The Medieval Skull Relic of Turku Cathedral

Preliminary Results of Analyses*

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Introduction

In Turku Cathedral, located in Southwest Finland, a remarkable collection of medieval relics has been preserved. There are almost 100 objects, most of them bones or their fragments. The assemblage also includes 15 relics with cloth cover or cotton wool padding. Some relics still have their parchment *authenticae* attached. Moreover, the collection has medieval textiles, a relic pouch, fragments of wax seals, and a silver coin among other things.

The reason for preserving such a collection of catholic relics in a Protestant cathedral is not known. Nonetheless, the relics were divided into two groups in a fairly early date. The first part of the relics – including a famous skull relic, the subject of this article – was put into a medieval wooden casket attributed to Blessed Hemmingus.¹ The casket was kept in the storeroom of the sacristy still in the eighteenth and the nineteenth centuries. In 1893 the casket was moved to Turku Castle, and after the restoration of Turku Cathedral in 1929, it was returned to the cathedral



where it has been on display ever since. The second group of the relics was stored in the sacristy, in a niche which was originally closed with an oak door and later sealed with a brick wall. The niche was discovered and opened in 1924 as part of the cathedral's restoration. After the discovery, the whole collection was studied by the State Antiquarian Juhani Rinne, the director of the restoration project.²

Fig. 1. The skull relic before opening in 2010.

^{*} Research for the present article was undertaken as part of *TheTurku Cathedral Relic Project* at the Department of Archaeology, University of Turku.

¹ Hemmingus was the bishop of the Diocese of Turku in 1338–1366.

² Juhani Rinne, *Pyhä Henrik: Piispa ja marttyyri* (Suomen kirkkohistoriallisen seuran toimituksia 33), Otava: Helsinki 1932.

In the relic collection, the skull relic with its bright red silk cover is perhaps the most impressive one. The dimensions of the object are 192 mm (length) x 141 mm (breadth) x 120 mm (height). On the front side of the skull relic, an embroidered depiction of martyrdom has been placed (Figs. 1 and 2). Different scholars have attributed the skull relic to two different saints: firstly to St. Henry, who was the Bishop of Uppsala and the patron saint of Finland and was murdered c. 1156, and secondly to St. Eric or the King Eric IX of Sweden who was martyred in 1160.³



Fig. 2. The depiction of martyrdom embroidered on the front of the skull relic (Rinne 1932, Fig. 186).

The skull relic was scientifically investigated for

the first time in the 1920s. Before that it had been partly opened at some point, and one or two pieces of bone had been taken out. Because the skull relic was not entirely opened even in the 1920s, the structure and the materials of the object could not be thoroughly documented. The bones of the skull structure were analyzed with the help of X-ray photography by Yrjö Kajava, who was the Professor of Anatomy at the University of Helsinki.⁴ All the findings were published in 1932 by Juhani Rinne in his monograph *Pyhä Henrik, piispa ja marttyyri* ('Saint Henry – The Bishop and Martyr'). After his study and accompanying documentation the skull relic was treated by conservators. The structure of the object was supported by



setting metal wires inside it, and extra textiles were added to cover those places where the original cloth was missing (Fig. 3).

Fig. 3. An X-ray photograph of the skull relic. The supporting metal wire construction is from the 1920s (Helsinki, The Archives of the History Unit/The National Museum of Finland, neg. 40134b [1946]).

³ Rinne 1932, 335–354; Carl Axel Nordman, 'En relik av Erik den helige i Åbo domkyrka', in Bengt Thordeman ed., *Erik den Helige: Historia – kult – reliker*, Nordisk rotogravyr: Stockholm 1954, 303–320.

⁴ Yrjö Kajava, 'Kallolaitteen luusto', in Rinne 1932, 336–345.

According to Carl Axel Nordman – the Finnish State Antiquarian of the time – the jawbone in the skull relic belonged to St. Eric. To test his theory he let part of the skull relic to be opened in 1946. The jawbone was taken to Uppsala, Sweden, where it was fitted with the skull kept in St. Eric's reliquary at Uppsala Cathedral (Fig. 4). The skull and the jawbone appeared to fit together, but there were other physical details which opposed the idea of their having a common origin.⁵ After the test, the jawbone was returned to Finland and placed back inside the skull structure. Finally, the skull relic was sewn together. After the 1940s, the skull relic was exhibited a couple of times, but it had to wait till the 21st century for a new scientific interest to emerge. The skull relic has been studied since 2010 as part of the Turku Cathedral Relic Research Project.⁶



Fig. 4. The jaw of the Turku skull relic was fitted to the skull kept in the reliquary of St. Eric in Uppsala Cathedral in 1946 (Helsinki, The Archives of the History Unit/The National Museum of Finland [29/V-49]).

From the point of view of conservation, the operations of the 1920s and 1946 caused three problems for the skull relic. In 1946, part of the metal wire construction installed in the 1920s was removed which caused the gradual collapse of the structure and wrinkling of the

embroidery. Eventually the lowest part of the martyrdom scene was turned under the object. The supporting structure was removed by cutting the metal wires in the 1940s, but the sharp ends of the wires were not covered in any way. This put the textiles next to them in risk of damage. In addition to the metal wires there were other materials which were added to the skull relic in the 1920s and the 1940s. Unfortunately there was no knowledge of the quality of these materials.

In the 2000s, removing both the supporting structure and the potentially harmful materials required opening up the entire object. When this was performed, the structure and materials of the skull relic were documented in detail. The task included identifying the weave and the fibres of the textiles. At the same time, it was possible to take scientific samples for further analysis, especially for radiocarbon dating. The opening

⁵ Bo E. Ingelmark, 'Skelettdelarna i Erik den heliges relikskrin', in Bengt Thordeman ed., *Erik den Helige: Historia – kult – reliker*, Nordisk rotogravyr: Stockholm 1954, 254–5.

⁶ The director of the project is Professor Jussi-Pekka Taavitsainen, Department of Archaeology, University of Turku.

procedure was carried out in 2010–2011. The task was performed with care using tweezers and microscope, and it took altogether 10 weeks. Every stage of the opening was documented both in writing and with a digital camera. In the end over 700 photos were taken. The description of the opening of the skull relic, remarks on its structure and materials, and the first results of the radiocarbon datings are included in the author's MA thesis.⁷ The analysis and dating of the materials is still going on, and the conservation of the skull relic will take place only after few years.

The Materials of the Skull Relic



The Relic Bones

A thorough osteological analysis of the relic bones still needs to be carried out. Nonetheless, at the moment we know that the large bones of the assemblage belong to a human skull (Fig. 5).

Fig. 5. The lower jaw in package 2.



However, Yrjö Kajava noted in 1932 that in the skull relic 'there are also bones which definitely derive from some other part of the body, even bones that do not belong to a human skeleton at all' (Fig. 6).⁸

Fig. 6. Miscellaneous (human?) bones in package 7.

The relic bones are divided into 19 packages.⁹ In each package there are 1–36 pieces of bone; the median is three.¹⁰ In some cases it is obvious that the small bone fragments belong together or to the largest piece of bone in the package. It is also obvious that some bones had been cut or crushed before they were placed in the package. There are cut marks on some bones (Fig. 7), and on one of the cranium bones a blunt tool was used to make a hole and a pit (Fig. 8). In the bones and inside the bone packages there is quite a lot of

⁷ Aki Arponen, *Turun tuomiokirkon keskiaikainen kalloreliikki*, unpublished MA thesis, Department of Archaeology, University of Turku 2013.

⁸ Kajava 1932, 340.

 $^{^{9}}$ There were 21 bone packages – two of them were found empty. The packages are numbered from 1 to 19.

¹⁰ Bones with grain size over 5 mm were included in the calculation.

soil indicating the circumstances where the bones were kept before using them as parts of the skull relic.



Fig. 7. Cut marks in the bone in package 4.

According to the C^{14} dating results the relic bones originate from several individuals (Table 1). Are there any bones which could be connected to either St. Henry or St. Eric? The most remarkable pieces of bone – the jaw (in package 2) and the

cranium bone with a hole (in package 6) – are too old to belong to either of them.



Fig. 8. A hole and a pit (to the left of the hole) in the cranium bone in package 6.

However, the other cranium bone (in package 8) dates from their lifetime. Future isotope and DNA analyses will either verify or disprove its connection to the Nordic saints.

Bone in package	Laboratory	BP	calBC / calAD (probability
	number		95.4%)
2	Ua-44315	1675±30	250-300 calAD and 320-430
			calAD
3	Ua-42098	1692±30	250–420 calAD
4	Ua-42100	1717±30	240–400 calAD
5	Ua-42101	1973±33	50 calBC – 90 calAD ¹¹
6	Ua-44318	1268±30	660–820 calAD ¹²
8	Ua-42102	833±31	1040–1220 calAD
13	Ua-42103	1990±31	50 calBC – 80 calAD
14	Ua-42104	1896±30	50–220 calAD ¹³
15	Ua-42107	1189±30	760–900 calAD ¹⁴

Table 1. Radiocarbon dating results of the relic bones. All C¹⁴ dating samples of the relic skull have been analysed at the Ångström Laboratory, University of Uppsala, Sweden by Professor Göran Possnert.

¹¹ Probability 94.1 %.

¹² Probability 93.7 %.

¹³ Probability 94.4 %.

¹⁴ Probability 88.6 %.

The Bone Packages

The relic bones were wrapped in undyed linen plain weave cloth and the packages were closed with sparse stitches of white linen yarn. The size of the packages varies considerably: the smallest ones include only a tooth or a fragment of a bone while the largest packages contain a jaw or cranium bone. In general, the bones were well wrapped but in some cases the cloth was too small to cover the bone entirely (Fig. 9).



Fig. 9. The cranium bone in package 6 was only partly covered with linen cloth. The length of the package is 135 mm.

There are six C¹⁴ dating results from both the linen cloth (Table 2) and the linen sewing yarn (Table 3) of the bone packages.

Bone package	Laboratory number	BP	calAD (probability 95.4%)
2	Ua-44316	652±30	1270–1330 and 1340–1400
3	Ua-42099	838±30	1150–1270
6	Ua-44319	652±30	1270–1330 and 1340–1400
8	Ua-45625	659±30	1270–1330 and 1340–1400
13	Ua-45627	741±30	1220–1290
14	Ua-42106	640±30	1280–1400

Table 2. Radiocarbon dating results of the cloths in the bone packages.

Bone package	Laboratory number	BP	calAD (probability 95.4%)
2	Ua-44317	652±31	1270–1330 and 1340–1400
3	Ua-45624	659±30	1270–1330 and 1340–1400
6	Ua-44320	846±38	1150–127015
8	Ua-45626	727±30	1220–130016
13	Ua-45628	762±33	1215–1285
14	Ua-42105	595±30	1290–1410

Table 3. Radiocarbon dating results of the sewing yarns in the bone packages.

The 19 bone packages were sewn together with sparse linen yarn stitches (Fig. 10). The packages form a skull which is considerably small compared to a human skull. The facial bones between the forehead (the frontal bone) and

¹⁵ Probability 84.0 %.

¹⁶ Probability 94.2 %.

the lower jaw (the mandible) are missing. It is possible that they were set in another location in the skull structure.



Fig. 10. The bone packages sewn together.

The Fillings

In the front and on both sides of the skull structure there are piles of small pieces of linen cloth. Some of the cloth fragments were

sewn together with a couple of stitches, while some of the fragments are completely loose. The fragments are mostly of undyed plain weave cloth. In the front where the facial bones are missing, nine cloth pieces support the upper textile layers;¹⁷ some of the cloth pieces are loose and they have lost their original shape (Fig. 11).



Fig. 11. The filling in the front of the skull structure demonstrates a violent intrusion into the skull relic before the 1920s.

On the sides of the skull structure the cloth pieces replace the temporal muscles, making the skull structure more round and keeping the upper

textile layers tight. On the right side of the skull structure there are 15 pieces of cloth¹⁸ and on the left side 11¹⁹.

There are three C^{14} dating results for the cloth pieces in the fillings (Table 4). All of them are from fragments with weave differing from plain weave. Piece o9 is a variant of broken twill (Fig. 12) and its size is 67 x 29 mm. The materials of the cloth are linen and cotton: the type of textile is known as fustian.

Cloth	Weave (material)		Laboratory	BP	calAD (probability 95.4%)	
piece				number		
09	broken	twill	variant	Ua-42604	604±30	1290–1410
	(cotton)					
e1	diamond twill (linen)		Ua-42605	694±30	1260–1310 and 1350–1390	
v7	huckaback (linen)		Ua-45621	988±31	980–1060 and 1070–1160	

Table 4. Radiocarbon dating results of the three cloth pieces in the fillings.

 $^{^{17}}$ The cloth pieces in the front are named e1–e9.

¹⁸ The cloth pieces on the right side of the skull structure are named o1-o15.

¹⁹ The cloth pieces on the left side of the skull structure are named v1-v11.



Fig. 12. The weave of piece o9: A variant of broken twill.

The weaving of fustian fabric began in Italy in the twelfth century and its production spread to the southernmost parts of the German-speaking regions in the mid-13th century. There it was called *Barchent* or *Schürlitz* (in Switzerland). The cloth piece in question is the only one of its kind in Finland. While there seem to be no entries regarding fustian in Finnish documents, it is mentioned several times in

Scandinavian medieval sagas and documents.²⁰

Early plant fibre cloths with twill weave are sparse. In the Late Iron Age cemetery of Birka in Sweden, there is only one fragment of twill; the weave of the cloth could not be determined with any greater precision.²¹ In the abundant archaeological material of medieval London there are no plant fibre cloths with twill weave.²²

Among the fillings there is another piece of twill cloth: the weave of piece e1 is diamond twill (Fig. 13). The piece of cloth is linen and it measures 69 x 52 mm.



Fig. 13. The weave of piece e1: Diamond twill.

There are several examples of medieval plant fibre cloths with diamond twill weave. Perhaps the best known group of such fabrics is the Perugia towels (*le tovaglie perugine*); they were used for both secular and ecclesiastical purposes. In the Perugia towels there are usually blue stripes, in the weaving of which an extra cotton pick was used.²³ The earliest

Perugia towels are from the fifteenth century. There are, however, earlier cloths with diamond twill.

²⁰ Aki Arponen, 'Cotton in Finland before the 1600s', in Janne Harjula, Maija Helamaa & Janne Haarala (eds), *Times, Things & Places: 36 Essays for Jussi-Pekka Taavitsainen*, J.-P. Taavitsainen Festschrift Committee: Turku 2011, 236–245, at 239–240.

²¹ Agnes Geijer, *Birka III: Die Textilfunde aus den Gräbern* (Birka Untersuchungen und Studien herausgegeben von Kungl. vitterhets historia och antikvitets akademien 3), Almqvist & Wiksells boktryckeri-aktiebolag: Uppsala 1938, 15.

²² Elisabeth Crowfoot, Frances Pritchard & Kay Staniland, *Textiles and Clothing c. 1150–c. 1450* (Medieval finds from excavations in London 4), Museum of London: London 2006, 80.

²³ Rosalia Bonito Fanelli, *Five Centuries of Italian Textiles 1300–1800: A selection from the Museo del Tessuto Prato*, Cassa di Risparmi e Depositi di Prato: Prato 1981, 81–85; Carolyn Priest-Dorman, 'Some Medieval Linen Weaves', *Complex Weaver's Medieval Textiles* 30 (2001), 1, 4–5, at 4.

In Hoogstraten, Belgium, a cloth called the 'Holy Blood Towel' (*Heilig Bloeddoek*) is preserved and it is dated to the last quarter of the century.²⁴ In the sarcophagus of a tenth-century count of Toulouse (St. Sernin, Toulouse, France) there were fragments of a linen and cotton tunic with broken diamond twill.²⁵ Also worth mentioning is a medieval cloth in the *Museo sacro* in the Vatican, the weave of which matches exactly the weave of piece e1.²⁶

The third radiocarbon dated piece of cloth in the fillings is v7. The size of the linen cloth piece is 68×20 mm. Characteristic to the weave are warp and weft floats; the weave is called huckaback (Fig. 14).



Fig. 14. The weave of piece v7: huckaback.

A Coptic textile in the *Pfister Collection* in the Vatican indicates the considerable age of huckaback weave.²⁷ The weave of piece v7 is similar to the 'Veil of Maria' (*Sluier van Maria*); the linen cloth is preserved in Tongeren,

Belgium, and it is possibly from the eleventh century.²⁸

In the archaeological material of medieval London there is only one fragment of linen cloth, the weave of which may be huckaback; the context is dated to the latter half of the twelfth century.²⁹ The early date of piece v7 is also noteworthy: it may derive from the Nordic Viking Age. It is the second-oldest textile in the skull relic dated so far.

The Cover Cloths

The skull relic is covered with three layers of cloth: next to the bone packages and the fillings there is a linen cover for which five comparatively large pieces of undyed plain weave cloth were sewn together with linen yarn. At the front of the skull relic a linen cloth (e8) was sewn to fit around the hole in the object (Fig. 15).

²⁴ Carolyn Priest-Dorman, 'Some More Medieval Linen Weaves', *Complex Weaver's Medieval Textiles* 31 (2002), 1, 5–7, at 5.

²⁵ Dominique Cardon, 'Burial Clothing of One of the First Counts of Toulouse', Archaeological Textiles Newsletter 21 (1995), 7–11; Dominique Cardon, 'Des Vêtements pour un comte', Le comte de l'An Mil: Revue Aquitania, supplément 8 (1996), 155–186, at 176–179.

²⁶ The catalogue number of the cloth is T-27; Priest-Dorman 2001, 4; 2002, 5.

²⁷ The catalogue number of the cloth is 7409.

²⁸ Daniël de Jonghe, 'Technologische beschouwingen', in Christina Ceulemans ed., *Tongeren Basiliek van O.-L.-Vrouw Geboorte I: Textiel van de vroege middeleeuwen tot het Concilie van Trente*, Uitgeverij Peeters: Leuven 1988, 65–88, at 65–66; Priest-Dorman 2001, 1, 4.

²⁹ Crowfoot, Pritchard & Staniland 2006, 80–81.



Fig. 15. The linen cloth (e8) sewn to fit the front of the skull relic.

The radiocarbon dating result for piece e8, 960–1050 calAD³⁰, makes it the earliest dated textile in the object: it is from the Nordic Viking Age. The

linen sewing yarn, however, is much younger: 1220–1295 calAD³¹.



Fig. 16. The inner silk cover.

Next to the linen cover there is the inner silk cover: several pieces of very thin beige plain weave silk cloth was sewn together with beige silk yarn (Fig. 16). The radiocarbon dating result for the silk cloth is 1280–1400 calAD³².



Fig. 17. The outermost cover of the skull relic is red Chinese silk damask.

The outermost cover of the skull relic is red silk (Fig. 17). Several pieces of thick silk damask were sewn together with white silk yarn. Figures from Chinese mythology were woven in the damask: the phoenix Fenghuang and the tortoise Bixi. Pointing at the small scale of the figures and the weaving technique Agnes Geijer has stated that the silk is of Chinese origin and it

was woven in the thirteenth century.³³ The radiocarbon dating result, 1220–1310 and 1360–1390 calAD³⁴, does not contradict Geijer's dating.

Fig. 18. The cut edges of the red silk cover and violently opened inner silk cover.

The silk covers demonstrate the post-medieval



³⁰ Ua-45622, 1015±32 BP, 960–1050 calAD (probability 82.4%).

³¹ Ua-45623, 735±30 BP, 1220–1295 calAD (probability 95.4%).

³² Ua-42096, 636±30 BP, 1280–1400 calAD (probability 95.4%).

³³ Agnes Geijer, 'Textilierna i Sankt Eriks skrin', in Bengt Thordeman ed., *Erik den Helige: Historia – kult – reliker*, Nordisk rotogravyr: Stockholm 1954, 289–302, at 294, 296.

³⁴ Ua-39385, 712±34 BP, 1120–1310 calAD and 1360–1390 calAD (probability 95.4%).

history of the skull relic. On the left side of it several pieces of red silk were cut off by collectors of mementoes and the torn edges of the inner silk cover suggest violent opening of the skull relic (Fig. 18). The skull relic was closed in the 1920s, and reopened and reclosed in the 1940s, which is indicated by different types of sewing yarns.

The Silk Ribbons



Fig. 19. The light green silk ribbon on the left side of the skull relic.

There are three light green silk ribbons in the skull relic: one under the hole in the middle of the front side, and two attached to the red silk damask cloth next to the corners of the hole (Fig. 19). Especially in the front side the ribbon is hidden under the red silk damask cover. The radiocarbon dating result for the ribbons is 1310–1350 and 1390–1450 calAD³⁵.

The Decorative Plates

On the red silk damask cover there are white silk yarn stitches in sparse circles. They were possibly left from decorative metal plates which were confiscated by the Crown after the Reformation.³⁶ The yarn of the stitches has been radiocarbon dated to 1220–1310 and 1360–1390 calAD³⁷.

When and for which Occasion was the Skull Relic Composed?

The lower limit, 1290 calAD, of the radiocarbon dating result of both the sewing yarn in the bone package 14 and the piece of fustian cloth (o9) is the *terminus post quem* for composing the skull relic. Thus it is possible that the construction took place between 1290 and 1300, and the skull relic was acquired for the consecration of Turku Cathedral in 1300. However, if the probability of the radiocarbon dating result is reduced from 95.4% to 68.2%, the *terminus post quem* shifts to 1305, and another occasion for acquiring of the skull relic has to be considered. In 1318 Novgorodian troops invaded

³⁵ Ua-42095, 527±30 BP, 1310–1350 calAD and 1390–1450 calAD (probability 95.4%).

³⁶ Geijer 1954, 294, PL. LIV, fig. 227.

³⁷ Ua-39384, 714±32 BP, 1220–1310 calAD and 1360–1390 calAD (probability 95.4%).

Turku and burnt it down. The cathedral was plundered and it suffered significant damages.³⁸ According to coin finds the former cathedral in Koroinen was in active use in the 1320s which may indicate its temporary use instead of the cathedral in Turku. If relics were moved from Koroinen to the new cathedral in 1300, they were probably lost in 1318, and new relics had to be acquired for the former cathedral in Koroinen. The skull relic could have been one of those relics.

Turku Cathedral was 'desolated and in ruins' as late as in 1335.³⁹ The rebuilding of the cathedral got well under way only after Hemmingus was elected bishop of Turku in 1338. The reconstruction was financed with donations and letters of indulgence granted by the pope and by the bishop himself .⁴⁰ Hemmingus donated a bishop's mitre and crosier, precious books and decorations for the cathedral in 1354.⁴¹ He may also be responsible for acquiring the skull relic for the 're-consecration' of the cathedral in the 1350s.⁴²

In the skull relic there are even younger components than the sewing yarn in the bone package 14 and the cloth piece o9. The radiocarbon dating result for the green ribbons is 1310–1350 and 1390–1450 calAD. By reducing the probability from 95.4% to 68.2%, only the younger period of the dating result remains: 1395–1435 calAD. This does not necessarily provide a later date for the composition of the skull relic. It may point to the date of attaching the silk ribbons to it after 1395.

Tasks for the Near Future

The radiocarbon dating results have given a reliable *terminus post quem* for the composition of the skull relic. This enables connecting it to the history of the cathedral and to certain bishops of the diocese. The interests and contacts of the bishops may hint to its area of origin. The research of similar objects in foreign collections will also illuminate the background of skull relics in general.

The nine radiocarbon dating results of the relic bones have revealed their wide age distribution (from the first century BC to the thirteenth

³⁸ Paavali Juusten, Suomen piispain kronikka, Otava: Helsinki 1956, 24. Adolf Lindman, Bidrag till Åbo stads historia: Första häftet: Anteckningar om Åbo Domkyrka och dess fornminnen, Frenckellska boktryckeriet: Åbo 1869, 87.

³⁹ Carl Jacob Gardberg, Simo Heininen & Per-Olof Welin, *Kansallispyhäkkö: Turun tuomiokirkko 1300–2000*, Tammi: Helsinki 2000, 43.

⁴⁰ Riikka Kaisti, *Turun tuomiokirkko: Rakkaudella rakennettu*, Turun ja Kaarinan seurakuntayhtymä – Turun tuomiokirkkomuseo: Turku 2013, 16.

⁴¹ Tor Carpelan, Åbo donatorer intill år 1909: Biografiska anteckningar (Bidrag till Åbo stads historia: Andra serien X), Bestyrelsen för Åbo stads historiska museum: Helsinki 1910, 2.

⁴² Gardberg, Heininen & Welin 2000, 47.

century AD) which proves the use of secondary bone material. The future osteological analyses will define which species the bones belong to. The good condition of the relic bones points at favourable preservation circumstances. By analyzing the soil attached to the bones both the type and the geological area of the burials will be determined. The origin of the relic bones and the textile materials will be defined with the help of isotopic analyses.

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