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THE MESOLITHIC "MULTIPLE BURIAL" OF GROSS FREDENWALDE REVISITED

Abstract

Palaeolithic and Mesolithic burials are rare discoveries in the archaeological record, and frequently receive special attention. As seen for the Late Palaeolithic burial(s) from Bonn-Oberkassel, reconstruction of the burial context can be difficult when they have been unearthed during old excavations, due to differing documentation standards. Here we present results from new investigations at the Mesolithic burial(s) from Groß Fredenwalde, which were poorly documented after their accidental discovery in 1962. New evidence from archival research combined with results from anthropological studies and ^{14}C-dating provided a new perspective on the original burial context. The results show that re-examination of old finds offer new perspectives, but these come paired with methodological pitfalls in the interpretation of double and multiple interments.

Keywords

Mesolithic, Groß Fredenwalde, multiple burial, double burial

OF DOGS AND MEN – INTRODUCTION

Burials are among the most fascinating features of Palaeolithic and Mesolithic archaeology. Martin Street has participated in and organised important excavations at Palaeolithic and early Mesolithic sites in the Rhineland, including Gönnersdorf, Andernach, and Bedburg-Königshoven. These Magdalenian and *Federmesser* sites allowed essential new insights into Late Glacial settlement structures and lifeways. However, burials were not preserved at these sites (Street et al., 2006). The search for the "Mann unter dem Bims", an idiom for a potential skeleton preserved under the tephra of the Laacher See eruption (ca. 10,950 cal BC), became a never-ending quest for all colleagues working in the Neuwied Basin.

Martin, with his expertise in faunal analyses, gained scientific access to the famous burial of Bonn-Oberkassel found in 1914, where he re-analysed the dog remains. His study contributed to a better understanding of the double burial (e. g., Street, 1995, 2002; Henke et al., 2006; Street and Jöris, 2015; Street et al., 2015). Based on the revised chronology the burial, formerly associated to Magdalenian contexts (e. g., Bosinski, 1982; Wüller, 1999), added insight to the Late Glacial cultural sphere of Central Europe. Today, the burial is assigned to ca. 12,000 cal BC and thus to the early *Federmessergruppen*.

The dog remains are a valuable testimonial, illustrating the special relationship between humans and dogs that already existed at that time. Today, the grave good of a carving of a cervid represents an important contribution to the record of Late Palaeolithic art (e. g., Giemsch et al., 2015; Veil et al., 2012).

Because of the poor initial documentation of the burial, the original find situation in 1914 is not entirely clear. According to Orschiedt (2018: 2) "it has to remain unclear whether Bonn-Oberkassel was a double burial or two single burials in close proximity to each other". The red-stained bones of both individuals indicate that both individuals had undergone the same ritual during inhumation and hence might signal a double burial.

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Another Late Palaeolithic "burial" was found in Neuwied-Irlich. In 1953, human bones probably belonging to four individuals (one adult, two children and a newborn) were collected from a secondary context. The bones were also dated to the Late Glacial period (ca. 12,500-11,900 cal BC). As their original find context is unknown, the number of Late Palaeolithic burials destroyed at Neuwied-Irlich remains unclear (Orschiedt et al., 2017).

The same problem applies to a number of Mesolithic burials in the region considered here (**Fig. 1**). It was a great surprise when Erik Brinch Petersen published a new burial from Strøby Egede on Zealand (Denmark) dating to the middle Ertebølle period (ca. 4,800 cal BC) (**Figs. 1-2**; Brinch Petersen, 1988, 1990). This unique late Mesolithic burial comprised no less than eight skeletons in a pit measuring ca. 2 m × 1 m.

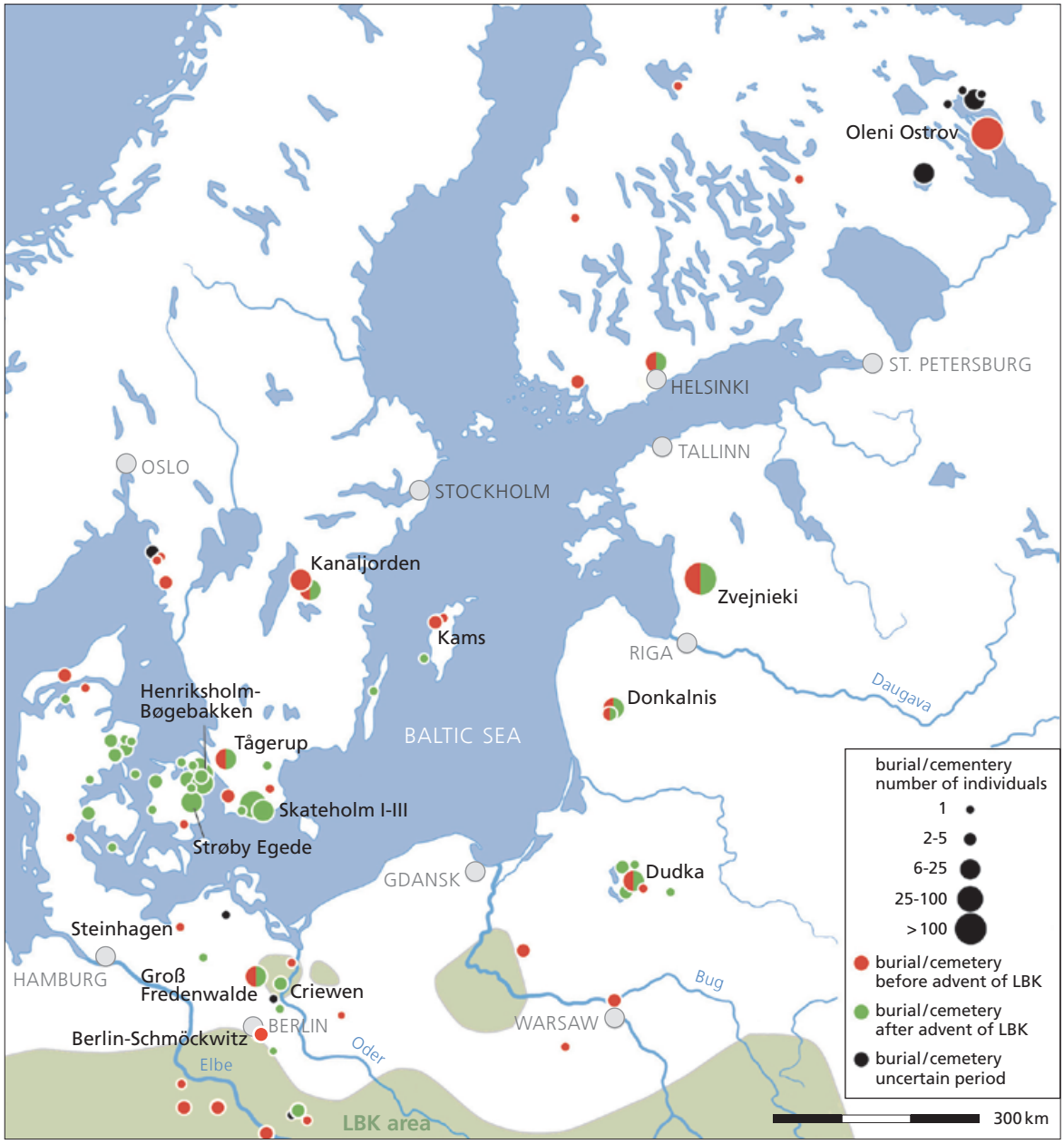

Fig. 1 Map of Mesolithic burial sites. – (After Terberger et al., 2015).

Fig. 2 The multiple burial of Strøby Egede, Zealand (Denmark). – (Photo: Danish National Museum Copenhagen).

The cause of death of these individuals remained unclear. The skeletons were closely arranged in various postures. Sex determination, though not always possible, showed that males and females were oriented in opposite directions with the heads of males towards the North and the heads of the females towards the South. There is little doubt that the two adults (male and female) and the six children belong to the same context, and according to Brinch Petersen (1988: 124) they had died and were buried at the same time. But is this really the case?

Brinch Petersen compares the record from Strøby Egede to a supposedly similar burial in Germany, burial I at Groß Fredenwalde, Brandenburg, where in 1962 several individuals were found. An ongoing research project funded by the German Research Council[1] sheds new light on this unusual Mesolithic burial site within its Stone Age networks and traditions. The project adds new information on the problematic identification of multiple burials, which is the focus of the current contribution.

THE MESOLITHIC CEMETERY OF GROSS FREDENWALDE

The site of Groß Fredenwalde is located on a morainic hill in the Uckermark district, NE Germany (**Fig. 1**; **Fig. 3**). In 1962, the prominent position of the Weinberg hill was chosen to erect a sign post, and during construction works, human skeletal remains were detected (Schoknecht, 1963; Gramsch and Schoknecht, 2003). Animal tooth pedants attached to one of the skulls suggested a prehistoric context for the skeletons (**Fig. 4**). Local policemen documented the find situation in a few photos. On the same day, the local ama-

[1] The interdisciplinary research project is financially supported by the Deutsche Forschungsgemeinschaft (TE 259/ 17-1; PI 1129/3-1).

Fig. 3 Aerial view of the Weinberg Hill at Groß Fredenwalde, Uckermark (NE Germany), with the site in the center and one of the nearby lakes in the background. – (Photo: Sebastian Lorenz).

teur archaeologist H. Zimmerling collected the material (complex I), and on the next day, archaeologist U. Schoknecht excavated two further individuals (complex II). A sketch drawing of complex II shows an adult individual together with the skeleton of a child lying on the adult's belly.

In his first publication, U. Schoknecht interpreted the ochre-stained skeletons and the few animal tooth pendants as the remains of Neolithic multiple burials. In his publication of the burial of Strøby Egede Brinch Petersen (1988) for the first time suggested a Mesolithic association for this find assemblage. Some years later, two radiocarbon dates confirmed the Mesolithic association, assigning the individuals to an early Atlantic context (ca. 6,500/6,300 cal BC; Hedges et al., 1995). A comprehensive report on the finds including the grave goods was published by Gramsch and Schoknecht (2003), in which the authors interpreted the entire feature (complex I+II) as one multiple burial.

In 2012, new archaeological field work started at Groß Fredenwalde, and in subsequent years the construction pit of 1962 was re-excavated. In the course of these works, new previously unknown burials were detected, among them a disturbed infant burial (feature 9), a baby burial (feature 8), and the unusual burial of a young man most probably buried in an upright position (feature 1/4) (**Fig. 5**; Terberger et al., 2015; Jungklaus and Terberger, 2016). Work in progress now is documenting further burials, and to date, twelve individuals have been reported from the site. According to systematic radiocarbon dating, the burial site was in use mainly from ca. 6,400-5,800 cal BC (**Tab. 1**). Due to possible aquatic reservoir effects in AMS dates on human bones, we might have to shift the dates to some decades later. Thus, the actual use period of the burial ground might have been shorter than indicated by the AMS dates. The burial of the young man (feature 1/4), however, clearly represents a younger phase around ca. 4,900 cal BC (**Fig. 6**).

Groß Fredenwalde is the only larger Mesolithic cemetery known in northern Central Europe. A decorated slotted dagger found in complex I shows parallels to southern Scandinavian sites of the Kongemose technocomplex (Gramsch and Schoknecht, 2003). On the burial site of Tågerup (burial 5), for example, a slotted bone dagger accompanied a male individual dated to ca. 6,100 cal BC (Karsten and Knarrström, 2001; see also Kotula et al., 2020).

Ongoing research aims to improve the understanding of the environmental context of the Groß Fredenwalde site and the land use pattern that prevailed during that time. To date, no Mesolithic settlement site has been identified in the direct vicinity of the burial ground on top of the hill, and we assume that camps and stations were located at the shores of the neighboring lakes in a distance of some hundred meters (**Fig. 3**). There is little doubt that this water rich area has been an attractive environment for hunter-gatherer-fishers during the Atlantic period, and isotope studies underline the contribution of aquatic resources to their life ways and subsistence economy (Terberger et al., 2015, 2018). *Linearbandkeramik* (LBK; i. e., Linear Pottery Culture) finds and settlements a few kilometers away from the Weinberg hill show that fertile soils also attracted early farming communinties towards the end of the use of the cemetery. From ca. 5,200 cal BC onwards we can expect local hunter-gatherer-fishers living side by side with colonizing farmers in this region (Weber, 2017), and it is likely that the unusually buried young man (**Fig. 5**; feature 1/4) would personally have met with early farmers during his life time. The Uckermark provides an important test case for interdisciplinary studies on the relationship of late Mesolithic groups and early farming communities.

Fig. 4 Groß Fredenwalde. Skull of a Mesolithic child found in 1962 with animal tooth pendants still attached. – (After Gramsch and Schoknecht, 2003).

THE "MULTIPLE BURIAL" – NEW RESULTS

For a long time, the "multiple burial" of Groß Fredenwalde remained a blackbox, and it was not even clear whether in 1962 one (Gramsch and Schoknecht, 2003) or two burials (Schoknecht, 1963; Brinch Petersen, 1988) had been detected. Following the discovery, a mere preliminary inspection of the human remains was conducted by anthropologist H. Grimm, and only hand and foot bones were studied in more detail (Grimm and Blume, 2003). Based on this analysis, six individuals were identified. A recent detailed study by one of the authors (B.J.) confirmed this number of individuals (Jungklaus et al., 2016). Because the skeletal remains were mixed up in the course of the rescue excavation, only part of the bones could be reliably assigned to specific individuals. Altogether, two male and one female adult (individuals nos 1-3) and three children (individuals nos 4-6) were identified (**Tab. 2**).

Unexpected but valuable new information is now provided by additional photos from the 1962 rescue excavation that were discovered in the archive of *Brandenburgisches Landesamt für Denkmalpflege*. Based on these pictures, the different individuals and their context can be better addressed. The photo provided in the initial publications shows a somewhat disturbed find situation with two skulls and long bones from different individuals, most of them apparently in original position. Now, a second photo of poor quality that had never been published provides additional information (**Fig. 7: a**). Furthermore, by identifiying the location of a photo showing a compass, the orientation of both complex I and complex II, the burial excavated on the second day, can be assessed. In conclusion, we can now presume that a minimum of two burials with differing orientations were found in 1962 that were probably located at a distance of ca. 1 m from each other (**Fig. 8**).

Closer inspection of the photos of complex I provides further new information (**Fig. 7: b**). In the lower part of the image, the skull (more or less complete), the arm bones, part of the spine, the pelvis and two femora of an adult individual are located *in situ*. Because the two adult individuals nos 2 and 3 are represented by other remains, these bones can reliably be assigned to individual no. 1, a man who died at the age of 30-39 years.

Alongside individual no. 1, a further adult individual is lying on the left side with the leg bones in an extremely crouched position (**Fig. 7: b**). Only part of the skeleton is visible, including the left humerus as well as an ulna and a radius of the left arm. The skull is not present on the photo, it is likely that it had already been removed in the course of the excavation. On this image, the femora visible are unusually bent, and according to osteoanthropological analysis only individual no. 2, a man who died in the age of 40-49 years, shows this pathology. It is very likely that the deformed femora of this individual were caused by rachitis during childhood (Jungklaus et al., 2016).

Interestingly, a skull of another individual has been lying next to the chest of individual no. 2 (**Fig. 7: b**). Close inspection of the image shows four animal tooth pendants attached to this skull. Additional photos showing this skull and tooth pedants exist. The breakage pattern of the bone leaves no doubt that we are dealing with individual no. 6, probably a 3-4 year-old male child (Terberger et al., 2015; Jungklaus et al., 2016; identification in contrast to Gramsch and Schoknecht, 2003). Other bones belonging to this child are not *in situ,* thus making the reconstruction of the exact position of the child's body difficult. There is little doubt, however, that the child was buried with/on top of the mature man (indiviual no. 2). The bones of the child are stained red, in contrast to the bones of the man which show less ochre staining. The reason for this variation remains unclear.

The photo taken on the first day of the excavation in 1962 only allows a reliable identification of grave goods (tooth pendants) for the child (individual no. 6) (**Fig. 4**). On the basis of parallels in the archaeological record (see below) we can only suggest that the slotted bone dagger was associated with one of the

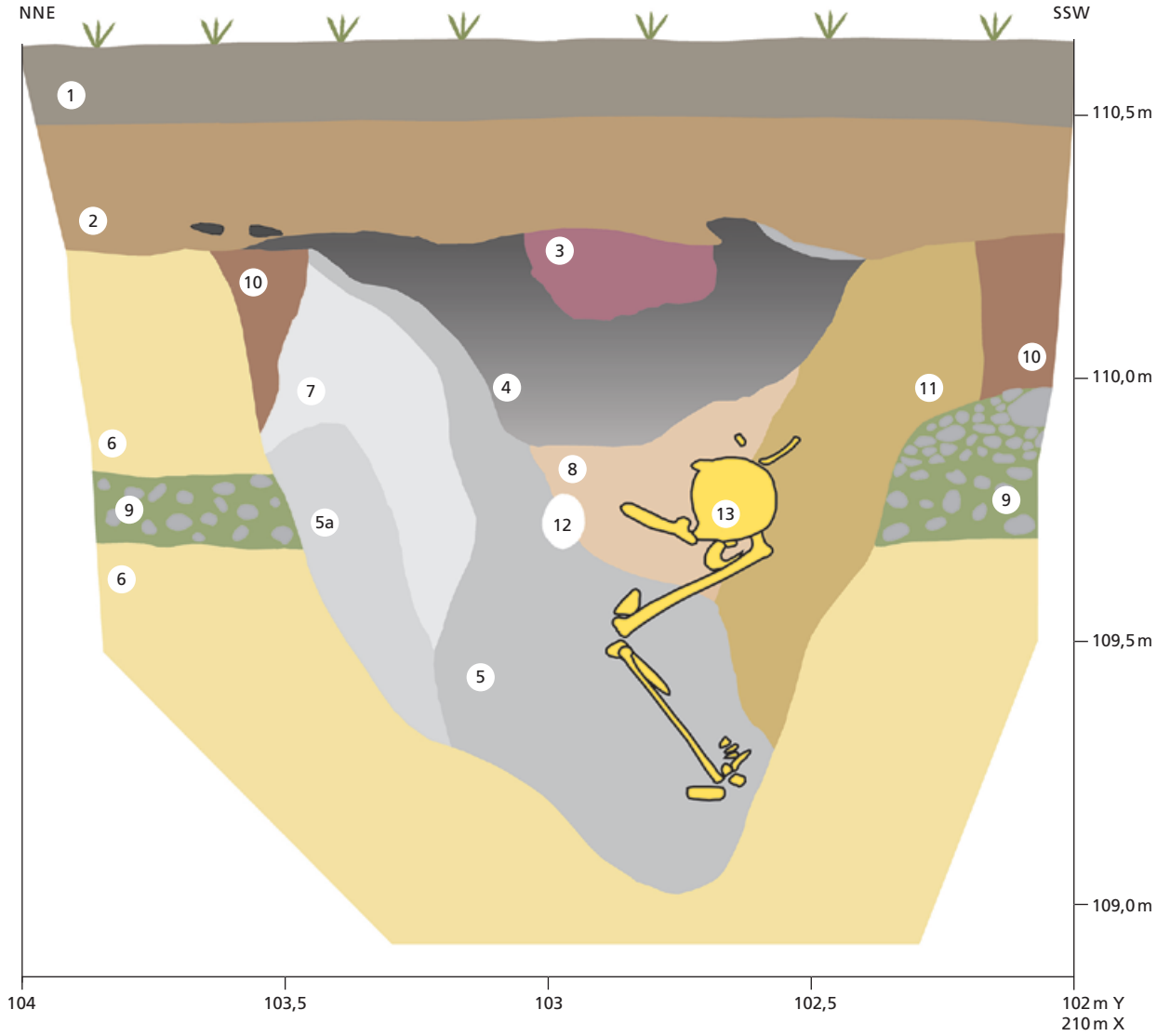

Fig. 5 Groß Fredenwalde. Profile of the burial pit of a young man probably buried in upright position (feature 1/4): **1** humic topsoil; **2** plough horizon; **3** hearth fill, cambic horizon; **4** fill, charred horizon rich in charcoals; **5** fill, sand with gravels, dark stained; **5a** fill, sand with gravels, dark stained, with charcoal flecks; **6** undisturbed sand; **7** fill, sand with gravels; **8** fill, slightly loamy and humic sand; **9** gravel bed; **10** cambic horizon; **11** fill, sand with gravels; **12** bioturbation. – (After Terberger et al., 2015).

adult (male) individuals (no. 1 or 2). The same can probably be said for ca. 39 flint blades/flakes and two transverse arrow heads (**Fig. 9: 13-14**). They too were probably associated with one or both men (Jungklaus et al., 2016). The assignment of a total of 86 animal tooth pendants is more difficult (**Fig. 9: 1-10**). A considerable number of the pendants are stained red, and it is possible that some of these pendants were also part of the head dress of the small child (individual no. 6; **Fig. 4**). The red colouring of bones from the child (individual no. 5) and the adult male (individual no. 1) might indicate that these individuals were also decorated with tooth pendants, as is the case with the female individual (no. 3) found on the second day of excavation (see below).

On the second day of the rescue excavation in 1962, an adult individual and a child (complex II) was more carefully unearthed (**Fig. 8**; **Fig. 10**). The quality of excavation is reflected in the good preservation

of the skull and the postcranial skeleton, belonging to a female indivdual who died at the age of 40-49 years (individual no. 3). The bones of the woman show little ochre staining. The same is true for the 4-5 year-old child (individual no. 4), their bones showing better preservation than the remains from complex I. Concerning the position of the bodies in this grave, we are dealing with the burial of a mature woman with a child lying on her belly. The sketch plan does not allow for a more detailed reconstruction of the position of the child. Schoknecht (1963) mentions three tooth pendants at the skull as well as four tooth pendants and a bone pin close to the leg bones of the female individual (no. 3). Because of the position of the child's bones, an association of the latter pendants (and the bone pin) with the child might also to be an option. These finds demonstrate that adults were also furnished with animal tooth pendants. In summary, pendants were placed on different parts of the body and they are associated with individuals of different sex and age.

In addition, the skeleton of a 7-8 year-old child (individual no. 5) was uncovered. According to information found associated with the bones stored in the archive, this individual was found on the first day of the excavation (complex I). It remains unclear whether this child was located close to the adult males (no. 1 or 2) or whether it represents a separate burial. The latter situation would parallel two single child burials found during recent field work at the site (features 8 and 9; Terberger et al., 2015; Jungklaus and Terberger, 2016).

In contrast to Gramsch and Schoknecht (2003), who suggested a single multiple burial, the re-assessment of the available information favors a more complex interpretation. A minimum of two burials is evident. Taking evidence from radiocarbon dating (**Tab. 1**) into consideration, up to four interments or burial events might have originally been preserved in the trench uncovered in 1962:

(1) We can reliably identify the double burial of a man with crouched legs (individual no. 2) and a young child lying on his upper body (individual no. 6), dated to ca. 6,220-6,010 cal BC [2].
(2) A slightly later context is indicated for individual no. 1, the man buried in supine position, by a direct date of ca. 5,880-5,760 cal BC. Alternatively, the later date might be explained by a dating error (or methodological problems related to differing reservoir effects in comparison with the dates obtained for individuals nos 2 and 6).
(3) An additional 7-8 year-old child (individual no. 5) could also belong to this setting. In this case, the evidence would originally have represented a triple burial. However, it is equally possible to postulate a separate child burial dated to ca. 6,060-6,000 cal BC.
(4) About 1 m to the east of "complex I" the interment of a woman with a child was found (individuals nos 3-4; complex II). Together with direct dates of ca. 6,070-6,020 (individual no. 3) and 5,990-5,890 (individual no. 4) cal BC the different orientation indicates a potentially slightly later context for this double burial.

If we follow this interpretation, which is based on the range of AMS dates and on the different type of body position of individuals nos 1 and 2 (**Fig. 7: b**), the spatial association of skeletons alone does not necessarily indicate a simultaneous burial. It is possible that the burial pit of individual no. 1 was located next to individual no. 2 following the same orientation but with a temporal offset. We would have to assume that the

[2] Data is displayed at 1σ range and rounded up to decade in the text. We have to expect some reservoir effects for the AMS dates of human bones and therefore only estimates can be given here for the dating. Most reliably were AMS dates of two animal tooth pedants providing almost identical dates of 6,010-5,918 cal BC and 6,012-5,922 cal BC (Terberger et al., 2015). For a discussion of reservoir effects in human bone dates from northern Germany see e. g., Olsen et al., 2010; Fernandes et al., 2015.

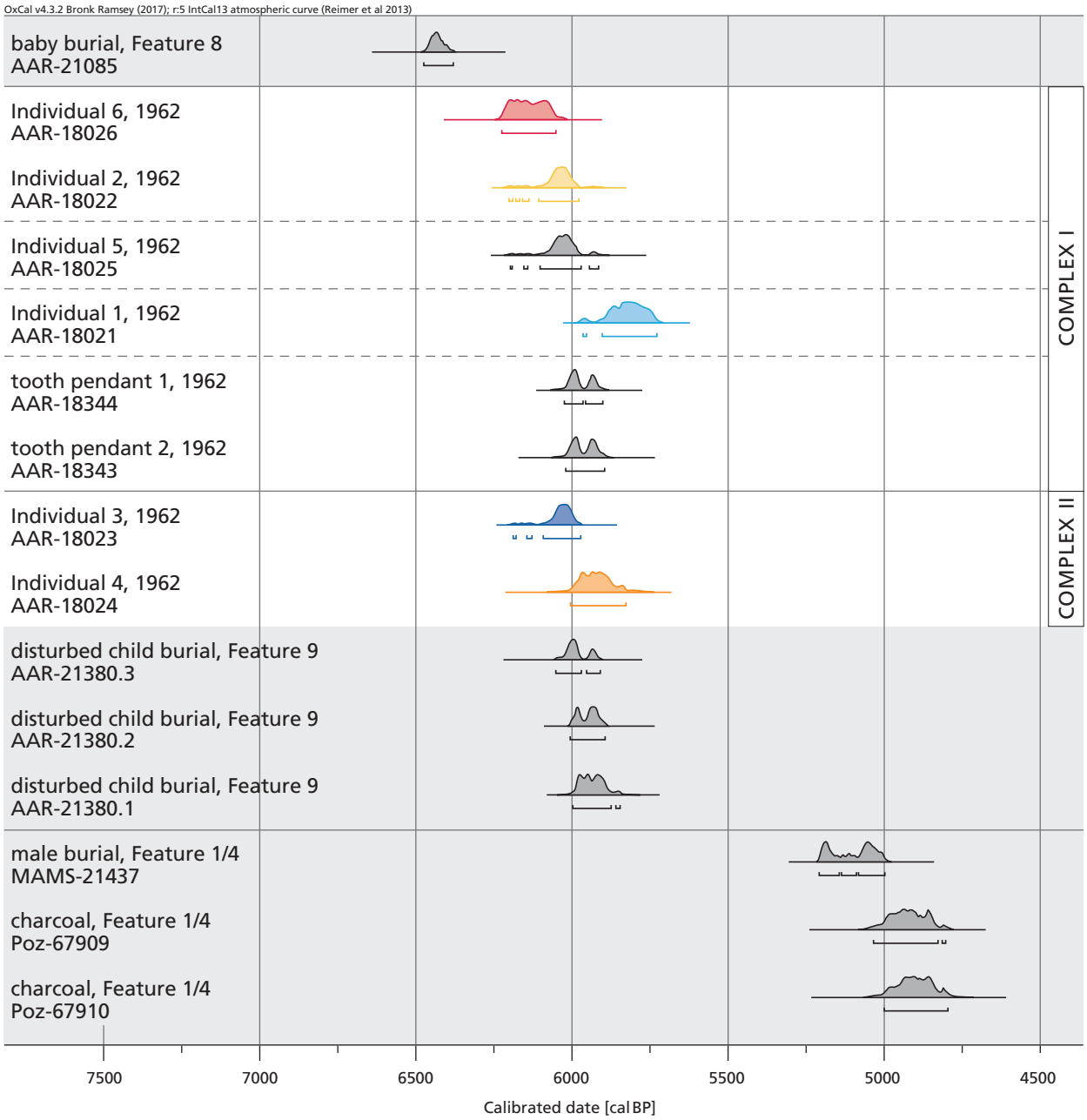

Fig. 6 Groß Fredenwalde. Calibrated radiocarbon dates. Note: colours refer to different individuals (cf. **Figs. 7-8**; **Fig. 10**). – (Graph: A. Kotula; calibration OxCal 4.3.2 with IntCal13 atmospheric curve: Bronk Ramsey, 2017; Reimer et al., 2013).

burial pit was still visible when individual no. 2 was interred. It is possible that even after generations people still have been aware of persons buried in the pits.

The new interpretation of the record uncovered in the 1962 trench as several burials is underlined by evidence from new excavations that uncovered additional burials in close vicinity. Burials dating to the first phase respect each other, and only the much later burial of the upstanding man (**Fig. 5**; **Fig. 8**; feature 1/4) spatially interfered with and almost completely destroyed an earlier burial pit of a child.

Context		Material	Lab. no.	Collagen Yield	C:N ratio	^{14}C [BP]	Calendar Age [cal BC] 68.3 % prob.	Calendar Age [cal BC] 95.4 % prob.	δ^{15}N [‰]	δ^{13}C [‰] (CF-CN)	δ^{13}C [‰] (dual-inlet)
Individual 1, c. I	excavation 1962	Human bone	AAR-18021	2.4	3.21 ± 0.18	6,944 ± 37	5,881-5,756	5,968-5,732	11.37 ± 0.29	-19.58 ± 0.14	
Individual 2, c. I	excavation 1962	Human bone	AAR-18022	1.6	3.19 ± 0.32	7,177 ± 40	6,070-6,012	6,209-5,924	11.25 ± 0.17	-20.48 ± 0.10	
Individual 5, c. I	excavation 1962	Human bone	AAR-18025	2.2	3.18 ± 0.23	7,161 ± 44	6,063-5,996	6,087-5,917	11.25 ± 0.29	-19.42 ± 0.14	
Individual 6, c. I	excavation 1962	Human bone	AAR-18026	1.1	3.18 ± 0.16	7,272 ± 42	6,218-6,073	6,230-6,034	11.74 ± 0.17	-20.02 ± 0.10	
multiple burial, c. I	Feature 3 re-excavation	Deer tooth pendant	AAR-18343	1.4	3.19 ± 0.17	7,085 ± 32	6,010-5,918	6,026-5,888	6.11 ± 0.17	-22.50 ± 0.10	
multiple burial, c. I	Feature 3 re-excavation	Deer tooth pendant	AAR-18344	3.0	3.19 ± 0.14	7,094 ± 28	6,012-5,922	6,026-5,895	5.05 ± 0.17	-20.76 ± 0.10	
Individual 3, c. II	excavation 1962	Human bone	AAR-18023	2.7	3.25 ± 0.22	7,187 ± 35	6,069-6,020	6,209-5,984	11.37 ± 0.29	-19.73 ± 0.14	
Individual 4, c. II	excavation 1962	Human bone	AAR-18024	2.0	3.20 ± 0.22	7,051 ± 45	5,987-5,892	6,022-5,832	11.62 ± 0.29	-19.33 ± 0.14	
hearth on top of burial	Feature 1/4	Charcoal	Poz-67909			6,030 ± 40	4,990-4,849	5,036-4,799			
hearth on top of burial	Feature 1/4	Charcoal	Poz-67910			6,010 ± 40	4,951-4,839	5,002-4,793			
young man burial	Feature 1/4	Human bone	SID-23897		2.7				11.30	-19.90	
young man burial	Feature 1/4	Human bone	MAMS-21437	6.7	3.1	6,137 ± 22	5,206-5,003	5,210-4,996		-20.10	
baby burial	Feature 8	Human bone	AAR-21095	4.5		7,569 ± 37	6,458-6,413	6,476-6,274		-21.75 ± 0.61	
baby burial	Feature 8	Human bone	AAR-21095 isotopes		2.7				12.30	-21.10	
disturbed child burial	Feature 9 (no UF)	Human bone	AAR-21380.1	7.3		7,040 ± 28	5,982-5,892	5,991-5,842			-19.47 ± 0.05
disturbed child burial	Feature 9 (UF > 30 kDa)	Human bone	AAR-21380.2	3.8		7,067 ± 28	5,990-5,908	6,016-5,851			-20.82 ± 0.57
disturbed child burial	Feature 9 (UF < 30 kDa)	Human bone	AAR-21380.3			7,108 ± 31	6,018-5,925	6,061-5,912			-20.92 ± 0.64

Tab. 1 Groß Fredenwalde. Radiocarbon dates of different individuals and contexts (c. I = complex I; c. II = complex II) (calibration OxCal 4.3.2 with IntCal13 atmospheric curve: Bronk Ramsey, 2017; Reimer et al., 2013). UF = ultrafiltration (with reference to molecule fraction).

Individual	anthropological assessment
1	Bones strong red discolouration, male, 30-39 years old, 161.0 ± 4.0 cm (Pearson, 1899)/ 166.9 ± 5.0 cm (Trotter and Gleser, 1952), no evidence of disease
2	Bones slight reddish discolouration, male, 40-49 years old, 161.8 ± 4.0 cm (Pearson, 1899)/ 168.1 ± 5.0 cm (Trotter and Gleser, 1952), femur and shafts of radius and ulna bent outwards (suspected Osteomalacia)
3	Bones slight red discolouration, female, 40-49 years old, 152.0 ± 4.0 cm (Pearson, 1899)/ 156.4 ± 4.3 cm (Trotter and Gleser, 1952), medium severe arthritis of the right elbow, severe tooth attrition, parodontosis
4	Bones slight red discolouration, probably male, 4-5 years old, height not determinable, no evidence of disease
5	Bones strong red discolouration, probably female, 7-8 years old, height not determinable, no evidence of disease
6	Bones strong red discolouration, probably male, 3-4 years old, height not determinable, porosity of teeth at gum edge, and some evidence of cribra orbitalia (suspected scurvy)

Tab. 2 Groß Fredenwalde. Results of the anthropological assessment of individuals nos 1-6 found during excavation in 1962. – (After Jungklaus et al., 2016).

DISCUSSION – LESSONS TO LEARN FROM GROSS FREDENWALDE

The critical re-assessment of the evidence from the "multiple burial" of Groß Fredenwalde exemplifies that care is needed with the identification and interpretation of "multiple burials" from early, and/or – by modern standards – inadequately documented excavations. Plural burials can shed light on funerary practices and rites, on underlying social structures, but also on the histories of individuals and communities. In the archaeological record, the (apparent) presence of remains of two or more individuals in the same structure or context can result from several different practices and processes: (1) The grave represents a burial of several individuals deposited either simultaneously, or successively over a short period of time (= multiple burial); or (2) The grave or context represents a multi-episode, successive deposit of individuals over a longer time period (= collective burial) (Tõrv, 2018: 49). A second important factor concerns the nature of the burial, whether it is (1) a primary burial, with fresh corpses buried soon after death, or (2) a secondary burial or deposit with human remains manipulated at least two times (e. g., decomposition at one location, followed by burial at another location; Tõrv, 2018: 45). Taphonomic variables (e. g., soil type, later disturbances, etc.), quality of documentation, and post-excavation analysis are also crucial for recognition and interpretation; as is the question whether the individual records allow the secure distinction between true plural burials and separate burials in spatial proximity.

At Groß Fredenwalde, the re-evaluation of the 1962 findings based on new archival and dating evidence suggests a minimum of two double burials, as opposed to one multiple burial suggested by Gramsch and Schoknecht (2003). It is however possible to reconstruct more burial events from the available record, with 3 or even 4 plausible. The two evident double burials comprise an adult and a child positioned on top of the adult's body (complex I: individuals nos 2 and 6, complex II: individuals nos 3 and 4) (**Figs. 7-8**; **Fig. 10**). The male individual no. 1 provided a slightly later date than the other individuals from the same complex (I). The body of this man is in close spatial association with the crouched-leged adult no. 2 and associated with child no. 6 (**Fig. 7: b**). The evident archaeological record can be read in terms of a simultaneous burial but

Fig. 7a Groß Fredenwalde. Refitted photos of the situation of 1962 excavated on the first day (complex I). – (Graph: A. Kotula).

the AMS dates indicate a temporal offset. If the younger date indeed reflects a younger interment, then this new burial respected the already-existing one. This scenario has to be tested by further radiocarbon samples.

New excavations at the site show that children were also individually buried from the age of ca. one year (feature 8). Red ochre and animal tooth pendants associated with a 3-4 year-old child (individual no. 6) indicate that in the early Atlantic Mesolithic, small children were already treated similar to older members of the community, with respect to the adornment of the clothes or body with tooth pendants, and the use of ochre as magical or ritual grave components.

Mesolithic double and multiple burials are not very frequent, but are nonetheless regularly observed both at cemeteries and as isolated burials (Grünberg, 1996; Tõrv, 2018: 214-222). The simultaneous interment of several corpses is signaled by the close, often carefully arranged, spatial relation of individuals, sometimes even expressed in physical gestures such as an arm put around another person's head (e. g., at Tamula XI and XII; Tõrv 2018: 221). Well-preserved evidence of a single, undisturbed burial pit would also be an indication for a simultaneous burial.

The death of two or more persons at the same time is an exceptional event, and several reasons might be responsible: Bone trauma or lesions due to weaponry are a strong indicator for the simultaneous violent death of individuals and would thus signal a double or multiple burial. Examples come from the Mesolithic head burials at Große Ofnet cave (e. g., Orschiedt, 2015; Terberger and Lidke, 2015; Terberger, 2006). More prominent evidence is known from later periods e. g., from the early Neolithic LBK site of Schöneck-Kilianstädten (Meyer et al., 2015), or the Bronze Age multiple burial from Wassenaar (Louwe-Kooijmans, 1993). Another reason for the need to simultaneously bury two or more persons are accidents with several casualties, e. g., with boats, or hunting accidents, identifiable due to the presence of skeletal trauma.

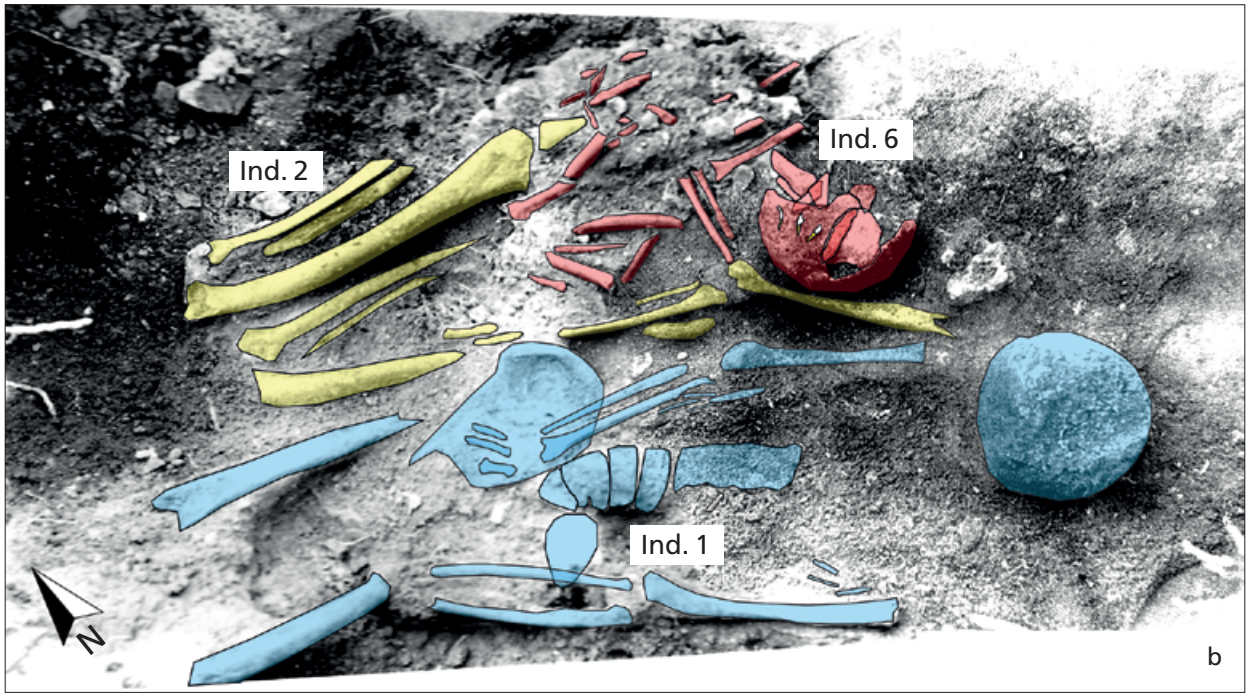

Fig. 7b Groß Fredenwalde. Complex I with identified individual no. 1 (blue, male adult), no. 2 (yellow, male adult) and no. 6 (red, 3-4 year-old child) (cf. **Tabs. 1-2**). Note: colours refer to different individuals (cf. **Fig. 6**; **Fig. 8**; **Fig. 10**). – (Graph: A. Kotula).

More numerous are double and multiple burials where anthropological analysis cannot detect any cause of death. Infectious diseases can be responsible for the simultaneous death of individuals (e. g., Grupe et al., 2015: 110), but generally do not leave traces on bones. Analysis of ancient DNA for detection of pathogens has not been widely applied to Mesolithic contexts. Multiple burials of adults and children, as represented at Groß Fredenwalde, could result from outbreaks in a family or community. Starvation is another reason for multiple deaths within a short period of time.

An unusual example of a hunter-gatherer multiple burial with 18 individuals was recorded at Sakhtysh 2 (Russia) (Kostyleva and Utkin, 2010: 20-21, 79-80). This Late Stone Age burial shows characteristics of a mass grave, with particularly dense packing of bodies and alternating body positions with heads pointing in opposite directions. Here, too, the skeletons lack evidence for the cause of death which must have been a catastrophic event. The excavators suggest a two-staged burial event, with a lower layer of already slightly decomposed carcasses on top of which an upper layer of carcasses was deposited, filling in the burial pit.

Re-use of burial pits is an additional option to explain burials with two or more individuals lacking evidence for simultaneous death. Re-opening of burial pits can only be detected during excavation if soil conditions and the documentation technique allows observation of these details. At the Mesolithic burial site of Oleni Ostrov in Russia (cf. **Fig. 1**) 16 double and three triple burials were found, most of them are regarded as simultaneous, multiple interments (Gurina, 1956: 50-55). However, for some burials, successive inhumations into a single burial pit have been suggested. Bone scatters or the partly removal of parts of a skeleton are interpreted as a result of re-opening of a pit, and in one case even a repeated re-opening of a pit is suggested (Grünberg, 2000: 61; Gurina, 1956: 40). In Zvejnieki, Latvia, several graves show stratigraphical separation of individuals in multiple burials (Grünberg, 2000: 87), probably indicating chronological depth and separated interments. An exceptionally complex situation with numerous multiple and sequential burials of several individuals, including inhumations as well as cremated remains, has been documented at

the Late Mesolithic/"Para-Neolithic" cemeteries at Dudka and Szczepanki in northeast Poland (Guminski and Bugajska, 2016). In contrast, Nilsson Stutz (2003: 304 ff.) rejected the interpretation of successive deposition of bodies at the burial sites of Skateholm and Vedbaek-Bögebakken as suggested by the excavators.

The importance of taphonomy and ritual for identification of the internal chronology of a Mesolithic multiple burial is well illustrated by more recent findings from Campu Stefanu, Corsica (France) (Courtaud et al., 2016). While some bones of several individuals were found in close proximity to each other and appeared in anatomical order, others were not in anatomical order, or were completely missing. The authors argue for a primary burial situation here, but cannot reconstruct the internal chronology of the burial(s). They suggest bone preservation and post-mortem manipulation as possible agents that prevent straight forward interpretation.

Finally, we come back to the Strøby Egede burial with eight individuals (**Fig. 2**), lacking indication for simultaneous death. One of the children (skeleton E) and an adult individual (D) were found in slightly elevated

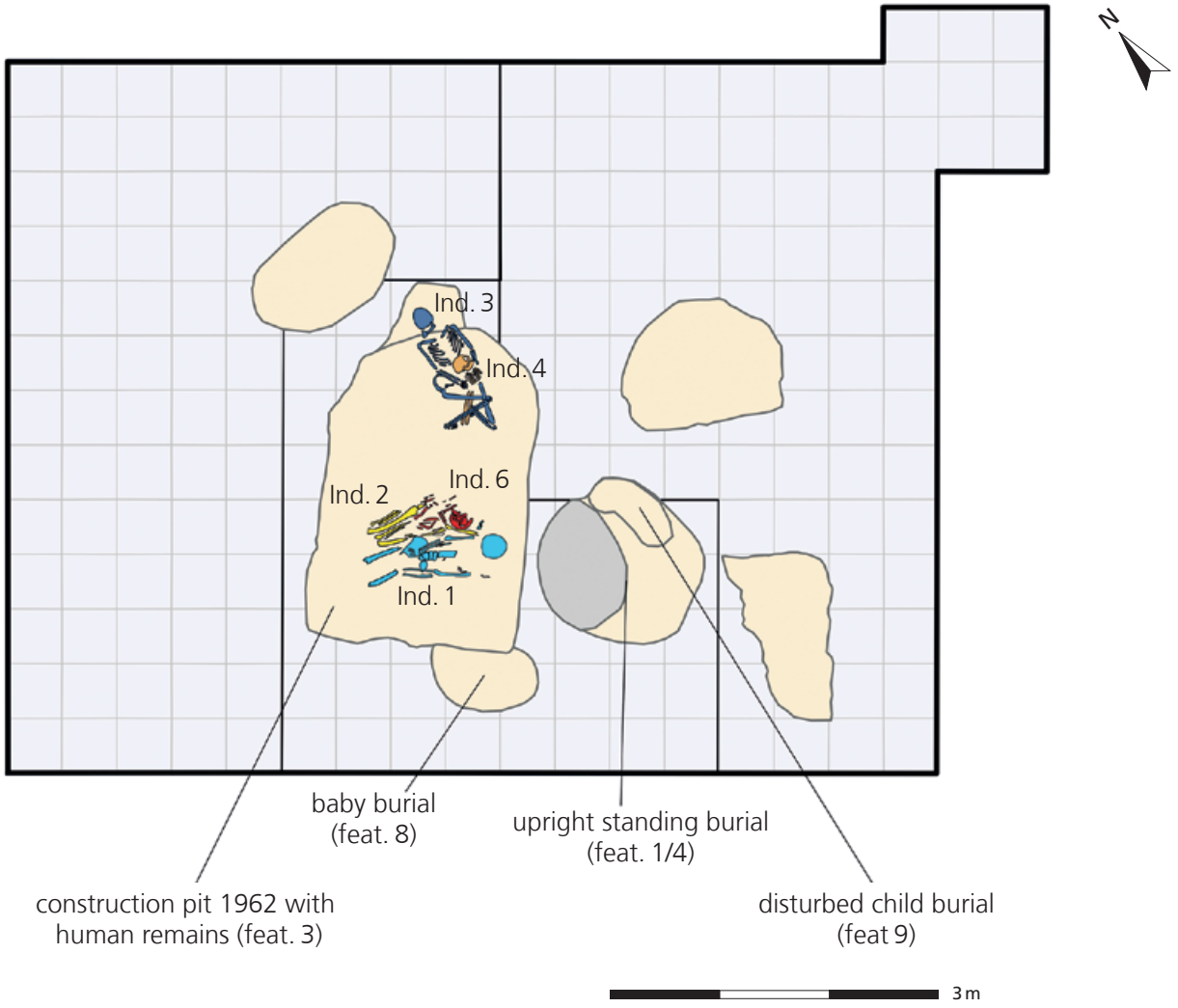

Fig. 8 Groß Fredenwalde. Location of Mesolithic features on the site and reconstruction of position and orientation of Mesolithic burials found in 1962 (complex I: individuals nos 1, 2, 6; complex II: individuals nos 3, 4). Note: colours refer to different individuals (cf. **Figs. 6-7**; **Fig. 10**). – (Graph: A. Kotula).

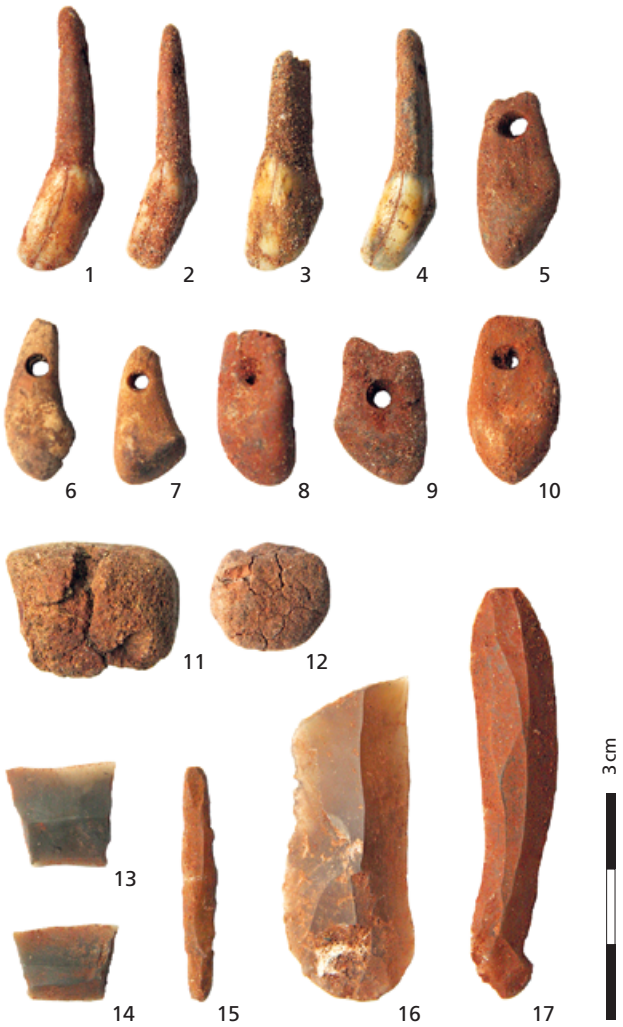

Fig. 9 Groß Fredenwalde. Selection of burial goods found in the re-excavated trench of 1962. **1-10** animal tooth pendants; **11-12** pieces of loan of unknown function; **13-14** transverse flint arrow heads; **15-17** flint bladelette and blades. – (Graph: A. Kotula).

positions that might indicate later deposition of these individuals in the same pit. However, Brinch Petersen (1988) suggests here a baby (individual G) lying in the arms of the male individual (D). We do not want to rule out that even such a well documented burial might be the result of more than one event.

Re-evaluation of multiple burials in Palaeolithic and Mesolithic contexts remains an interesting challenge for future research. Our investigation at Groß Fredenwalde calls for caution when interpreting the "double" and "multiple" burials of Bonn-Oberkassel and Neuwied-Irlich mentioned above. The complexity of these records can only be addressed by detailed observations during excavation and a thorough post-excavation assessment of the entire evidence and – where possible – by systematic and reliable radiocarbon dating of all individuals in a burial and preferably also of additional grave goods and other associated samples. It can be said with certainty that Martin Street as a critical scientist is always aware of such pitfalls!
For Groß Fredenwalde we were able to show that the situation discovered in 1962 results from different burial events and the use of the site for a longer period of time. We have to be aware, however, that only certain individuals were buried at these "cemeteries" and that many other deaths remain invisible in the archaeological record. The considerable number of children and individuals in double/multiple burials might have resulted from unusual events.

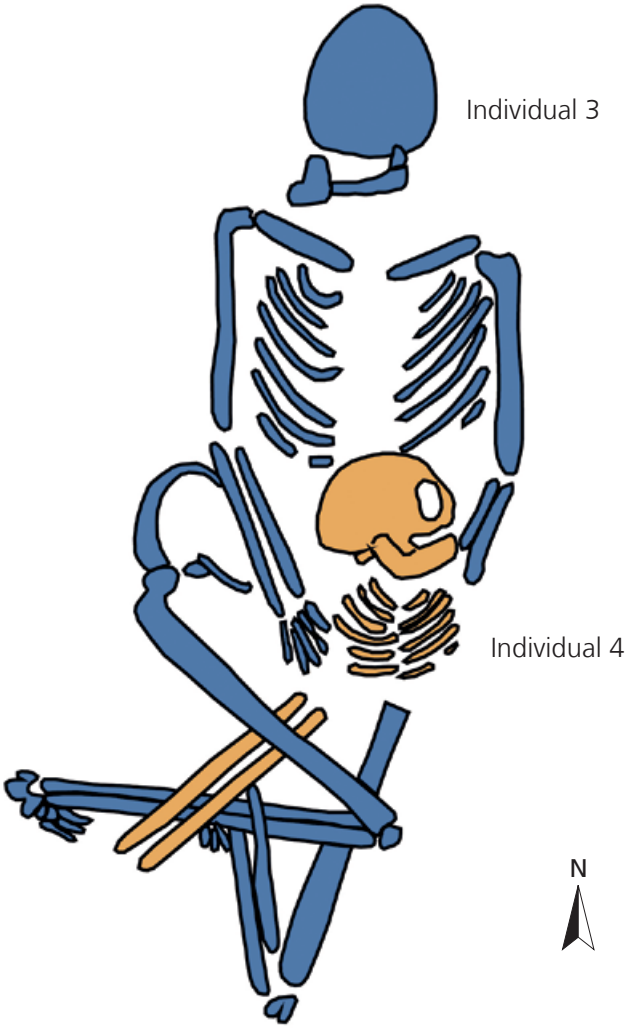

Fig. 10 Groß Fredenwalde. Sketch drawing of the burial found in 1962 on the second day (complex II) with individuals no. 3 (female adult) and no. 4 (child) (see **Tabs. 1-2**). Note: colours refer to different individuals (cf. **Figs. 6-8**). – (After Gramsch and Schoknecht, 2003).

Combining the evidence from the initial investigation in 1962 with the re-assessment of the record and evidence from the new, ongoing excavations since 2012, we can state that Groß Fredenwalde is an exceptional hunter-gatherer burial site in the vast North European Plain, although it does share characteristics with other Mesolithic burial grounds in the wider region from Scandinavia to the Baltic and Russia. Even though so far only twelve individuals have been discovered, already a wide spectrum of ritual and social practices is reflected in body positions (including an upstanding individual), the presence of single as well as double/multiple burials, and varying orientations of the bodies. However, a larger variety of burial rites seems to be typical for the Atlantic Mesolithic. Perhaps it is already legitimate to regard the burial site with its prominent topographical setting on the Weinberg hill at Groß Fredenwalde, as one of those nodes in the cultural landscape that might have developed as cosmological transition places between worlds, reflecting the entangled lifeways of local hunter-gather groups, as has been suggested e.g., for Oleni Ostrov and Skateholm (cf. Nilsson Stutz, 2014: 720-721).

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