Radiocarbon dating of linen hairnets in sprang technique

Antoine De Moor, Cäcilia Fluck, Mark Van Strydonck and Mathieu Boudin

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Ten woollen hairnets in sprang technique from the collection Katoen Natie in Antwerp were radiocarbon dated in 2000 and 2001. The results were published in 2002 (De Moor, Van Strydonck and Verhecken-Lammens 2002). The interquartile range—which takes into account the middle 50%, excluding the early and late dates—was between AD 485 and 600. This was certainly the period in which these hairnets were popular. The 95% probability range was between AD 420 and 650 (De Moor, Van Strydonck and Verhecken-Lammens 2002, 30).

In the past years, five linen hairnets produced in the same technique from various collections also have been radiocarbon dated: one from the collection Katoen Natie (De Moor, Verhecken-Lammens and Verhecken 2008, 74, 76), two from the Museum für Byzantinische Kunst in Berlin (Fluck and Mälck 2007, 156–57, 166) and a further two from the Département des Antiquités Égyptiennes of the Musée du Louvre in Paris (Bénazeth 2011, 31).

In order to come to a more precise dating of these linen hairnets it was desirable to radiocarbon date more pieces. In the context of ‘DressID: Clothing and identities. New perspectives on textiles in the Roman Empire,’ a project that ran between 2007 and 2012, funded by the cultural programme of the European Commission, it was possible to radiocarbon date a further 16 pieces from different museums.1 These linen hairnets, however, show different features which made it necessary to divide them into three groups:

- hairnets with only linen (7 pieces)
- hairnets of linen with a small amount of wool (9 pieces)
- linen hairnets with more wool (5 pieces).

The five pieces that had been radiocarbon dated previously were included in these groups.

Due to the dry climate and the local burial customs in Egypt from the Late Antique to the early Islamic period, many such hairnets survive. At that time, it was common to bury the dead in the clothing they wore during their lifetime. As far as the find context is known, hairnets have been found only in connection with women’s burials.

Sprang is a special textile technique based on warp threads only (Fig. 1). Fixed by simple rods, the threads can be interlinked or twined, starting from the lower end. Simultaneously at the opposite end, the same interlinking and twining occurs by itself. This means that the pattern of the two halves is mirrored. The middle must be fixed, which is usually done by a thread (Seiler-Baldinger 1991, 60–65; Linscheid 2011, 17; Kwaspen 2011, 71). Sprang creates

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1 Royal Museums of Art and History, Brussels (Mieke Van Raemdonck), The Whitworth Art Gallery, Manchester (Frances Pritchard), The British Museum, London, Department of Ancient Egypt and Sudan (Elisabeth R. O’Connell), the Victoria and Albert Museum, London (Lesley Miller and Helen Persson), the Museum für Angewandte Kunst, Vienna (Barbara Karl) and the Skulpturesammlung und Museum für Byzantinische Kunst, Berlin (Cäcilia Fluck and Kathrin Mälck).

http://www.britishmuseum.org/research/publications/online_journals/hmsaes/issue_21/de_moor_et_al.aspx
a very elastic, netlike structure, perfectly suited for hairnets.

Two shapes of hairnets attributed to this period can be distinguished: a conical and a rectangular one, the latter in different lengths—short, square and long (Linscheid 2011, 17–31). Among the pieces chosen for analysis only the conical type can be distinguished with certainty. Some pieces are too fragmentary to determine their original shape.

Tables 1–3 on the following pages show the results of the radiocarbon analyses of the three different groups and the results of the ¹⁴C-analyses for each piece. The years BP—the conventional radiocarbon age—means 'before present,' i.e., before 1950, the start of radiocarbon dating. The estimated age uncertainty of this radiocarbon age is given as 1 standard deviation, mostly plus/minus 25 or 30 years. This radiocarbon age however must be calibrated in order to obtain the calendar years. This calibration curve relies on the accurate ¹⁴C-measurement of dendrochronologically dated tree rings (Bronk Ramsay 1995; Stuiver et al. 1998).

These three groups, however, were too small to have reliable statistical results. Therefore, the sum probability and integrated probability of all 21 pieces were put in one graph:

The interquartile range (IQR) of the 21 linen hairnets lies between AD 446 and 635 and the 90% probability range between AD 343 and 753 (Aitchison, Ottaway and Scott 1990). The IQR, which takes into account the middle 50%, excluding the early and late dates, is a stable parameter and can be considered as the flourishing period for these textiles. The 90% probability range was used instead of the usual 95% probability range because the latter overestimates the period by a few decades (Van Strydonck 2007).

The period in which these hairnets flourished lies between c. mid-5th and mid-7th century AD (linen), and the whole period between c. mid-4th and mid-8th century AD (wool). Thus, the periods in which hairnets made entirely of linen and those made completely of wool were popular roughly overlap. Nevertheless, it seems to be the case that the linen hairnets were in use for a longer time than the woollen ones.
<table>
<thead>
<tr>
<th>Collection and inventory number</th>
<th>Years BP</th>
<th>Photo</th>
<th>Calendar years (95.4%)</th>
<th>Laboratory number</th>
</tr>
</thead>
<tbody>
<tr>
<td>V&amp;A inv. 235-1977</td>
<td>1735±25</td>
<td><img src="image" alt="Fig. 2" /></td>
<td>AD 240–390</td>
<td>KIA-40822</td>
</tr>
<tr>
<td>MBK inv. 38/2011 (Schweinfurth collection no. 258)</td>
<td>1505±30</td>
<td><img src="image" alt="Fig. 3" /></td>
<td>AD 430–90 (11.0%) AD 530–640 (84.4%)</td>
<td>KIA-43016</td>
</tr>
<tr>
<td>WAG inv. T 1968.302</td>
<td>1460±30</td>
<td><img src="image" alt="Fig. 4" /></td>
<td>AD 550–650</td>
<td>KIA 43342</td>
</tr>
<tr>
<td>MBK inv. 45/2011 (Schweinfurth collection no. 269)</td>
<td>1360±25</td>
<td><img src="image" alt="Fig. 5" /></td>
<td>AD 630–90 (94.0%) AD 750–70 (1.4%)</td>
<td>KIA-43019</td>
</tr>
<tr>
<td>MBK inv. 44/2011 (Schweinfurth collection no. 259)</td>
<td>1347±23</td>
<td><img src="image" alt="Fig. 6" /></td>
<td>AD 640–700 (92.0%) AD 750–70 (3.4%)</td>
<td>KIA-11467</td>
</tr>
<tr>
<td>MBK inv. 9322</td>
<td>1295±30</td>
<td><img src="image" alt="Fig. 7" /></td>
<td>AD 660–780</td>
<td>KIA-43021</td>
</tr>
<tr>
<td>RMAH inv. ACO. Tx.2478 (radiocarbon dated twice with almost identical results)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) 1210±35</td>
<td>a) AD 680–900</td>
<td><img src="image" alt="Fig. 8" /></td>
<td>a) KIA-42137</td>
<td></td>
</tr>
<tr>
<td>b) 1235±35</td>
<td>b) AD 650–900</td>
<td></td>
<td>b) KIA-45762</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Radiocarbon dates of seven hairnets with only linen, in decreasing years BP (= before present). See also Figs 2–8.

http://www.britishmuseum.org/research/publications/online_journals/bmsaes/issue_21/de_moor_et_al.aspx
<table>
<thead>
<tr>
<th>Collection and inventory number</th>
<th>Years BP</th>
<th>Photo</th>
<th>Calendar years (95.4%)</th>
<th>Laboratory number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBK inv. 39/2011 (Schweinfurth collection no. 266)</td>
<td>1669±26</td>
<td><img src="http://www.britishmuseum.org/research/publications/online_journals/bmsaes/issue_21/de_moor_et_al.aspx" alt="Fig. 9" /></td>
<td>AD 262–428</td>
<td>KIA-16600</td>
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<td>V&amp;A inv. 50-1891</td>
<td>1645±25</td>
<td><img src="http://www.britishmuseum.org/research/publications/online_journals/bmsaes/issue_21/de_moor_et_al.aspx" alt="Fig. 10" /></td>
<td>AD 420–570</td>
<td>KIA-40820</td>
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<td>WAG inv. T 1995.5</td>
<td>1635±30</td>
<td><img src="http://www.britishmuseum.org/research/publications/online_journals/bmsaes/issue_21/de_moor_et_al.aspx" alt="Fig. 11" /></td>
<td>AD 340–540</td>
<td>KIA-43340</td>
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<tr>
<td>BM inv. EA 18292</td>
<td>1610±25</td>
<td><img src="http://www.britishmuseum.org/research/publications/online_journals/bmsaes/issue_21/de_moor_et_al.aspx" alt="Fig. 12" /></td>
<td>AD 400–540</td>
<td>KIA-44298</td>
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<tr>
<td>KTN inv. 872-02</td>
<td>1580±30</td>
<td><img src="http://www.britishmuseum.org/research/publications/online_journals/bmsaes/issue_21/de_moor_et_al.aspx" alt="Fig. 13" /></td>
<td>AD 410–550</td>
<td>KIA-27612</td>
</tr>
<tr>
<td>V&amp;A inv. T14-1947</td>
<td>1550±25</td>
<td><img src="http://www.britishmuseum.org/research/publications/online_journals/bmsaes/issue_21/de_moor_et_al.aspx" alt="Fig. 14" /></td>
<td>AD 420–570</td>
<td>KIA-40821</td>
</tr>
<tr>
<td>Louvre inv. AF 5945</td>
<td>1515±25</td>
<td><img src="http://www.britishmuseum.org/research/publications/online_journals/bmsaes/issue_21/de_moor_et_al.aspx" alt="Fig. 15" /></td>
<td>AD 430–90 (14.7%) AD 510–620 (80.7%)</td>
<td>KIA-29156</td>
</tr>
<tr>
<td>MAK inv. T 11733</td>
<td>1480±25</td>
<td><img src="http://www.britishmuseum.org/research/publications/online_journals/bmsaes/issue_21/de_moor_et_al.aspx" alt="Fig. 15" /></td>
<td>AD 540–640</td>
<td>KIA-44328</td>
</tr>
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<td>RMAH inv. ACO. Tx.2473</td>
<td>1460±30</td>
<td><img src="http://www.britishmuseum.org/research/publications/online_journals/bmsaes/issue_21/de_moor_et_al.aspx" alt="Fig. 16" /></td>
<td>AD 550–650</td>
<td>KIA-42138</td>
</tr>
</tbody>
</table>

Table 2: Radiocarbon dates of nine linen hairnets with a little wool, in decreasing years BP. See also Figs 9–16.
<table>
<thead>
<tr>
<th>Collection and inventory number</th>
<th>Years BP</th>
<th>Photo</th>
<th>Calendar years (95.4%)</th>
<th>Laboratory number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Louvre inv. E 32791</td>
<td>1640±25</td>
<td><img src="image" alt="Fig. 17" /></td>
<td>AD 330–470 (82.2%) AD 480–540 (13.2%)</td>
<td>KIA-29153</td>
</tr>
<tr>
<td>WAG inv. T 1968.290</td>
<td>1520±30</td>
<td><img src="image" alt="Fig. 18" /></td>
<td>AD 430–610</td>
<td>KIA-43341</td>
</tr>
<tr>
<td>V&amp;A inv. 1197-1904</td>
<td>1510±25</td>
<td><img src="image" alt="Fig. 19" /></td>
<td>AD 430–90 (10.3%) AD 530–620 (85.1%)</td>
<td>KIA-40824</td>
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<tr>
<td>MBK Inv. 42/2011 (Schweinfurth collection no. 253)</td>
<td>1500±30</td>
<td><img src="image" alt="Fig. 20" /></td>
<td>AD 430–90 (7.5%) AD 530–640 (87.9%)</td>
<td>KIA-43631</td>
</tr>
<tr>
<td>RMAH inv. ACO. Tx.2481</td>
<td>1315±35</td>
<td><img src="image" alt="Fig. 21" /></td>
<td>AD 650–780</td>
<td>KIA-42139</td>
</tr>
</tbody>
</table>

Table 3: Radiocarbon dates of five linen hairnets with a high proportion of wool, in decreasing years BP. See also Figs 17–21.
Abbreviations

BM = The British Museum
KTN = Katoen Natie
MAK = Museum für Angewandte Kunst, Vienna
MBK = Museum für Byzantinische Kunst, Berlin
RMAH = Royal Museums of Art and History, Brussels
V&A = Victoria and Albert Museum, London
WAG = The Whitworth Art Gallery, Manchester

Bibliography


Fig. 1: Sprang technique (after Seiler-Baldinger 1991, 61, fig. 94a).

Fig. 2: V&A inv. 235-1977 (© Victoria and Albert Museum, London).
Fig. 4: WAG inv. T1968.302 (© The Whitworth Art Gallery, Manchester).

Fig. 3: MBK inv. 38/2011; Schweinfurth collection no. 258 (© Skulpturensammlung und Museum für Byzantinische Kunst, Staatliche Museen zu Berlin, photo A. Voigt).

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Fig. 5: MBK inv. 45/2011; Schweinfurth collection no. 269 (© Skulpturensammlung und Museum für Byzantinische Kunst, Staatliche Museen zu Berlin, photo A. Voigt).

Fig. 6: MBK inv. 44/2011; Schweinfurth collection no. 259 (© Skulpturensammlung und Museum für Byzantinische Kunst, Staatliche Museen zu Berlin, photo A. Voigt).
Fig. 7: MBK inv. 9322 (© Skulpturensammlung und Museum für Byzantinische Kunst, Staatliche Museen zu Berlin, photo A. Voigt).

Fig. 8: RMAH inv. ACO. Tx.2478 (© Royal Museums of Art and History, Brussels).
Fig. 9: MBK inv. 39/2011; Schweinfurth collection no. 266 (© Skulpturensammlung und Museum für Byzantinische Kunst, Staatliche Museen zu Berlin, photo A. Voigt).

Fig. 10: V&A inv. 50-1891 (© Victoria and Albert Museum, London).
Fig. 11: WAG inv. T 1995.5 (© The Whitworth Art Gallery, Manchester).

Fig. 12: BM inv. EA 18292 (© The Trustees of the British Museum, Department of Ancient Egypt and Sudan, London).
Fig. 13: KTN inv. 872-02 (© Collection Katoen Natie, Antwerp, photo H. Maertens).

Fig. 14: V&A inv. T14-1947 (© Victoria and Albert Museum, London).

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Fig. 15: Louvre inv. AF 5945 (© Musée du Louvre, Paris, photo G. Poncet).

Fig. 16: RMAH inv. ACO.Tx.2473 (© Royal Museums of Art and History, Brussels).

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Fig. 17: Louvre inv. E 32791 (© Musée du Louvre, Paris, photo G. Poncet).

Fig. 18: WAG inv. T 1968.290 (© The Whitworth Art Gallery, Manchester).
Fig. 19: V&A inv. 1197-1904
(© Victoria and Albert Museum, London).

Fig. 20: MBK inv. 42/2011; Schweinfurth collection no. 253 (© Skulpturensammlung und Museum für Byzantinische Kunst, Staatliche Museen zu Berlin, photo A. Voigt).
Fig. 21: RMAH inv. ACO. Tx.2481 (© Royal Museums of Art and History, Brussels).