriage or the birth of a child. In any case, women seemed to lose their social visibility[28] in comparison to men as they reached higher ages.

Middle Bronze Age women's graves occasionally include objects of considerable weight and size, which appear impractical and even hinder body movement. An assemblage from Upflamör, Germany, for example, includes leg spirals that were linked by a chain; use-wear analysis suggests they were worn in life, and do not only constitute the death costume.[29] In the later part of the Bronze Age, sets of ornaments are increasingly found separated from bodies and found as 'personalised' bronze hoards. A study of the interplay between graves and depositions in the Netherlands showed that ornament deposition in graves might relate to identity construction, while ornament deposition in hoards may be part of the deconstruction of identities. Both may have coincided with transitional points in the female life-cycle.[30]

Mothers

In order to investigate if and how women's social status changed when they became mothers, and whether social status increased with reproductive success, a comparison of how they were buried with markers of health and obstetric histories is useful. Pregnancy and childbirth are stress events that can leave physiological traces on female skeletons. The bones of the pelvis are joined by ligaments that, under pressure and hormonal influences, can cause bones to react and remodel. A preauricular groove develops where the pelvic bone joins the sacrum; the pubic symphysis may open up and calcify, giving rise to an extension of the pubic tubercle. These changes in the pelvis are indicators of whether a woman has given birth or not.[31]

The presence of such pelvic markers in an only 17 to 19 year old woman buried in Stuttgart, Germany, around 1560 BC, has led to the conclusion that she had already given birth. Her grave appeared isolated; she was placed on the left side with animal bone thought to be raw material for the production of artefacts.[32] A pilot study of selected parity features of skeletons from the Early Bronze Age site of Unterhautzenthal, Austria,[33] found preauricular grooves and extended tuberculum pubis in women of juvenile, adult and mature ages.

The absence of pelvic makers in a 50-year-old woman buried in the remnants of a burnt-down pithouse at Stillfried, Austria, on the other hand, led to the conclusion that she may have been infertile. Her death was almost certainly violent, as indicated by perimortal impression fractures on the back of the skull, and in contrast to the cremation rite prevalent at the time, she was placed or left in a settlement structure. Although fire had affected her body, it was not burnt in the usual way. Whether violent death, infertility and mode of deposition can indeed be causally tied together, as Emil Breitinger suggested,[34] remains unclear.

A further scientific method that may give insights as to whether and at what age a woman has first given birth is the microscopic analysis of tooth cementum. Tooth cementum annulation (TCA), or cementochronology, investigates thin sections of the teeth's roots. Acellular Extrinsic Fibers Cementum grows continuously and regularly at 2-3 μm per year in all teeth. One year includes a two-phase annual growth corresponding to a pair of alternating clear and dark lines. The estimated age at death is calculated by adding the age of tooth eruption to a count of the pairs of dark and light lines.[35] TCA is currently the most reliable method to estimate age at death, arriving at an accuracy of 2.5 years in modern samples with known biographical data.[36] It has further been shown that life-history events such as pregnancies, skeletal traumata and renal disease result in hypomineralized incremental lines, possibly due to their influence on calcium metabolism.[37] The position of these lines in the chronological sequence may not only reveal the age of the first pregnancy of a woman, but also the frequency of pregnancies and birth spacing.

Death during pregnancy and childbirth

Childbirth is risky, for both mothers and babies, and has certainly been recognised as a dangerous time of transition. Infant mortality[38] is estimated at c. 30%, sub-adult mortality at up to 50% for prehistoric periods.[39] Maternal mortality rates vary widely, in tandem with cultural and social factors such as the level of involvement of women in physical work before and after labour, access to food of high nutritional value, and the level of care provided by relatives and society. Beliefs about hygiene and childbirth may also play a part. Complications range from obstructed labour to haemorrhage and infection, and birth injuries may affect women's lives in the long term. The underlying cause of maternal mortality, however, is the social status of women: today, maternal and infant mortality is the result of factors such as poverty, access to healthcare and female participation in decision-making. Today, if nothing effective is done to avert death, about 1.5 % of births result in the death of the mother.[40] Ten pregnancies during a woman's lifetime in the Bronze Age resulted in a 15% chance of dying of pregnancy and childbirth complications; this number fits well with palaeo-pathological studies of past populations.[41] The numbers alone suggest that everyone knew someone who had died in childbirth.[42]

Demographic evidence from the anthropological analysis of cemetery data frequently shows a peak in female mortality in early adulthood; nevertheless, women buried with foetus in situ are relatively rare. Issues of foetal preservation and recovery do not suffice to account for the deficit of pregnant women in Iron Age societies;[43] it seems that the practice of separating foetus and mother after death and affording them separate treatments was widespread in antiquity (e.g. mentioned in the Talmud and Roman Law).

Nevertheless, a few Bronze Age burials of pregnant women inform us about the perils of childbirth. Further, the ages at which the mothers died leads to conclusions about when they were married and had their first pregnancies. The skeleton of a 16-20-year-old, for example, was found with the left femur of neonate in a cave, the Grotta del Re Tiberio, Italy (c. 2400-1700 BC).[44] Inside the rooms of the houses of an agricultural village at Cerro de las Viñas de Coy, Spain (c. 1500-1000 BC), the crouched inhumation of a 25-26-year-old woman was found with a full-term foetus. The baby was lying transversely with the right foetal arm protracted; the cause of death was almost certainly dystocia (a specific case of obstructed labour).[45] Foetuses and infants are often buried in settlement contexts rather than formal cemeteries; this case may demonstrate that the selection of burial place was based on the baby, not the mother.

At the cemetery of Franzhausen I, Austria (c. 2000-1600 BC),[46] which includes over 730 individuals, three pregnant women were documented. The youngest was 20-25 years old and buried in a crouched position, placed south-north on her right side, as was customary for women. The full-term foetus was placed directly north of her pelvis, suggesting a post-mortem coffin birth. The mother was deposited in a rather small grave pit. Grave goods include a bronze awl, flint tools, bone rings, molluscs and a set of pottery. The 30-40 year-old-mother was placed in a similar way, with the full-term foetus head down within the pelvic area. The woman's grave had been reopened after burial and objects were removed from her head and chest area, which is not unusual in this cultural context. Upon excavation, her grave still included a bronze awl, a shell necklace, a dress pin with disc head, pottery and animal bones. Instead of the usual one, there were two bowls in the grave – one perhaps intended for the unborn child. The grave of a 40-60-year old woman was also disturbed and only the lower legs were found in situ. Remains of a seven-month-old foetus to neonate were preserved by copper salts stemming from bronze grave goods. Hair rings and glass beads were found in the grave. At this site, mothers who died in childbirth were not treated differently to other women; grave goods that may be linked to their circumstances include cutting devices[47] and objects that may be interpreted as amulets or charms, such as the beads.

After the prevailing burial rite changed to cremation, burials of women of reproductive age together with foetal or neonatal remains suggest that they were in fact mother and child. The fire of the funerary pyre and the subsequent recovery process, however, destroyed any physical relationship between the dead bodies, and the heat destroyed their DNA. The bodies could also have been cremated at separate times and deposited together.

The 16-18 year-old woman inhumed in an oak coffin under a burial mound at Egtved, Denmark (c. 1370 BC),[48] for example, was buried with the cremated remains of a 5-6 year-old child at her feet. The woman's clothes were well-preserved and included a loose bodice with sleeves and a short string skirt, leaving her waist bare. Contemporary bronze figurines and rock art depictions suggest a ritual role of people wearing such dress that involved some acrobatics or dancing. Isotope analysis of soft tissue revealed that the woman had travelled widely during her life. Although it is just about possible that the child buried at her feet was her own biological child, the age gap between the individuals is small - it would make her an unusually young mother. Unfortunately, at present there are no scientific methods available to test the genetic relationship of the two buried individuals.

Other examples of cremated women with foetal/neonatal remains include a late juvenile to early adult from Telgte-Raestrup, Germany,[49] and a 16 to 30-year old as well as an adult from Zuchering, Germany.[50] Interesting are the Late Bronze Age/Early Iron Age (c. 1300-660 BC) urn burials from Cottbus-Alversleben, Germany.[51] In grave 166, a late adult to mature woman was buried in one urn, with some foetal/neonatal remains, whereas a second, smaller urn contained the remains of a perinatal individual. That they were buried in such a separated way suggest that, although likely cremated together, the foetus/neonate was perceived as a separate individual by the mourning community.

Marriage and residential patterns

The scarce evidence available seems to suggest that some women first gave birth in their late teens and early twenties. Both archaeological and isotopic data points to a patrilocal residential pattern in the Bronze Age, in which the women joined the husbands' communities after marriage; they often gave birth to and raised their children in a different community than the one in which they grew up. This has considerable implications for reproductive success, as the maternal grandmother's presence has been demonstrated to be particularly beneficial for the survival of babies.[52]

Evidence for patrilocal residence patterns are, for example, female ornaments that are found at considerable distance from their place of production; whereas most women likely married locally, some marriages took the women more than 150 km from their native community. Marriage networks spanned the whole of Germany in the Middle Bronze Age,[53] and likely contributed widely to elite relationships, diplomatic endeavours and politics. Nordic ornaments produced during the ninth and eighth centuries BC were found along the common trading routes, the Rivers Oder and Vistula, south of the Elbe, throughout northern Germany and the Netherlands.[54]

Stable isotope of human remains[55] gives insights into diet and mobility, as human tissue records the isotopic signature of groundwater and foodstuff. In particular, strontium ($^{87}Sr/^{86}Sr$) and oxygen ($\delta^{18}O$) isotopes in the enamel of teeth that develop during childhood and adolescence can inform us about where people grew up and where they moved to, whether they were locals or foreigners in their place of burial. Matching the geographical background to isotopic signatures is not always easy, however, especially in geologically heterogeneous areas. Isotope analysis of late Neolithic collective graves in Switzerland and Germany suggest that taking women from outside the group has a long pedigree.[56] Further

examples of cemeteries with a great isotopic variability, especially amongst the women, include the Early Bronze Age sites of Prag-Miškovice, Czechia,[57] and Hainburg, Austria.[58] At Singen, Germany,[59] in contrast, there was no evidence for individual mobility, even though metal artefacts indicate long-distance trade and exchange.

Family relations

Direct evidence for family relations frequently comes from rather tragic events, in which individuals died a violent death. The four multiple burials from Eulau, Germany (late Neolithic, c. 2600 BC),[60] produced the oldest evidence for a nuclear family so far. In Grave 99, a 35-50-year old mother was buried holding her 4-5-year old son in her arms; in the same grave, the 40-60-year father is placed holding their 8-9-year old son. DNA testing confirmed that the woman and both children share the same mtDNA haplogroup, and the Y chromosome haplogroup of the man corresponds to the boys. Grave 98 contained the remains of a 30-38-year old woman with three children (an infant, a 4-5 and 7-9-year old). The two older children were maternally related, but their mtDNA did not match the woman's. She was buried facing away from the children, but cradling the baby. The reconstruction of family relations via DNA was not successful in the two remaining graves, in which a 25-40-year-old man was found with two children (4-5 and 5-6) and a 25-30 year old woman was found with a 4-5-year old. This case study is enormously important for understanding prehistoric family relations. It demonstrates that – at least in this community - biological relatedness was the basis of social kinship, and it further shows that the way people were buried together does indeed reflect family relationships.

Because of the individualised burial rite in the Early Bronze Age, however, double and multiple burials are rare. At Franzhausen I, for example, 716 grave pits were excavated, but only 12 held double and multiple interments or secondary burials.[61] The triple burial 599 included an 18-20 year old man, placed on the left side with the head in the north, the usual placement for men. At his feet, two individuals were found laying on their right side, head south as customary for women; they were 14-16 and 12-14 years old.[62] Granted the normal gendered burial rites were followed correctly, what bound these persons together after death? Were they siblings? Did they die for the same reason, perhaps an infectious disease? Was the young man a newlywed with his two wives? Some of these questions may soon be answered if the DNA analysis returns interpretable results.

Grave 662 held two separate wooden coffins placed parallel; the persons within were placed on their left sides, with the head in the north, as men usually are. This is why at first both individuals were assumed to be men.[63] The anthropological analysis, however, showed that only the left individual, a 50-70-year-old buried with an axe, a neck ring, a dress pin and some food provisioning was male; the right individual placed in front of the old man was a 25-35 year old woman. A dress pin, a bowl and animal bones were found with her body, but the upper body region was disturbed by grave robbing. The communal grave pit suggests that the individuals had some sort of relationship, perhaps a marital one or that of master and servant. That the woman was buried following male funerary placement tentatively suggests a subordinate role.

In the Late Bronze Age settlement of Stillfried, Austria, large storage pits were discovered that contained the skeletons of multiple people.[64] Seven individuals were found in pit V1141 (c. 900 BC); there is no evidence of a violent death and their health status prior to death was good. The reason for their unusual death and deposition remains unclear; normally people were cremated after death and buried in urns in this community. The c. 45-year-old woman placed on her back at the bottom of the fill is especially striking, as she is staged as a mother. A six-year old boy was placed close to her right, with one leg over her thigh; in turn, the

woman's right hand is placed on his right thigh. A slightly older, eight-year-old boy was laid on her left side. Directly over the mother, a 30-year-old man was placed in the centre of the pit. Separated by a thin layer of soil, a woman of about 40 years was placed on top of the older woman. A nine-year-old girl seems to cower slightly isolated at the feet of the individuals, and the deposition of a three-year-old boy was last in the sequence; he appeared to have been thrown into the pit rather than carefully placed like the others.

Suggestions of how the individuals were related, based on heritable morphological traits, include one version in which the nine-year-old girl is the only child of the older woman, whilst the younger woman was the mother of the boys[65] and another version in which the older woman is the mother of all children.[66] In one version, the man had two wives, in another, the younger woman is assumed to be an aunt; both accept the man to be the father. Due to chemical treatment of the bones for preservation, DNA analysis has so far not returned any useful results.

This example highlights how little we know about what constituted a family in the Bronze Age. Did men have children with more than one woman at any one time? Was polygamy, or polyandry, an option? Was an age gap of ten to fifteen years significant for sexual partners? The only reliable piece of information seems to be an age gap of two to three years between siblings.

Sibling spacing

Hunter-gatherers typically have three and a half to four years between children,[67] which is what we assume normal for prehistoric people before the Neolithic, i.e. the adoption of agriculture, animal husbandry and a sedentary lifestyle. Unrestricted breastfeeding seems to suppress ovulation and prevent further pregnancies, which is one way this child spacing is achieved: how exactly this mechanism works in detail is still under debate. Mothers expend a lot of energy during pregnancy, breastfeeding and the time when infants have to be carried,[68] particularly in nomadic societies.

A sedentary lifestyle with a more steady supply of high-calorie foodstuff ensured by agriculture and animal husbandry enables shorter intervals between births and population growth.[69] In farming communities, siblings are born in quicker succession, leaving only two to three years between births. The physical toll of childbirth likely increased for mothers, and their social position might have changed significantly. No longer required to go out on gathering trips as much and remaining close to home, presumably with other women in the same situation, they may have suffered the consequences of confinement and control.

Childrearing practices likely changed, too, as children were spaced more closely. Early childrearing is incredibly labour intensive and frequently involves a number of people other than the mother. Taking care of children communally is one of the strategies to spread out the burden of bringing up babies. Older siblings make perfect babysitters, and both children and their mothers can be supported by their communities, sharing childcare and provisioning. At Unterhautzenthal, Austria, two children were laid to rest in an old storage pit;[70] although the grave does not include any objects, the children were placed on their sides, facing each other in an embrace. They were 2 to 2.5 and 6 to 7 years old at death. The placing suggests an emotional connection between the children, as siblings might have had.

Breastfeeding and weaning

Bronze Age babies were almost certainly breastfed. Breastfeeding is an important part of the mother – child relationship and highly relevant for infant survival. It ensures optimal nutrition, avoids contaminated substitute food and enhances the babies' immune system by the transmission of maternal antibodies. However, cultural attitudes to breastfeeding and

beliefs about the effects of breast milk vary widely, and at present, we cannot yet address if cross- and wet-nursing,[71] out of necessity or choice, took place in the Bronze Age. The duration of breastfeeding and the age of weaning, a process from the introduction of supplementary foods to the cessation of breastfeeding, is highly culturally contingent and can best be investigated by a combination of palaeo-anthropological methods and isotope analysis.

Weaning often represents a period of emotional and nutritional stress for the infant and coincides with a peak in childhood mortality. Stress may leave its mark on teeth in the form of enamel hypoplasias; their distribution can be related to the stage of the development of the tooth, which reveals when the hardship occurred.[72] Tracing infant diet through stable isotope ratios works on the basis that babies who are breast-fed exclusively appear enriched in δ15 nitrogen: this trophic level effect results from their position in the food chain above their mothers. δ18 oxygen helps to trace water supply (breast milk vs. drinking water).[73] Bones of children who died young can be tested for their isotopic signature to see if they were still breastfed. Recent studies, however, have demonstrated that the interpretation of elevated nitrogen levels is not as straightforward as previously thought, as maternal health, illness and the microbiome may play a significant role.[74] It is therefore more fruitful to study the weaning process in individuals who survived the process. Analysing samples from the dentin of adults provides fine-grained insights into the timing of weaning. Dentin does not remodel in the same way as bone and therefore reflects the diet at the time of tooth development. Gathering isotopic data at multiple points in time in relation to the growth of the individual leads to powerful insights into weaning practices.[75]

A study of Early Bronze Age infant feeding practices in Poland revealed that supplementary foods were introduced by the age of six months, and breastfeeding was discontinued around the age of three.[76] Similar results were obtained for the Bronze Age Mediterranean; these results fit well within the range of what is typical for societies before large-scale urbanisation.[77] The substitution of animal milk for mother's milk would have been risky because of contamination and a mismatch of the nutritional value with the species-specific needs of the infant. From the Late Bronze Age, however, small vessels with a spout are frequently found in graves, which are interpreted as feeding vessels.[78] They occur in both adults' and children's graves, albeit with varying frequencies across different cemeteries. Sometimes, a religious function is presumed, for instance for libation rites.

Toys and child-specific material culture

It is surprisingly difficult to unambiguously identify child-specific material culture in the Bronze Age. Children's toys are difficult to recognize, as they resemble adult material culture; interpretations are frequently based on size, rarity and modern assumptions about the function of objects. Unusual objects are further frequently linked to religious practices; differentiation between the trivial from the sacred is often impossible. In addition, prehistoric people may not have thought in these terms and applied different categorisations to their objects. Similarly, the world of adults was likely not separable and separated from that of children as it commonly occurs today.

It can safely be assumed that children learned about the world by engaging with their environment in play, as all children do. This does not necessitate specific objects used as toys; a potting mother would give children some clay to play with. (A recent study of Bronze Age pottery from Sweden found the fingerprints of a c. nine-year-old, for example).[79] The context of where such objects are found is crucial. Ceramic figurines of the Gârla Mare Culture in Middle to Late Bronze Age Romania, for example, are known from settlement contexts, but are also disproportionally found in graves that include children; they have been

interpreted as dolls, toys and status symbols, as general evidence of a fertility cult, and, intriguingly, as substitute mothers for the buried children.[80]

Ceramic rattles are frequently found in Late Bronze Age/Early Iron Age central Europe[81] and come in many different shapes, from spherical to bird-shaped. Designed to be held in the hand, their hollow body is filled with pebbles or ceramic balls to produce an acoustic effect when shook. The instruments appear in settlement contexts as well as in graves, and although they are more frequently associated with children in some cemeteries, their use is not exclusive to children. Interpretations have thus ranged from musical instruments to magical devices and amulets, from cult objects to children' toys. A particularly charming example from Ichstedt, Germany, was a bird-shaped rattle with a decorated back following contemporary Bronze Age decorative conventions and indicating the feathers of the bird. It was in fact found in the context of a Roman grave; it had been discovered and cherished in antiquity, many hundreds of years after its production.[82]

The size of artefacts in relation to its user is one criterion to judge whether children may have used it; but again, the miniaturisation of objects can also be a sign of transforming the functional into the symbolic. Pendants represented miniature halberds in Early Bronze Age Wessex, England, and wheel pendants were common in Bronze Age Central Europe, for example Slovakia and Austria.[83] Miniature weapons, razors and tools became common in Late Bronze Age cremation graves from Denmark,[84] replacing real-size grave goods with symbolic ones. Similar cultural phenomena are known from Slovakia, Hungary and Bosnia, indicating far-reaching economic and ideological contacts.[85]

Whereas the presence of miniature ceramic vessels in graves is not a definite sign of a child's grave, the size of urns is adjusted to the age of the buried person in some Central European Late Bronze Age cemeteries, e.g. Cottbus Alvensleben-Kaserne, Germany, and Franzhausen-Kokoron, Austria.[86]

Conclusion: motherhood in the Bronze Age

Although the survival of entire Bronze Age societies depended on bringing up children successfully, we still know little about motherhood in the Bronze Age. We have no direct evidence for how children were held and carried, or where they slept. No carrying devices such as baby slings were preserved that would enlighten if babies accompanied women on their every-day tasks; only later, early Iron Age sources suggest that even newborns were taken to workplaces such as underground salt mines.[87] Most of our evidence for prehistoric motherhood and child rearing comes from graves or evidence of tragic events. And yet, these are testimony to great love between mothers, fathers and their children, between siblings and amongst the Bronze Age communities as a whole.

Material culture in graves of women, whose age and gender are known, suggests that young woman were socially recognised from the age of about fourteen. If this age coincided with marriage and first motherhood is not yet entirely clear, but a number of women under twenty have been recognised as having died of the consequences of pregnancy and childbirth. Distribution patterns of female ornaments and isotope analyses point to patrilocal residential patterns. At least in some cases, babies were born and raised in communities foreign to the mother, without the help of the maternal grandmother. Babies were breastfed about two to three years, and children were spaced accordingly. Child-specific objects in the Bronze Age are elusive. A few figurines, rattles, feeding vessels, miniature vessels and miniature bronze items have been linked to children's graves. Most types, however, also played a role in adults' graves, and may be linked to ritual and religion.

New scientific analytical methods, such as isotope and DNA analyses, are expected to bring major advances in our understanding of individuals and their place in their communities in the near future. A better link between the reconstruction of women's biological life parameters, including diet and reproductive histories, with other archaeological evidence, will give insights into the variety of past female lives. At present, only a few case studies, often widely separated in time and place, illuminate snapshots of motherhood in the Bronze Age. As more evidence becomes available, perhaps regional and temporal patterns of different reproductive strategies will emerge. Giving birth and caring for children – amongst the most significant events in any woman's life – need more focused attention in archaeological research.

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