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CONDITIONS CONTRIBUTING TO THE NATURAL MUMMIFICATION OF CORPSES DEPOSITED BELOW NORTH FINNISH CHURCHES

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Abstract. The tradition of burying the members of the elite beneath the floors of North Finnish churches has resulted in a number of naturally mummified remains. The practice began during the Catholic period, continuing and even intensifying after the Reformation until it was finally prohibited in the early 19th century. Although the combination of low temperatures and good ventilation beneath the old unheated churches of northern Finland can be seen as the primary cause of corpse preservation, there were also a series of funerary customs and traditions that, though unintentional, may have also contributed to mummification. We present the results of our recent work with the mummified remains of North Finnish churches and comment on the possible role of certain cultural and funerary traditions to natural mummification processes.

Keywords. 16-19th century. Church burials. Funerary customs. Natural mummification. North Finland.

At the Mummy Congress on Lanzarote twelve years ago, we presented an interpretation of the processes leading to the natural mummification of the corpses deposited below the churches of northern Finland (Núñez *et al*. 2008). The main reason was the combination of sustained periods of low temperatures and good ventilation, which gave rise to some sort of freeze-drying processes. Ventilation was an inbuilt architectural feature meant to avoid humidity and the deterioration of building wooden components. As for temperatures, the local monthly means went into refrigeration range (<5°C) by late September, reaching freezing by late October, and remained so until April (Fig. 1a). Particularly those corpses deposited beneath the churches in late fall or winter were likely to become mummified.

The North Finnish mummies are thus the result of the unique environments beneath the churches; and their sacral location has protected them from major vandalism, even in wartime. However, they now seem threatened by the climatic

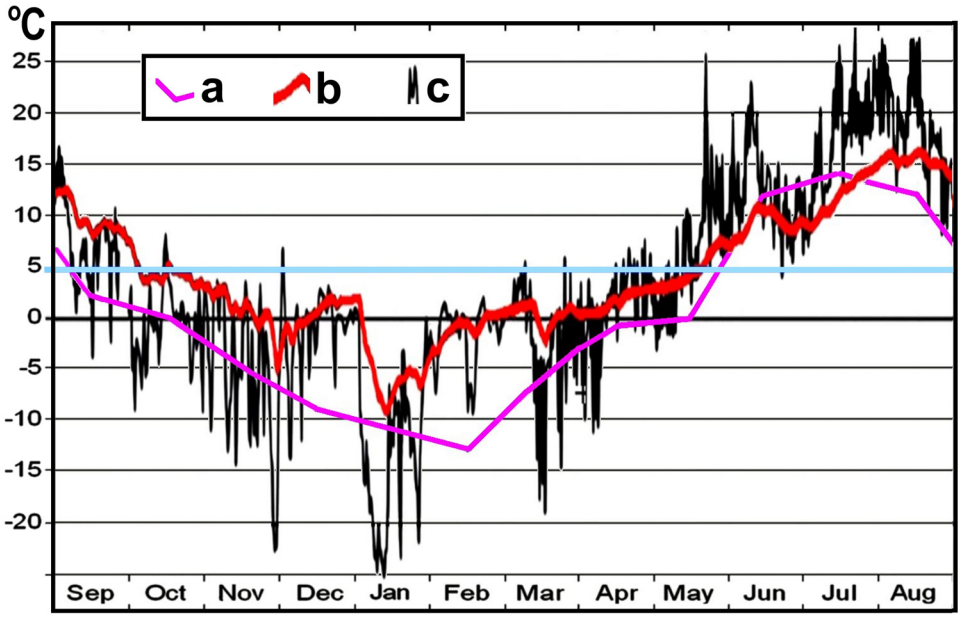

Fig. 1. Temperatures in the study area: (a) Mean monthly temperatures during 1970-2000. (b) Temperatures recorded below the Kemi church floor between September 2013 and October 2014. (c) Temperatures recorded at the nearby (6 km) Kemi-Tornio airport during the same period. (Drebs et al. 2002; Väre 2017).

change. Alarming signs of deterioration had developed between the inventories done in 1996 and 2012. To assess the damages caused by climate change, devices were placed to monitor the environment below the floor of some churches in 2013 (Väre 2017). The most interesting for our research is the Kemi church, which is not in regular use and is still unheated as in earlier times. The devices showed that the temperatures below the Kemi church trailed closely behind those measured at the nearby (5 km) Kemi-Tornio airport (Fig. 1b), which points to the good ventilation conditions below the church.

The old North Finnish churches were small (150-200 m^2). They had simple plank floors, below which the dead of the elite (priests, high officials, the wealthy) were deposited for their final rest. There were no real crypts, but a of shallow basement originally meant for keeping the building ventilated and humidity free. That left about two meters between the dead beneath the floor and the noses of the people on the church benches. There are indeed numerous references to the stench escaping between the planks in summer (Kallio-Seppä *et al*. 2019). Church burials were finally prohibited for sanitary reasons by an 1822 law, but they lingered in some isolated parishes a few decades. The burial activity in the studied churches (Fig. 2a) spans from the late 16th to the mid-19th century (Paavola 1998).

Although we fully agree with our interpretation of 12 years ago, there is new evidence suggesting that certain funerary customs and traditions may have unintentionally helped the natural mummification processes. They are the subject of this paper.

DEATH-TO-BURIAL-INTERVALS (DBI)

While conducting demographic studies at some Finnish parishes (e.g. Núñez *et al*. 2013), it became clear that there were considerable intervals – weeks, even months – between the death and burial of many individuals. Since it seemed likely that this could be climate related, three small parishes situated at 66.5, 63 and 60 degrees north (Fig. 2) were tested. Based on the 1751-1850 defunction registers, the mean time elapsed between the death and burial of 12994 individuals in these three parishes was 18, 9 and 6 days from north to south (Núñez 2015; Núñez & Silver 2019). Finland's inhabitants must have been used to long waits to bury their dead, but this often surprised visitors from southern Europe (Regnard 1875 [1681]; Ganivet 2017 [1898]).

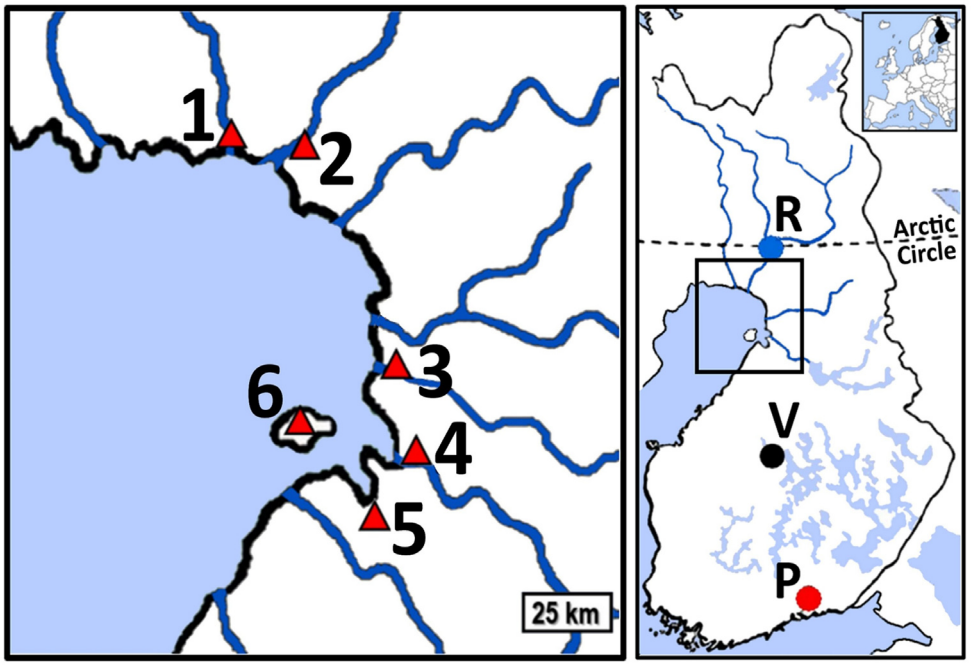

Fig. 2. Parishes mentioned in the text: (a) Location of the study parishes: (1) Tornio, (2) Kemi, (3) Haukipudas, (4) Oulu, (5) Kempele, and (6) Hailuoto. (b) Location of the parishes with DBI statistics: (R) Rovaniemi, (V) Viitasaari, and (P) Pukkila.

The reasons for delaying burials varied with season and region. The ground was frozen in winter – longest in the north – and several factors affected the transportation of the dead to churchyards. Inland the distances could be over 50 km, roads were poor, and even the more reliable waterways became impassable in certain seasons. Solutions for what to do with the waiting dead varied also with region and season. In general, those that died in winter were stored in unheated buildings in wait for soil thaw. In many areas, those that died in summer and could not be taken directly to the distant churchyards were temporarily buried on specific "death islands" until transportation became possible in autumn or early winter (Manker 1945; Koivunen 1990; Laitinen 2001; Ruohonen 2002). There were also especial local solutions. Some Sámi groups in Lapland hung their bark-wrapped dead from trees on small islands until they could be taken to the churchyard (Elgström 1922; Manker 1945). Similarly, in the South Finnish Karkku Parish the dead

were temporarily placed on a plank[1] among the branches an old lakeside spruce, where they are said to have dried without decay or maggots (Valonen 1948). If true, this would imply that spruce scent has insect-repellent properties or that it masked the DMTS gases from the blowflies. It is noteworthy that both spruce and the water surrounding "death islands", supposedly had an apotropaic effect against ghosts and revenants according to local lore (Hagberg 1937; Pentikäinen 1990; Haavio 1992).

Unlike the commoners, the elite that buried their dead beneath churches did not have wait for soils to thaw or roads to become passable, yet they needed time to arrange their grandiose funerals (Ilmakunnas 2019).

The mentioned commoners' procedures solved to some extent the problems of corpse preservation and stench during the long death-to-burial periods, but there is very little information about what the elite did with the dead waiting to be buried. Although artificial embalming was not practiced in Finland (Erämaja 2006), there is nevertheless some evidence that something was being done to the corpses of the elite to temporarily lessen decomposition and stench. The information comes from the burials of two clergy members, Reverend Johannes Tornæus and Bishop Peder Winstrup.

Reverend Johannes Tornæus (1605-1681)

Hints of such measures can be found in Jean-François Regnard's account of his visit to Lapland in 1681. The famous comedy writer arrived in Tornio (Fig. 2) on July 27. On the next day he went to the home of Reverend Tornæus, whom he admired («*un homme extrêmement savant*»), but the priest had passed away on July 26. He describes the deceased laying "in state" in a coffin with his best priestly garments. In the same room was the widow in bed, surrounded by weeping ladies, and a table with silver jars continuously refilled with wines and brandy. Regnard's descriptions of this scene[2] and other events of Tornæus' funeral ceremonies are not without irony.

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[1] Presumably birch-bark wrapped or in a coffin.

[2] «*Nous le trouvâmes étendu dans son cercueil avec des habits conformes à sa profession, et que l'on lui avoit fait faire exprès… Sa femme étoit d'un autre côté, couchée sur son lit, qui témoignoit, par ses soupirs et par ses pleurs, le regret qu'elle avoit de perdre un tel mari. Quantité d'autres femmes ses amies environnoient le lit, et répondoient par leurs gémissements à la douleur de la veuve. Mais ce qui consoloit un peu, dans une si grande affliction et une tristesse si générale, c'étoit la quantité de*

The Frenchman left soon after for North Lapland and returned on September 2, just in time to participate as honor guest at Tornæus' funeral ceremonies on September 3. Intrigued by the 39-day delay, Regnard asked was told that in Sweden[3] the more important a person was, the longer it took for the funeral be held (Regnard 1875[1681]:134-135).

The crucial question is: How was Tornæus' corpse kept during those 39 days? Tornio summer days are long with temperatures often reaching over 20°C and an August mean of 14°C (Fig. 1). Although Regnard did not see how Tornæus' body was treated, he gives important details about the state of the corpse nearly six weeks after death. He wrote that the coffin was in the middle of the church and that the women passing the deceased would throw themselves over the coffin and embrace (kiss?) him.

> «*Les femmes en passant preès du défunt, se jetèrent sur le cercueil et l'embrassèrent pour la dernière fois*» (Regnard 1875:137).»

Here, it is worth noting that, despite Regnard's numerous ironic remarks about the funeral ceremonies, he makes no reference to the stench or unpleasant appearance of the 39-day corpse – even if as an honor guest he had been quite close to it during the long funeral ceremony (Regnard 1875:136-137).

What was done to preserve Tornæus' corpse in embraceable condition? One possibility is that, after a couple of days lying in state, the corpse was stored in a subterranean cellar, which were common at the time and are known to hold refrigeration temperatures. Unfortunately, we do not have Tornæus' grave, which may have been lost in the fire that destroyed the old Tornio church in 1682, but further hints may be obtained from the burial of his contemporary, Bishop Peder Winstrup.

Bishop Peder Winstrup (1605-1679)

The recent investigation of the grave of Peder Winstrup, Bishop of Lund, provides interesting additional information (Lagerås 2016; Karsten & Manhag 2018). He was buried 51 days after his death and, luckily, his naturally mummified body

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grands pots d'argent faits à l'antique, pleins, les uns de vins de France, d'autres de vins d'Espagne, et d'autres d'eau-de-vie, qu'on avoit soin de ne pas laisser longtemps vides. Nous tâtâmes de tout; et la veuve interrompoit souvent ses soupirs pour nous presser de boire» (Regnard 1875[1681]:13-14).

[3] At the time and up to 1809, Finland was part of the Swedish Kingdom.

and the coffin contents have been preserved. The body rested on two pillows and a mattress, all stuffed with plant materials, and there was also a basal bedding of twigs below the mattress. Obviously, the plants served as padding, but they would have also helped to absorb the corpse fluids. Moreover, the numerous plants with aromatic properties (hops, lavender, hyssop, lemon balm, dwarf everlast) suggest an intention to conceal the corpse stench which, at the same time, may have kept away corpse insects. Also, according to Karsten & Manhag (2018:13), some of the plants in the pillows, mattress and bedding "*are known to counteract insect attack and hinder decomposition*".

There was little evidence of blowflies associated with Winstrup's corpse, but this may have to do with Winstrup dying in December. Only three Calliphoridae wing fragments were found in the mattress, which is naught compared to non-necrophilic insects: 140 species and c.850 identified individuals in 49 samples from the pillows, mattress, bedding and Winstrup's clothing. All these taxa are thought to have been introduced with the plant materials. The numerous coleoptera remains (c.80%) were dominated by *Epauloecus unicolor* with a total of 659 specimens in 26 of the 49 samples, mostly in the upper pillow (336) and mattress (156). Though not a corpse beetle, it feeds on decomposing organic matter, and its abundance in the upper pillow and mattress indicates that it came with the plant filling and subsequently reproduced within the coffin. *Epauloecus* was probably responsible for the many gnawing holes in Winstrup's skin. (Fägerström 2018).

Summing up, the numerous plants used in Bishop Winstrup's burial seem to have had two main functions in addition to padding. Some were meant to absorb the body fluids, while others had aromatic properties intended to hide the stench of the decaying corpse (Lagerås 2016). Furthermore, some of the latter are also known insect repellents (Cowan 1999; Zhang 2013; Karsten & Manhag 2018). There are also indications that the corpse had been kept at relatively low temperatures before burial (Fägerström 2018; Karsten & Manhag 2018), which was no problem during winter.

BACK TO THE CHURCH BURIALS

Bishop Winstrup's burial served as reminder that similar pillows, mattresses and basal beddings were also present in many of the coffins below the northern churches. Unfortunately, we have not been able to do proper analyses of their contents, since we were only allowed to inspect the coffins with open/broken lids

Table 1. Frequency of the most common plant materials in burials below the study churches (Kempele, Hailuoto, Haukipudas, Kemi, Tornio) and in the Oulu churchyard. The "X"s in Tornio reflect the abundance of the materials. Based on Joona (1997), Suvanto (2005), Lempiäinen (2009), Tranberg (2018) and M. Núñez's observations.

	Kempele	Hailuoto	Haukipudas	Kemi	Tornio	Oulu	Sum
Birch	2	27	2	1	XX	13	45+
Spruce	3	5	3	7	XXX	5	24+
Straw/grass/reeds	1	2	2	7	X	5	17+
Peat moss/sedges	0	1	3	2	X	5	13+

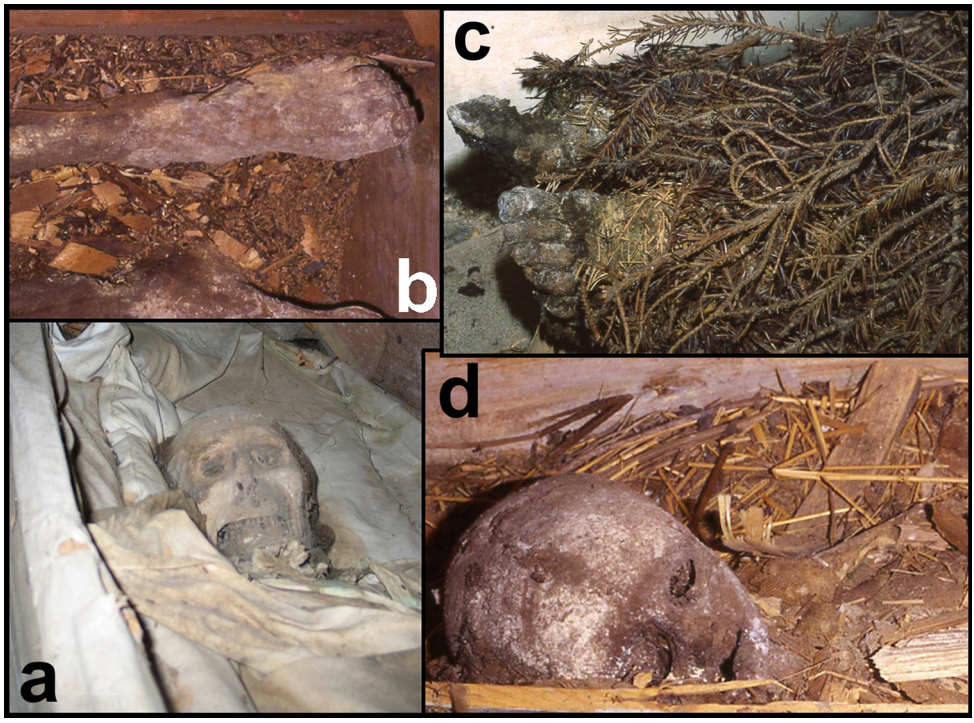
and were not supposed to handle the contents within. The only exceptions were specific permissions to take minute hair/nail samples from a dozen mummies for isotope analyses and to perform computer tomography on Nikolaus Rungius' mummy and a few sealed infant coffins (Väre *et al.* 2016; Núñez *et al.* 2017; Väre 2017; López-Costas *et al.* in this volume). Nevertheless, we had observed and photographed plant materials in the coffins, and archaeobotanist A. Tranberg (2015, 2018) has even identified some of them (Table 1).

The coffins of several church burials contained pillows and mattresses of unknown but likely plant filling as well as basal beddings and body packings of various plant materials (Lam. I-III). Birch and spruce were the most common (Table 1), but a variety of other materials were also recorded, among them peat-moss, sedges, grasses, straw, rushes, reeds, twigs, sawdust and wood shavings in various combinations.

Birch occurred in the form of bark and branches. Birch bark was a multipurpose material used extensively in Fennoscandia (Niemi 2015). It has been reported in both prehistoric and early modern graves, where it was used either as wrapping, cover or as basal bedding for the deceased (e.g. Elgström 1922; Hagberg 1937; Edgren 1959; Storå 1971; Ahola 2019). Birch-bark was eventually replaced by wooden coffins, but we observed several cases of birch bark on or within (Lam. IIc) coffins (Paavola 1991; Joona *et al.* 1997; Suvanto 2005; Tranberg 2015, 2018). When used as bedding or wrapping for the corpse, birch bark would have absorbed the body fluids. Wrapping or covering the corpse with birch bark would have helped to trap some of the stench. This possibly applies also to the observed partial covering of the corpse from the waist down. Birch branches could have added a traditionally "clean" smell which may, or may not, have masked some of

the corpse stench. Fresh birch shoots symbolize the spring season and renewal, perhaps resurrection, and were, and are, used as decorations in feasts, weddings and funerals celebrated in spring and summer.

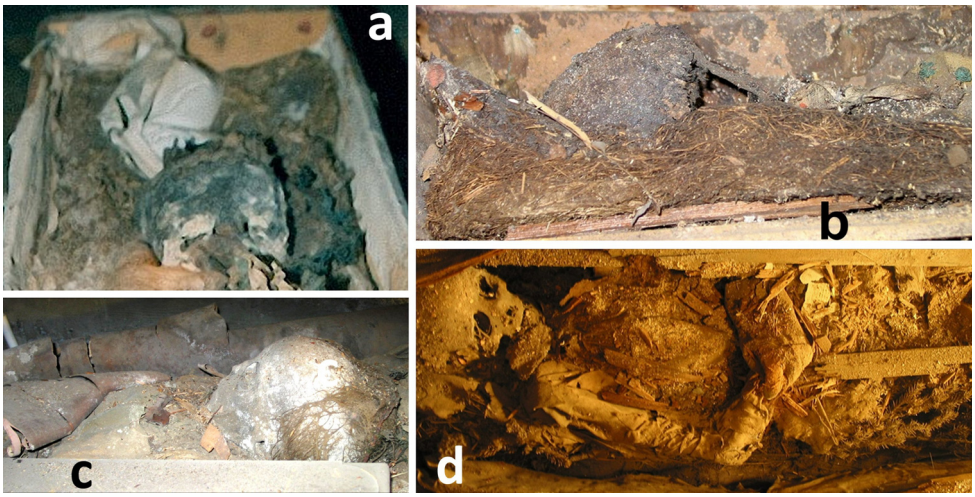
Spruce was also common, either as basal beddings or as packings (Lam. Ic, IId). There is also the mentioned claim of corpses keeping free of decay and maggots among spruce branches. We were not able to find any references to the possible insect-repellent properties of spruce, but the strong aroma of fresh spruce may have hidden the DMTS from blowflies. As in the case of birch, packings of spruce branches were often placed around or on top the hips and legs of the corpse. This again suggests an attempt to mask the stench, which may have been more effective with spruce. Another possibility is that they were meant to hinder the dead from becoming revenants (Hagberg 1937).



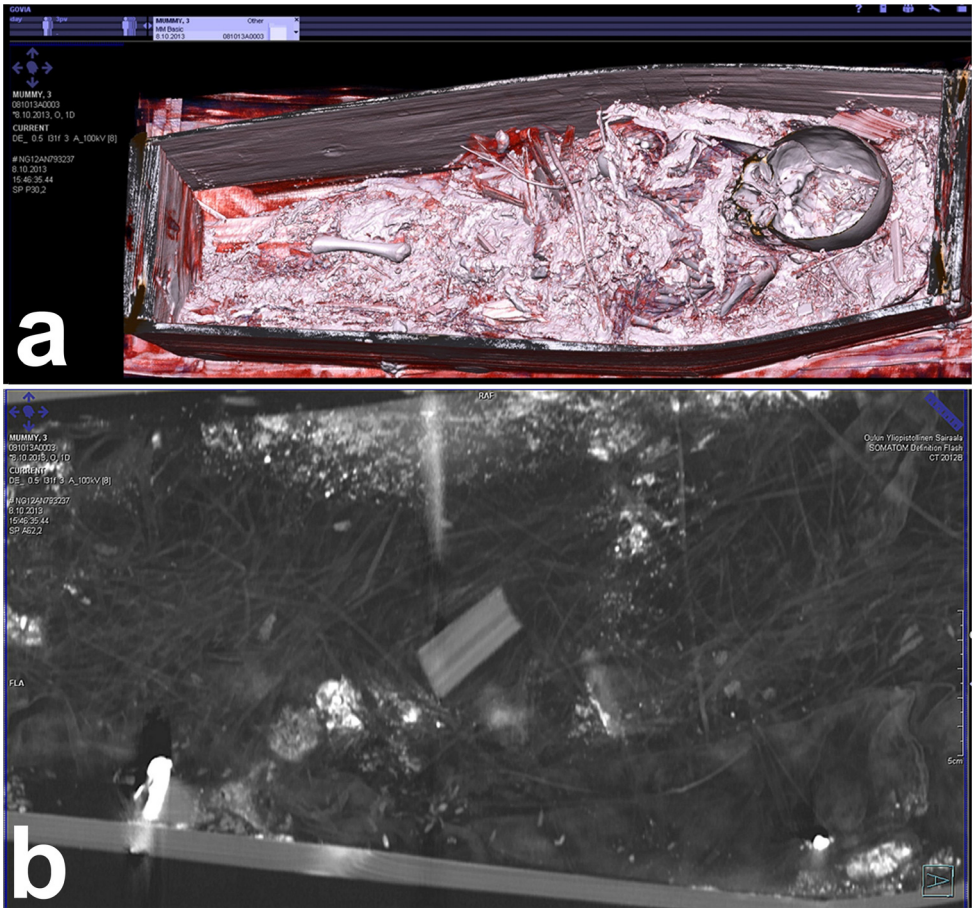
Lam. I. Details from church coffins: (a) Pillow and mattress with likely plant filling. (b) Sawdust and wood shavings as basal bedding. (c) Spruce branch packing around the legs. (d) Bedding of straw/grass, twigs and wood shavings.

Peat-moss beddings were also fairly common (Lam. IIa, IIIa), which is not surprising since 29% of Finland consists of peatlands and, most importantly, peat-moss is an extremely efficient drying agent that absorbs 15-25 times its dry weight in water. It would have been ideal for absorbing corpse fluids, both while waiting for the funeral and in the final resting place below the church. Keeping the corpse dry would have hinder stench and helped preservation. It is worth pointing out that peat-moss has long served to absorb both liquids and smell in Finnish mink farms (Selin & Nyrönen 1985).

Grass, straw and sedges have also fluid-absorbing properties. The Sámi used sedges and grass to keep their feet dry inside their boots. Sawdust and/or woodshavings (Lam. Ib,d,III) would have also been efficient fluid-absorbing materials, but their presence may be also connected with the superstition that all the wood waste generated in coffin making should go with it into the burial (Paulaharju 1914; Hagberg 1937). Some species observed within the coffins are flowering plants and could have been meant to hide the stench, but their low incidence suggests that their presence is more likely accidental or decorative. Nevertheless, one of them, knotgrass, is known to have insect-repellent properties (Sõukland *et al*. 2010).



Lam. II. Details from church coffins: (a) Peat-moss bedding. (b) Grass/turf packing. (c) Wrapping with birch bark. (d) Spruce branches as both bedding and packing around hips and legs. The sawdust is intrusive, due to carelessness in recent repairs to the church floors.



Lam. III. CT-scans of a sealed coffin containing a partially mummified child: (a) Middle plan showing what appears to be a bedding of peat-moss. (b) Top view showing that the coffin was packed full with twigs and wood shavings above of the peat-moss bedding.

FINAL REMARKS

Although little is known about what the elite of northern Finland did to preserve their dead during the weeks-long waits before burial, the fact that Reverend Tornæus' corpse was kept in "embraceable" state for 39 summer days indicates that they knew what to do and were doing it right. The information from the thor-

ough study of Bishop Winstrup's burial suggests that the similar features observed in the northern church coffins may also have been meant to temporarily preserved the corpse until the actual burial. The use of fluid-absorbent, insect-repellent and aromatic agents in the northern Finnish church burials were probably intended to mask the corpse stench and temporarily and slow down its decomposition. Though unintentionally, these measures may have served as an initial stabilization phase that helped the onset of natural mummification processes once the corpses were finally deposited in the cool ventilated spaces beneath the churches. On this basis, it may be useful to look into the possible innocent pre-burial procedures whenever studying natural mummification cases.

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