The Turku Cathedral Relics Revisited and Anonymous Relics dated to the Eleventh and Twelfth Centuries

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The project

In 2007, an interdisciplinary research project focusing on the medieval relics and reliquaries of Turku Cathedral was launched at the Department of Archaeology of the University of Turku. The ongoing project seeks to combine a range of scientific analyses with the approach of the humanities, i.e. with such disciplines as archaeology, art history, history, cultural anthropology and theology. This wide range of approaches is applied to analyse the collection in Turku as part of the period in which the cult of relics flourished and eventually waned in the Nordic countries.

Turku Cathedral was consecrated in 1300 as the Cathedral Church of the Blessed Virgin Mary and St Henry of Uppsala. A large number of relics and their reliquaries were acquired by the Cathedral during the Middle Ages, but they lost their liturgical importance after the Reformation in the early sixteenth century. Not all the relics of Turku Cathedral, however, were destroyed or lost, and some at least were deposited in the nineteenth century in a wooden reliquary casket traditionally attributed to Beatus Hemmingus (in office 1338–1366) which was kept in the sacristy, and is presently on display in the Cathedral (Fig. 1), while some items were hidden in a wall niche in the sacristy (Fig. 2). They were found there by the archaeologist and architectural historian Juhani Rinne during the restoration of the Cathedral in the 1920s. He was the first to describe the relics in detail in his monograph *Pyhä Henrik: Piispa ja marttyyri* (St Henry: Bishop and Martyr) published in 1932.

The number of individual objects in the relic assemblage of both the niche and the coffin is around 90. The collection includes not only relics wrapped in textiles, but also pieces of bone, wood, textiles, paper, a bag for relics, pieces of wax seals, a medieval coin etc. No reliquaries of metal survive, mainly due to the Danish raids (1509) on Turku and the confiscations of ecclesiastical property in connection with the Nordic Reformation.

Rinne estimated that there are approximately thirty saints represented among the relics in addition to St Henry, including King Eric, Margaret, Benedicta, Pancras and the Holy Innocents while small fragments of a stone from Gethsemane are related to Christ. The most impressive reliquary, a skull structure wrapped in Chinese red silk damask with embroideries, has been attributed to either St Henry or St Eric, as discussed by Aki Arponen.[1] Most of the relics and their fragments, however, remain unidentified. In his study of them, Rinne was at the cutting edge of science of his day, applying x-ray photography and anatomical analyses to the skulls and bones. He described every object and fragment in detail, accompanying his text with lavish illustrations and photographs.

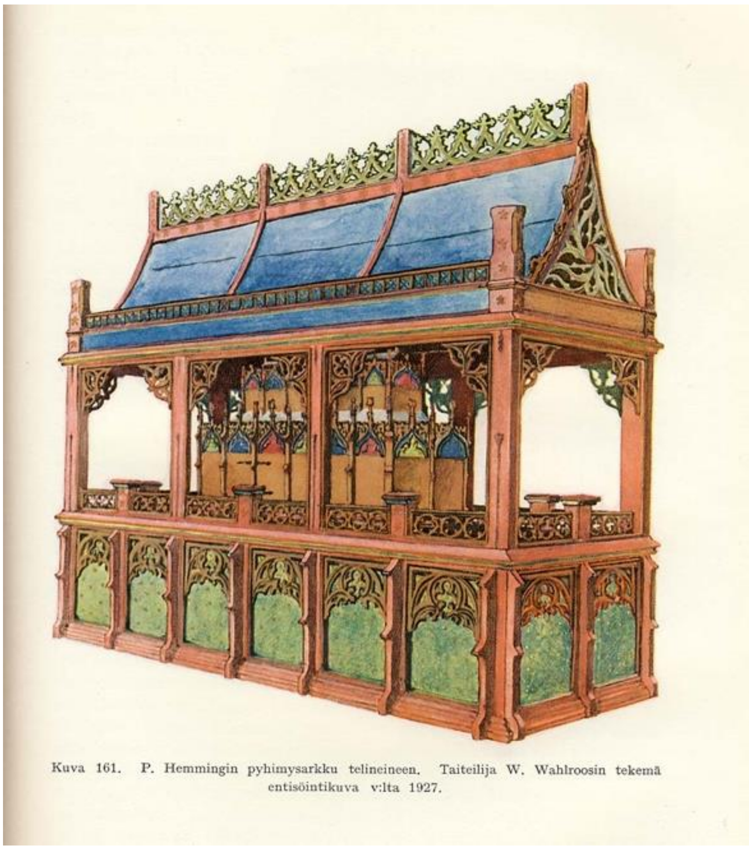


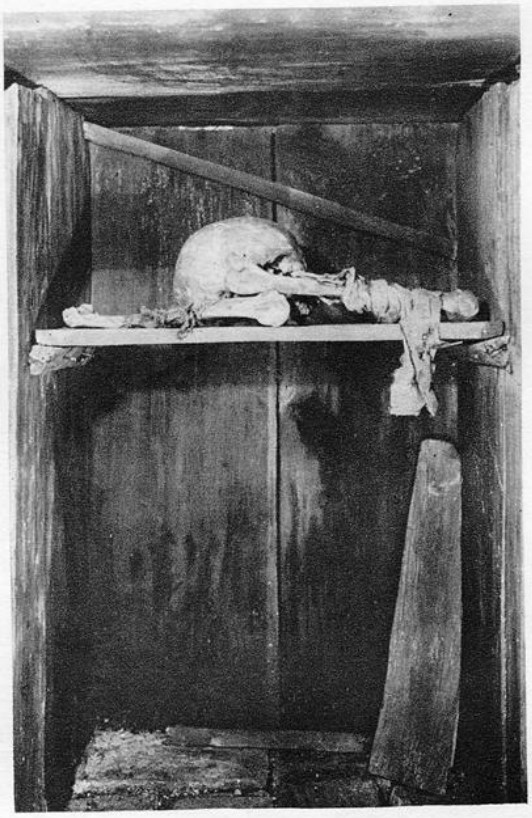
Fig. 1. The late-medieval wooden casket traditionally attributed to the Blessed Hemming is on display at Turku Cathedral. The illustration shows a reconstruction from 1927 by the artist W. Wahlroos (Rinne 1932, Fig. 161).

In medieval studies, the cult of relics has come to be seen since the 1980s as one of the most characteristic aspects of Western Christianity.[2] The veneration of relics is a vantage point from

[1] Aki Arponen, 'The Medieval Skull Relic of Turku Cathedral. Preliminary Results of Analyses', *Mirator* 16 (2015), 104–116, at 105.

[2] See e.g. Donald Weinstein & Rudolph M. Bell, *Saints & Society. The Two Worlds of Western Christendom, 1000-1700*, The University of Chicago Press: Chicago & London 1986; Arnold Angenendt, *Heilige und Reliquien: Die Geschichte ihres Kultes vom frühen Christentum bis zur Gegenwart*, 2nd ed., Nikol-Verlag: Hamburg 2007; Charles Freeman, *Holy Bones, Holy Dust. How Relics Shaped the History of Medieval Europe*, Yale University Press: New Haven & London 2011; Sari Katajala-Peltomaa, Christian Krötzl & Marjo Meriluoto-Jaakkola (eds), *Suomalaisten pyhiinvaellukset keskiajalla. Kun maailma aukeni* (Suomalaisen Kirjallisuuden Seuran Toimituksia 1399), Suomalaisen Kirjallisuuden Seura: Helsinki 2014. Examples of scientific studies on the theme, see e.g. M. Nilsson, G. Possnert, H. Edlund, B. Budowle, A. Kjellström, & M. Allen, 'Analysis of the Putative Remains of a European Patron Saint – St. Birgitta', *PLoS*

which, among others, the social construction of holiness, various responses to religious images and the religious significance of sacred bodies have been analysed. Relics and reliquaries were at the core of medieval piety, and the cult of the saints permeated society as a whole. In the Middle Ages, all over Europe, faith in saints formed the most important side of folk religiosity.[3] Due to their central position in culture, the relics of Turku Cathedral offer glimpses of a range of material, social and cultural phenomena related to the medieval cult of relics. Moreover, an archaeological perspective on medieval relics provides a unique opportunity to incorporate a range of ways and technologies to approach medieval relics, reliquaries and cultural practices related to them. Archaeology, the discipline focusing on the material traces of the past, has a key role in drawing scientific methods and humanities together, since interdisciplinary collaboration in archaeology has frequently and successfully combined methodological and theoretical insights and results across disciplines.



Kuva 138. Sakariston komero VII aukaistuna ja puhdistettuna. Pyhäinjäännösluut hyllylle takaisin nostettuina.

Fig. 2. Wall niche no. VII of the sacristy of Turku Cathedral opened and cleaned in 1924. The relic bones have been placed on the shelf (Rinne 1932, 275).

With the help of modern methodologies, the project revises and expands knowledge of, among other things, the origins of the relics, their dating, material qualities, impurities, materials used in processing them, medieval 'forgeries', textual issues, ethnic backgrounds, possible illnesses and physiological defects, as well as the

ONE 5:2 (2010): e8986. doi: 10, 1371/journal.pone.0008986; Mark Van Strydonck, Anton Ervynck, Marit Vandenbruaene & Matias Boudin, *Relieken echt of vals?* Davidsfond: Leuven 2006.

[3] Tuomas Heikkilä, *Pyhän Henrikin legenda* (Suomalaisen Kirjallisuuden Seuran Toimituksia 1039), Suomalaisen Kirjallisuuden Seura: Helsinki 2005, 16. The study is also available in Swedish, as *Sankt Henrikslegenden* (Skrifter utgivna av Svenska litteratursällskapet i Finland, 720), Svenska litteratursällskapet i Finland–Atlantis: Helsingfors–Stockholm 2009.

technical qualities of the reliquaries, their containers and wrappings. The results and interpretations of these various topics enable to approach, not only the cult of relics in Turku Cathedral, but also such issues as trade networks, craftsmanship, diet and diseases. In Finland, the medieval silks and other sumptuous textiles wrapped around the relics are unique, since the textile fragments from archaeological excavations reflect far more modest consumption. Hence, after their origins are identified, the relic textiles, whether imported from Central Europe or perhaps even Asia, are an invaluable addition to the history of medieval trade. Even relics or body parts themselves were luxurious items for ecclesiastical and lay consumers, and their analysis may possibly expand our understanding of the patterns of luxury trade in North Europe.

Fig. 3. In 1955, the Finnish postal authorities issued two stamps in honour the 800th anniversary of the Finnish Church. In a statue in the Church of Isokyrö on the left St Henry is treading/trampling his murderer Lalli. On the right are the crusaders landing Finland as depicted in the cenotaph of St Henry in the Church of Nousiainen.

The dating of the relics is the basis of the project. The accelerator mass spectrometry (AMS) radiocarbon method is used. Since the relics and reliquaries are highly complex objects with parts of different age, more than one sample per object is needed. Samples are taken from the bones, textile wrappings, stitching threads etc. Professor Göran Possnert with his research team at Ångstrom Laboratory in Uppsala University has the expertise to analyse extremely small samples of organic material needed for the AMS datings. The results so far have been surprisingly consistent. Following the Finnish chronology, all the established dates directly related to the relics, are medieval or pre-1523. The dates vary from the Birth of Christ to the beginning of the sixteenth century. The majority of the relics date, however, from the fourteenth century. So far 159 datings of relics and their textiles etc. have been carried out.

The focus so far has been on the dating, but the project is gradually moving towards applying other scientific methods. The extraction of scientific samples is related to the disassembling, assembling and material analysis of relics and reliquaries. Other material analyses will include the fibre and structural analysis of textiles and paper, and dye analyses of textiles, as well as X-ray fluorescence and other element analyses of the ink used on the medieval parchment slips identifying relics, the fragments of wax seals, and the casket of Beatus Hemmingus.

The bones in the assemblage are of major scientific potential. All the bones will be re-measured, their densities defined, and then osteologically analysed. In addition to macroscopic observations, the material will be photographed and analysed both microscopically as well as radiologically. Also DNA samples will be taken and analysed. Bones belonging to the same individuals can be identified from the material, and the genetic relationship with the individuals reconstructed with the help of Y chromosomal and mitochondrial DNA in addition to the autosomal DNA marks.

In addition to the DNA analyses, the isotopics of the bones will be analysed. The isotopic composition of oxygen in the bone material reveals the climate in which the person lived, and thus indicates his or her geographical origins. Also a comparison of the strontium isotopic rates of bones might give clues regarding their origins. The isotopes of nitrogen and carbon reflect, in turn, the lifetime diet and the importance of vegetables, meat and fish in the diet.

The Missionary Period and Anonymous Relics Dated to the Eleventh and Twelfth centuries

As an example of the ongoing project the relic bones dated to the eleventh and twelfth centuries are discussed in this paper. They are crucial to the much discussed missionary period of Finland and the historicity of St Henry, the patron saint of Finland. Due to the lack of space the dates of their textile wrappings are not discussed. It is underlined that the discussion is preliminary because the isotope and DNA analyses are still to be done.

The missionary period of Finland's settled western part took place roughly in the eleventh and twelfth centuries.[4] It is still an archaeological period, called the Crusade Period, which is illuminated by only a few sporadic written sources. The national saint St Henry and his murderer Lalli belong to this period (Fig. 3). St Henry was the most important representative and focus of the cult of saints in Finland and 'the most important figure of Finland's early history',[5] although his historical nature is currently being doubted.[6]

According to the hagiography of St Henry, he was the English-born Bishop of Uppsala. Together with King Eric of Sweden, St Henry led the First Swedish Crusade and sailed to Finland in the 1150s. He baptized the natives, and subsequently became the province's first bishop, and the patron saint of the diocese and the country. The remains of St Henry were translated or transferred to the Cathedral from the Church of Nousiainen, some 25 km northwest of Turku. The legend of St Henry written in Finland at the end of the thirteenth century,[7] and oral tradition relating to his activities in spreading the Christian faith and baptizing pagans in Finland, place his work in the present-day regions of Finland Proper and Satakunta in the middle of the twelfth century. The sources tell of his violent death, and in practice the legend is the story of the death of St Henry and the meanings given to it. Henry and his murderer Lalli are still central figures not only in history, art history and folklore but also in the arts and popular culture, including comic strips.

Every historical period has presented its own interpretation of Henry and his murderer and the interpretations and the order between the two have varied. In 2008, a survey with the title *The most popular/notable Finn throughout the ages* placed Lalli at fourteenth, with St Henry only

[4] See e.g. Markus Hiekkanen, *Suomen keskiajan kivikirkot* (Suomalaisen Kirjallisuuden Seuran Toimituksia 1117), 3rd ed., Suomalaisen Kirjallisuuden Seura: Helsinki 2014, 11–16; Jussi-Pekka Taavitsainen, 'Kristinuskon merkit', in *Suomen historiallinen kartasto*, Karttakeskus: Helsinki 2007, 36–37.
[5] Heikkilä 2005, 16.
[6] Heikkilä 2005.
[7] Heikkilä 2005, 230.

receiving stray votes. The changing statuses of these figures are a good example of *Erinnerungspolitik*, the politics of memory.[8]

So far, no one has approached St Henry through his possible relics and the information acquired from them. That will be the contribution of archaeology to the discussion.[9]

Rinne attributed the skull found in the sacristy as well as some other bones in the assemblage to St Henry. Can we say anything preliminary about the problems of identification? We have chosen anonymous bones dated to the eleventh and twelfth centuries for a closer look. With 'anonymous bones' we mean loose bones lacking identifying parchment pieces. Among our dates, twelve so far belong to this group (Table 1, Fig. 4). Finland's missionary period (AD 1000–1200) is clearly represented in

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[8] See e.g. Pertti Anttonen, 'Le meurtre de l´Évêque Henry ou la fabrication d'une mythologie nationale en Finlande', in P. Centlivres, D. Fabre & F. Zonabend (eds), *La Fabrique des Héros* (Ethnologie de la France 12), Maison des sciences de l'homme: Paris 2008, 103–113; Pertti Anttonen, 'Myytin ja todennäköisyyden historiaa – Piispa Henrikin surma viimeaikaisen suomalaisen historiankirjoituksen valossa', in S. Louekari & A. Sivula (eds), *Historioita ja historiallisia keskusteluja* (Historia mirabilis 2), Turun historiallinen yhdistys: Turku 2004, 93–127; Pertti Anttonen, 'A Catholic Martyr and Protestant Heritage: A Contested Site of Religiosity and its Representation in Contemporary Finland', in A.-L. Siikala, B. Klein & S. R. Mathisen (eds), *Creating Diversities: Folklore, Religion and the Politics of Heritage* (Studia Fennica Folkloristica 14), Finnish Literature Society: Helsinki 2004, 190–221.

[9] Listed below are the most important articles published so far: 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 and Helsinki 2011, 236–245; Visa Immonen & Jussi-Pekka Taavitsainen, 'Fingers of a Saint, Thumb of a Priest. Medieval Relics in the Diocese of Turku, and the Archaeology of Lived Bodies', in T. Ahlbäck & B. Dahla (eds), *Religion and the Body. Based on Papers Read at the Symposium on Religion and the Body Held at Åbo, Finland, on 16–18 June 2010*, Donnerska institutet: Åbo 2011, 141–173; J.-P. Taavitsainen, 'Viattomat lapset - marttyyrien kukkaset - flores martyrum', in Janne Ikäheimo, Risto Nurmi & Reija Satokangas (eds), *Harmaata näkyvissä. Kirsti Paavolan juhlakirja*, Kirsti Paavolan juhlakirjatoimikunta: Oulu 2011, 49–56; Jussi-Pekka Taavitsainen, 'Interdisciplinary Perspectives on the Medieval Relics and Reliquaries of Turku Cathedral, Finland', *Material Religion: the Journal of Objects, Art and Belief* 7:3 (2011), 447–450; Jussi-Pekka Taavitsainen, 'The Material Culture of Holy Bodies. Interdisciplinary Perspectives on the Medieval Relics of Turku Cathedral', in J. Hansson & H. Ranta (eds), *Archaeology and History of Churches in Baltic Region. Symposium June 8-12, 2010 Visby, Sweden*, Gotland University & County Administrative Board of Gotland: Visby 2011, 196–202; Jussi-Pekka Taavitsainen & Markus Hiekkanen, 'Pyhän Gertrudin pyhäinjäännös Turun tuomiokirkossa. Jyrsijännahka pyhänä esineenä?', in A. Nieminen, P. Olsson, H. Ruotsala & K. Siivonen (eds), *Aineen taikaa. Näkyvän ja näkymättömän kulttuurin jäljillä*, Suomalaisen Kirjallisuuden Seura: Helsinki 2011, 124–136; Jussi-Pekka Taavitsainen, Markku J. Oinonen & Göran Possnert, 'Luultua vanhempia luita Turun tuomiokirkossa', *Historiallinen Aikakauskirja* 3 (2012), 341–347; Jussi-Pekka Taavitsainen & Markus Hiekkanen, 'Die Reliquie der heiligen Gertrud in Dom zu Turku', in Alfred Falk, Ulrich Müller & Manfred Schneider (eds), *Lübeck und der Hanseraum, Beiträge zu Archäologie und Kulturgeschichte. Festschrift für Manfred Gläser*, Verlag Schmidt-Römhild: Lübeck 2014, 579–585; Jussi-Pekka Taavitsainen, Aki Arponen, István Kecskeméti, Mika Hakkarainen, Kari Kinnunen & Göran Possnert, 'Turun tuomiokirkon lisä paperihistoriaan – vanhimmat Suomessa säilyneet paperit', in Päivi Happonen ed., *Kleion pauloissa*, Suomalaisen Kirjallisuuden Seura: Helsinki 2014, 33–50; Jussi-Pekka Taavitsainen, Aki Arponen, Jaan Tamm, Mikko Putkonen, Seppo Hornytzkyj & Göran Possnert, 'Preliminary Results of the Relics of the Pirita Brigittine Convent in Tallinn, Estonia', *Muinaisaja teatused. Lootus, inimene ja tehnoloogia* (in press).

the material. This is also the period to which at least five of the 59 Swedish saints belong.[10]

Table 1. Radiocarbon dates of anonymous bones.

Catalogue number	Relic	Sample from a	Laboratory number	Age(BP)
52090-4-22	anonymous	rib	Ua-43564	1090±30
52090-4-20	anonymous	rib	Ua-43563	1083±31
52090-4-11	anonymous	long bone	Ua-45955	1050±30
52090-4-14	anonymous	thin bone	Ua-45956	965±30
52090-7-1	anonymous	cranial bone	Ua-40204	951±30
52090-4-3	anonymous	vertebra	Ua-40198	938±30
52090-1	St Henry?	skull	Ua-37634	933±35
52090-4-7	anonymous	vertebra	Ua-45954	920±30
52090-4-28	anonymous	long bone	Ua-43565	906±31
52090-4-8	anonymous	hip bone	Ua-41831	869±30
52090-4-37	anonymous	hip bone	Ua-41832	859±30
52090-3	skull relic	bone in package 8	Ua-42102	833±31

The radiocarbon datings (Table 1) were carried out at the Ångstrom Laboratory, Uppsala University. Specifically, for each sample, bone collagen was extracted with the Longin method. Collagen was combusted to CO_2, its $\delta^{13}C$ value measured with Isotope Ratio Mass Spectrometry and the CO_2 sample was chemically converted to graphite sample. Radiocarbon concentration was measured with Accelerator Mass Spectrometry (AMS) facility of the Uppsala University.[11] The dates have been converted to calendar years with Oxcal 4.2. software[12] and the Intcal13 calibration curve.[13] Each radiocarbon dating includes carbon stable isotopic measurement ($\delta^{13}C$) to normalize for isotopic fractionation,[14] with typically ±0.2‰ analytical uncertainty. It is clear that such isotopic data should

[10] Tryggve Lundén, *Svenska helgon*, Verbum: Stockholm 1973.

[11] R. Longin, 'New method of collagen extraction for radiocarbon dating', *Nature* 230 (1971), 241–242; Göran Possnert, 'AMS with the Uppsala EN tandem accelerator', *Nuclear Instruments and Methods in Physics Research Section B*, Volume 5, Issue 2, 159–161.

[12] C. Bronk-Ramsey, 'Bayesian analysis of radiocarbon dates', *Radiocarbon* 51:1 (2009), 337–360.

[13] P. J. Reimer, E. Bard, A. Bayliss, J. W. Beck, P. G. Blackwell, C. Bronk Ramsey, C. E. Buck , H. Cheng, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, H. Haflidason, I. Hajdas, C. Hatté, T. J. Heaton, D. L. Hoffmann, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, S. W. Manning, M. Niu, R. W. Reimer, D. A. Richards, E. M. Scott, J. R. Southon, R. A. Staff, C. S. M. Turney, van der Plicht J., 'IntCal13 and Marine13 Radiocarbon Age Calibration Curves, 0 - 50,000 Years cal BP', *Radiocarbon* 55 (2013), 1869–1887.

[14] M. Stuiver & H. A. Polach 1977, 'Discussion: Reporting of ^{14}C Data', *Radiocarbon* 19(3), 355–363.

always be dealt cautiously due to possible fractionation effects related to sample handling processes. Nevertheless, the data also inarguably contains information on the origin of carbon. Therefore, with caution, we can take a glance at the obtained carbon stable isotopic ratios of the relic samples. Several isotopic ratios depleted in ^{13}C indicate significant marine influence. That is, carbon from marine environment has been integrated into human bones through dietary habits of eating marine food. This makes $\delta^{13}C$ values less negative, since marine organisms often have more heavy carbon (^{13}C) compared to terrestrial ones due to seabed carbonates.

Therefore, we have also corrected radiocarbon ages for marine reservoir effect.[15] Particularly, we have assumed that the marine influence comes from the Baltic basin and thus have adopted a maximum marine reservoir effect as 262 ± 100 ^{14}C years,[16] and scaled that down for each sample according to its measured $\delta^{13}C$ value and reference values from the Baltic area.[17] Eventually, both uncorrected and corrected radiocarbon dates have been calibrated and given in Table 2 and Figures 4 and 5.

Table 2. Calibration of uncorrected and marine-corrected radiocarbon ages to calendar years. HPD refers to highest posterior density range.

Laboratory number	Age (BP)	HPD 95,4%, uncorrected (calAD)	$\delta^{13}C$ ‰ (V)PDB	Marine correction (^{14}C years)	HPD 95,4%, corrected (calAD)
Ua-43564	1090±30	890–1020	-21,2	0	890–1020
Ua-43563	1083±31	890–1020	-19,4	33 ± 23	890–1040
Ua-45955	1050±30	900–1030	-17,6	72 ± 43	970–1190
Ua-45956	965±30	1010–1160	-21,4	0	1010–1160
Ua-40204	951±30	1020–1160	-19,9	22 ± 20	1020–1190
Ua-40198	938±30	1020–1160	-19,0	42 ± 27	1030–1220
Ua-37634	933±35	1020–1190	-18,4	55 ± 34	1030–1250
Ua-45954	920±30	1020–1190	-18,5	53 ± 33	1040–1260
Ua-43565	906±31	1030–1210	-19,7	26 ± 21	1030–1250
Ua-41831	869±30	1040–1250	-19,4	33 ± 23	1050–1280
Ua-41832	859±30	1040–1260	-19,2	37 ± 25	1050–1280
Ua-42102	833±31	1150–1270	-21,4	0	1150–1270

[15] Following similar procedure as in M. Oinonen, A. Vasks, G. Zarina & M. Lavento, ‘Stones, Bones, and Hillfort: Radiocarbon Dating of Ķivutkalns Bronze-Working Center’, *Radiocarbon* 55:2–3 (2013), 1252–1264.
[16] B.C. Lougheed, H.L. Filipsson & I. Snowball I, ‘Large spatial variations in coastal 14C reservoir age – a case study from the Baltic Sea’, *Climate of the Past* 9 (2013), 1015–1028.
[17] See Oinonen et al. 2013.

The marine correction typically results in a shift of a couple of decades to the radiocarbon ages. The largest shift is accordingly expected for the date that has the most depleted δ^{13}C value (Ua-45955). Altogether, the possible marine effect does not alter the overall picture based on the datings. Particularly, dating of the probable skull of St Henry (Ua-37634) is still coherent with his assumed living years in the twelfth century. It should be noted that this correction depends on the assumption of the living area: correction due to oceanic environment could be larger.

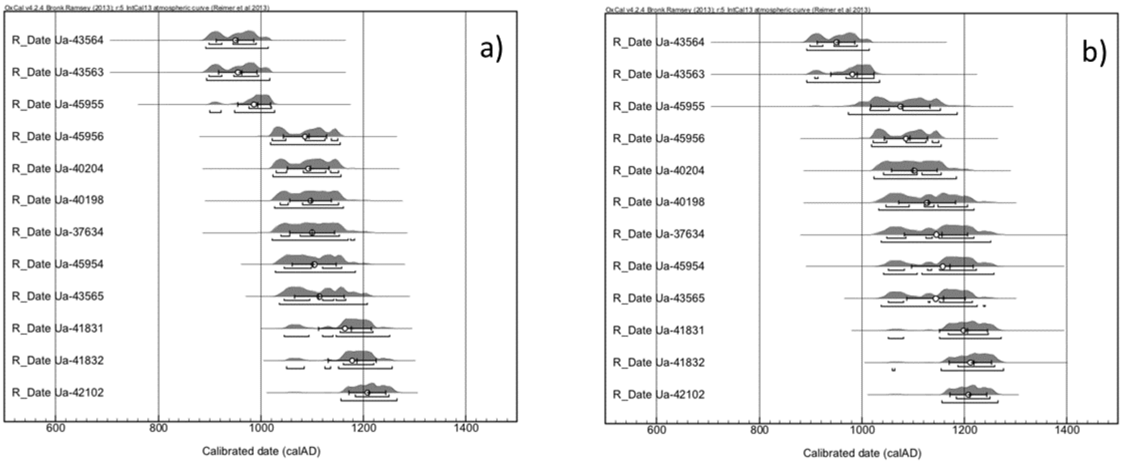

Figure 4. Individual dates converted to calendar year probability distributions. a) Original uncorrected dates. b) Marine-corrected dates.

Based solely on the individual calendar year probability distributions (Fig. 4), the dates seem to cluster in two age groups around 900–1000 calAD and 1020–1250 calAD. Marine correction shifts one of the dates (Ua-45955) from the first to the second cluster. We plotted the formed δpairs (age, δ^{13}C) to a two-dimensional chart (Fig. 5) to see whether the isotopic ratios cluster similarly with the observed ages. It appears that the δ^{13}C values scatter broadly for each assumed age cluster. However, within the post-1000AD samples, there are a couple of pairs of values that seem to be the same within analytical uncertainties: (Ua-41831, Ua-41832), (Ua-37634, Ua-45954) and (Ua-40204, Ua-43565). From the point of view of ages and isotopic ratios, it is possible that these pairs of samples in particular could originate from the same individuals. Particularly the assumed skull of St Henry (Ua-37634) found in the sacristy seems to have only one possible counterpart, namely the piece of vertebra (Ua-45954). The other vertebra belonging to the same age cluster (Ua-40198) has a more depleted carbon isotopic ratio, pointing to different body metabolism and diet.

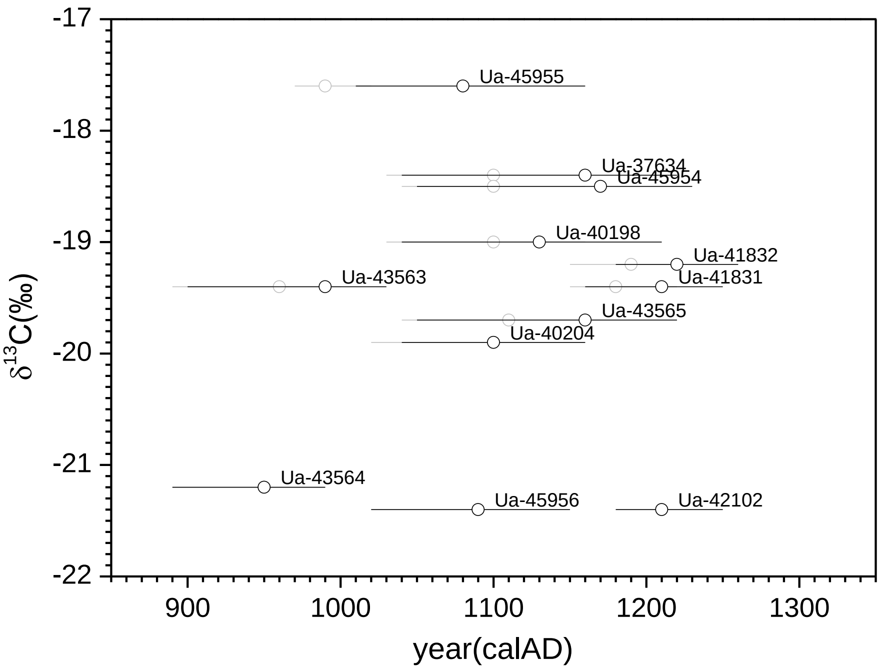

Figure 5. Two-dimensional representation of the observed (age, δ13C) pairs. Median values and 1σ ranges of the calendar year probability distributions are given. The grey symbols refer to uncorrected and black symbols to marine-corrected radiocarbon ages.

Do the bones tell whether St Henry was a historical figure or not? When discussing the possibility of identifying St Henry's bones among our collection and considering the tolerances of radiocarbon dates, six or seven datings – depending on whether marine correction is adopted or not – give calibrated dates between 1010–1160 and 1030–1210. Three younger dates slightly overlap them in ranges. The dates Ua-37634 & Ua-40204 are from craniums. Because the first date is from an intact cranium, the second date must represent another individual, which is also supported by a different $\delta^{13}C$ ‰ value (-18,4 v. -19,9). Stable isotopes are highly useful for identifying different individuals. So far we unfortunately lack nitrogen, oxygen and strontium isotope ratios, but even $\delta^{13}C$ ‰ values help us further. On the basis of their evidence, the six/seven dates might represent four individuals (Table 1, Fig. 4).

The above analysis above helps us rule out several relic finds, but the quest for the real St Henry should be still supported by further isotopic and aDNA studies and possibly by the clustering of the combined multiproxy data of ^{14}C, stable isotopes and aDNA.

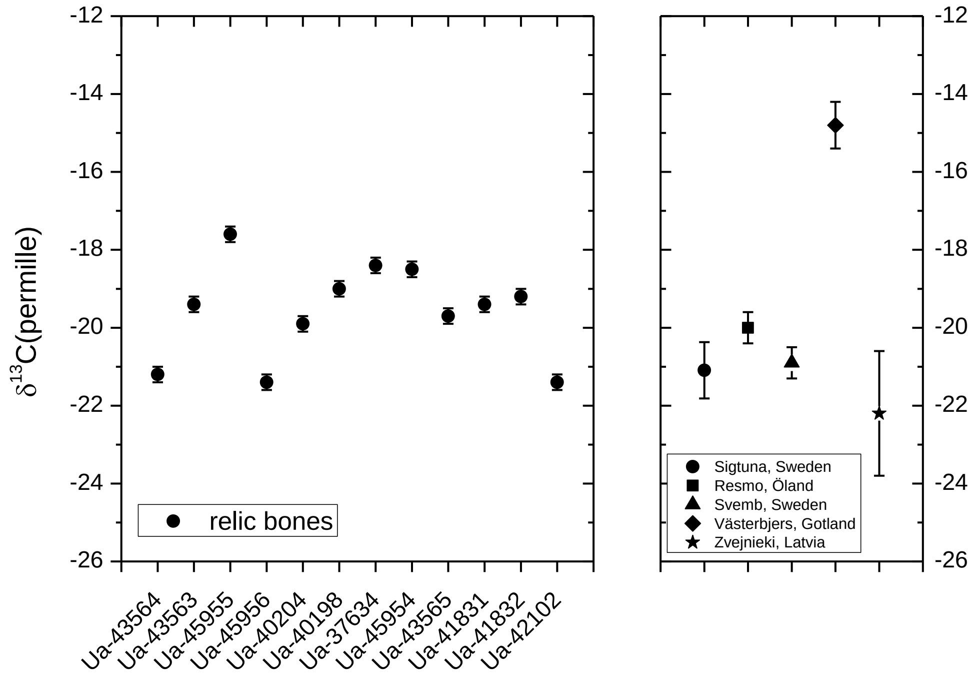

Figure 6. Carbon stable isotopic ratios of relic bone samples (left) compared with Sigtuna, Svemb, Resmo, Västerbjers & Zvejnieki reference data sets (right) of humans by Eriksson & Lidén.[18] The uncertainties of the measured isotopic values are of similar order as the symbol sizes.

We compared the obtained stable isotopic data to the data sets of human bone collagen of Sigtuna / Sweden,[19] Svemb / Sweden[20], Resmo III phase / Öland,[21] Västerbjers / Gotland[22] and Zvejnieki / Latvia[23] (Fig. 6).[24] The elevated $\delta^{13}C$ value of the Västerbjers site in Gotland in the middle of the Baltic Sea is known to be due to the extensive use of marine resources.[25] On the other hand, both the Resmo and Svemb sites contain evidence of using

[18] Gunilla Eriksson & Kerstin Lidén, 'Dietary life histories in Stone Age Northern Europe', *Journal of Anthropological Archaeology* 32 (2013), 288–302.
[19] Anna Kjellström, Jan Storå, Göran Possnert & Anna Linderholm, 'Dietary patterns and social structures in medieval Sigtuna, Sweden, as reflected in stable isotope values in human skeletal remains', *Journal of Archaeological Science* 36 (2009), 2689–2699.
[20] Eriksson & Lidén 2013.
[21] Gunilla Eriksson, Anna Linderholm, Elin Fornander, Marie Kanstrup, Pia Schoultz, Hanna Olofsson & Kerstin Lidén, 'Same island, different diet: cultural evolution of food practice on Öland, Sweden, from the Mesolithic to the Roman Period', *Journal of Anthropological Archaeology* 27 (2008) 520–543.
[22] Gunilla Eriksson, 'Part-time farmers or hard-core sealers? Västerbjers studied by means of stable isotope analysis', *Journal of Anthropological Archaeology* 23 (2004), 135–162.
[23] Gunilla Eriksson, 'Stable isotope analysis of human and faunal remains from Zvejnieki', in Lars Larsson & Ilga Zagorska eds., *Back to the Origin: New Research in the Mesolithic–Neolithic Zvejnieki Cemetery and Environment. Northern Latvia*, Almqvist & Wiksell International: Lund 2006, 183–215.
[24] Markku Oinonen, A. Vasks, G. Zarina & M. Lavento, 'Stones, bones and hillfort – radiocarbon dating of Ķivutkalns bronze-working centre', *Radiocarbon* 55 (2013), 1252–1264.
[25] Eriksson & Lidén 2013.

mainly terrestrial resources.[26] This is reflected by $\delta^{13}C$ values of around -20 – -21 ‰. The Zvejnieki site in Latvia stands out as a context with exceptionally pronounced use of freshwater resources[27] with lower carbon isotopic values.[28] The site of Sigtuna on Lake Mälaren possibly also displays a slight freshwater character. These findings are supported by high $\delta^{15}N$ values reflecting long aquatic food chains.[29]
Assuming that the measured $\delta^{13}C$ values bear information on the origin of the carbon and based on the above discussion, we can cautiously assess the relic data as follows. Three samples with the lowest isotopic ratios (Ua-43564, 45956, 42102) may contain carbon from mainly terrestrial sources with a slight flavour of freshwater character. Most of the data (others) indicate mainly use of terrestrial resources, supported by an essential marine contribution.

Conclusions

The most interesting item is the cranium hidden in a wall niche in the sacristy. One of the vertebra is of almost the same age and has almost the same $\delta^{13}C$ value. They probably represent the same individual.

Why was the wall niche with the bones bricked in? Many stories are related to St Henry's bones. When Finland was occupied by the Russians during the Great Northern War (1700–1721), the bones were listed in 1720 and sent to Peter the Great's *Kunstkamera*. There is, however, no verification of their arrival in St Petersburg. There are also contemporary comments that the Russians may not have obtained all of Henry's bones.[30] Rinne's suggestion is that the niche was bricked up in 1806. This is later than the Great Northern War, but behind the brick wall there was a solid oak door closed with nails.[31] Whether this double closing was made at the same time, remains unanswered. The natural question arises of whether the cranium could have been hidden from the Russians.

Bones and textiles were not the only finds from the niche. Also a piece of paper and nut shells were found and dated (paper Ua-38648 265±34 BP; nut shell Ua-38649 223±30 BP). The calibrated age of the paper

[26] Eriksson et al. 2008; Eriksson & Lidén 2013.
[27] Eriksson 2006.
[28] O. E. Craig, M. Forster, S. H. Andersen, E. Koch, P. Crombé, N. J. Milner, B. Stern, G. N. Bailey & C. P. Heron, 'Molecular and isotopic demonstration of the processing of aquatic products in northern European prehistory', *Archaeometry* 49:1 (2007), 135–152.
[29] Eriksson et al. 2006; Kjellström et al. 2009.
[30] Juhani Rinne, *Pyhä Henrik piispa ja marttyyri*, Otava: Helsinki 1932, 382–391.
[31] Rinne 1932, 266–267.

is 1490–1670 cal AD (83,4 % prob.) and that of the nut shell is 1640–1690 cal AD and 1730–1810 cal AD (82,0% prob.).[32] The latter part of the seventeenth century is most probable and the date may give the *terminus post quem* of the bricking up of the niche. It is slightly too early for the Great Northern War, but it does not exclude the bricking up during the Great Northern War.

The identification may seem to be of secondary importance but it interests both the learned community as well as the general public. Circumstantial evidence gives some support to St Henry:

1. The Cathedral is dedicated to St Henry
2. The age matches with St Henry
3. The hiding place hints to unusual treatment.

If we assume that the skull of the sacristy and the vertebra belong to St Henry, the isotopic ratio of -18.4 – -18.5‰ would be attributed to St Henry's remains. These values would indicate a partially marine diet and fall in between the values observed in typical terrestrial and marine contexts within the Baltic Sea area. Such values would not be surprising, considering the mobile and marine lifestyle of the English-born Bishop of Uppsala. Specifically, there is no indication of significant freshwater fish consumption.

Chronologically St Henry is not an impossible alternative, which applies also to other Nordic saints of the twelfth century.[33] We may also have St Eric, his companion-in-arms, among the holy bones. We need, however, the evidence of stable isotopes other than carbon and DNA in order to obtain more circumstantial evidence, to answer the questions of identity. The final, definite answer may never be found.

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[32] Taavitsainen et al. 2014.
[33] Lundén 1973.

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