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# Sticks, stones, fingers and bones: Nurturing knitting and the other neglected non-wovens

## Abstract

Textile analysis is dominated by woven fabrics across all time periods. A variety of other textile production methods are attested by the archaeological and historical evidence, including knotting, lacemaking and sprang, and all are worthy of serious study. It is surprising to find knitted artefacts among these under-investigated textiles. The serious scientific study of evidence for early knitting is long overdue. Few knitted artefacts have been comprehensively reported leaving a large gap in the recorded history of textiles. This article sets out the argument for a new protocol to study knitted fabric and an agreed terminology for debating it.

**Keywords:** Textile, knit, analysis, terminology, protocol

Knitting is one of the many poor cousins of textile history. To date, textile analysis has largely concentrated on the evidence for weaving even though there is copious archaeological and historical evidence for many other techniques – from knotting to bark beating. Perhaps this neglect can be excused because their results are not easily recorded using conventional textile definitions and descriptions. Nevertheless, the lack of attention to knitting in particular was recognised in 1993 with the formation of the Early Knitting History Group (EKHG) in the United Kingdom with the hope that work on “the origins and history of knitting in western Europe” would be encouraged (Staniland 1997, 247). At an EKHG meeting in Manchester (United Kingdom) in March 1996, there was evidence of international collaboration with contributions from specialists from Denmark (Karen Finch and Lise Warburg), Spain (Eulalia Morral and Silvia Carbonnell) and Switzerland (Noemi Speiser). Richard Rutt suggested “strategies for setting up a database of early knitting” and, at the same meeting, Montse Stanley recognised that there was much confusion in the vocabulary of knitting history. The

meeting concluded with a discussion chaired by Joan Thirsk on “clarity in terminology” (Knitting History Forum 2017). The EKHG later amalgamated with the Medieval Dress and Textile Society (MEDATS) but re-emerged as the Knitting History Forum (KHF) in 2006.

Despite these laudable initiatives, the scholarly study of knitted items has been slow to evolve – not from a lack of enthusiasm or interest in the development of the craft and industry – but because of a disjointed and diverse approach to the evidence available. There has been a regrettable lack of collaboration between practitioners of the craft and keepers of the material evidence – not due to any resistance on either side but rather because of a lack of opportunity and resources. It is the purpose of the following articles to press on with the EKHG’s aims of collecting the evidence for early knitting and developing the tools to discuss it. Malcolm-Davies et al. (2018, 10-24, in this issue) propose a terminology for the scholarly study of knitted items in order to contribute to the debate about the craft’s origins and development, which are surprisingly mysterious given its relatively



late appearance in the history of textile production processes (Desrosiers 2013, 36). Most discussions of early knitting point to the High Middle Ages for its arrival in continental Europe but as yet there is no systematic scholarly analysis of the evidence which corroborates this. A recent article in the *Oxford Journal of Archaeology* demonstrates the continued lack of precision with which non-woven textile structures are discussed. The identification of textile imprints in clay as evidence for “two-needle knitting” dating to Early Bronze Age Anatolia is not supported by clear definitions or logical arguments (Sagona 2018).

Attempts at defining knitting are many and varied. Most have merit but none capture all the necessary characteristics which would permit them to be used as diagnostic tools. Several rely on definition by comparison with looping techniques which look similar to knitting (Emery 1994, 30-33; Phipps 2011, 50). Examples of looping are so-called coptic “knitting” or single-needle “knitting”, and warp “knitting” – neither of which are true knitting (Kruseman 2015). Some works accurately describe looping and differentiate it from knitting (Burnham 1972; Claßen-Büttner 2015) but sometimes in corrected later editions of previously erroneous work which is still in general circulation and use (for example, d’Harcourt 1987). Others, including very recent contributions, inadequately distinguish between “looping” and “knitting” thereby continuing to confound rational debate (Warburg 2018, 426-435; Meakes 2018). There is as yet no published and tested method for differentiating the concept of looping (also known as nålebinding, knotless netting and other similar ill-defined names) from knitting, although an excellent discussion of “structures readily confused with knitting” is available (Rutt 1987, 8-11).

One limiting characteristic (Dury & Lervad 2016, 2) which might distinguish knitting from other similar techniques is the use of a single continuous yarn which runs through the fabric from beginning to end (Emery 1994, 39; Gagneux-Granade 2016, 47 & 85). The end of this theoretically continuous element is never put through a loop, however complex the loops. The multitude of possible structures embraced by the term “knitted” (and its sibling “crocheted”) share just one characteristic – that the loops are only penetrated by other loops of the theoretically endless yarn. Simple knit “is commonly understood to be the creation of a fabric from a single thread, formed with horizontal rows of individual loops that intermesh with each successive row of loops” (Black 2012, 7). However, the thread or yarn is not necessarily continuous because separate yarns may be used for different sections of the fabric (Rutt 1987, 7) – as happens, for example, when



Fig. 1: Eleonora of Toledo’s stockings on display at the Palazzo Pitti, Florence, Italy (Image: Gabinetto Fotografico delle Gallerie degli Uffizi)

one ball of yarn ends and a new one is introduced or a new colour is added. True knitting, whether made with two or more needles, a spool or a machine, produces a “looped construction formed in rows of open loops-into-loops” (Phipps 2011, 44) in which the alignment of loops and their interconnection is vertical (Emery 1994, 40). It is worth noting that it is possible to mimic some knitted loops by sewing – as in, for example, the grafted join (Hemmons Hiatt 2012, 641; Stanley 2001, 241) and the embroidered Ceylon stitch (Eaton 1989, 113 & 131).

#### The state of the art

Well researched works document contemporary knitting techniques (for example, Hemmons Hiatt 2012; Stanley 2001). There are a few general histories which draw together some of the evidence (Nargi 2011; Rutt 1987; Thirsk 2003; Turnau 1991) and a welcome recent contribution adds details of previously obscure but relevant artefacts in France (Gagneux-Granade 2016). Each has its limitations – superficiality, a narrow cultural or geographical



focus, or a lack of footnotes. None achieves a thorough account of the present knowledge of the archaeological and historical record.

There has been no systematic or scientific review of the archaeological and historical evidence for knitting, although preliminary catalogues have been published (for example, Kruseman 2015). Such useful research tools are hard to compile owing to many knitted items going unrecognised as such in museum collections. Curators in the past may have lacked the knowledge to identify this method of construction or simply failed to record that items were knitted because it was obvious to them. Today, curators in many museums (even those with relevant specialist knowledge) lack the resources to investigate collections for such overlooked evidence.

A few studies describe the context of a specific item in detail (for example, Buckland 1979 on the Monmouth cap), survey examples of similar items (Ringgaard 2014 on silk waistcoats) or record a diverse collection such as that at the Victoria & Albert Museum in London (Levey 1982; Black 2012). Very rare are accurate academic articles describing individual items or disciplined systematic surveys (Gilbert 2012 on cotton waistcoats), which not only make evidence available to a wide audience but contribute to the clear definition and diagnosis of knitting as a method of textile production. Archaeological fragments of knitted fabrics have been recorded but not always to the exacting standard of woven items from the same excavation and sometimes omitting key characteristics (for example, Henshall 1951, 36, 21-28; Walton 1981, 1983; Walton Rogers 1999, 2012, 2013). Often, the best contributions to this debate explain items made with techniques mistaken for, but which are not, knitting because of the need to distinguish clearly between the results (Burnham 1972).

Scientific studies of the fibres and dyes used for knitted goods are even more scarce. Notable recent exceptions are details about an 18th century stocking found on the *Sankt Michel* in Finland (Vajanto 2014, 122-123) and older studies of similarly shipwrecked items from the 17th century *Vasa* and 16th century *Mary Rose* warships (Ryder 1983 & 1984). Fibre diameters are discussed for two knitted fragments from Black Gate, Newcastle (United Kingdom) (Walton 1981, table 1). More recent isotopic analysis of one of these knitted fragments of an unidentified item dated to the first half of the 15th century (T13) has produced more questions than answers in terms of trade in raw materials and finished goods (Von Holstein et al. 2016).

There is a dearth of knitted items on display in museums – especially the older, fragmentary examples which

help demonstrate the evolution of the craft. They lack glamour and are largely incomprehensible without considerable interpretation. Notable exceptions are: two 13th century silk cushions at Las Huelgas, Burgos in Spain; at the Museum of London (United Kingdom) a 16th century child's petticoat (or waistcoat), mitten and cap; a collection of 17th century gloves, mittens and headwear at the National Museum of Denmark, Copenhagen; and the Early Modern multicoloured whalers' caps at the Rijksmuseum, Amsterdam (Netherlands). The disadvantage of permanent display is that these items have been unavailable for close study for decades. They also tend to take on a significance beyond their representativeness because they are more accessible than those in storage, especially with the advent of Pinterest and other online platforms which increase their global visibility.

Even those on display can remain a mystery. Among the most iconic of Early Modern knitwork is a pair of stockings recovered from the grave of Eleonora of Toledo, who died in 1562. Their construction remains a source of much speculation since they have never been reported in detail by their first-hand observers, who state only that "different stitches were used to create vertical designs on the legs, with open-work effects in the upper section which just covered the knee. They were worked starting from the top, and then joined with a seam under the foot" (Landini & Bruni 2007, 146). The relevant footnote (28) cites Westerman Bulgarella (1993, 86-87). However, neither source gives evidence for the knitting being from the top down or toe up, worked round or back and forth, nor is there any information about the shaping or materials. A more thorough description based on photographic examination suggests they were knitted round not back and forth and that they present "the earliest verifiable purled stitches" (Rutt 1987, 24, 71-72, figs 63 & 64). A set of pre- and post-conservation photographs are available online but these are not of sufficient quality or comprehensive enough to allow hard and fast conclusions to be drawn (Digital Archive 2008).

Eleonora of Toledo's stockings are currently on display behind glass at the Palazzo Pitti in Florence (Italy). They are flattened (that is, not displayed on mounts to give them a three-dimensional shape) and folded to show the sections covering the tops of the feet but not the soles or the centre backs of each leg. One stocking was inside out on Eleonora's body (Westerman Bulgarella 1993, 86-87) but they are both displayed the right way out thereby hiding the insides from view. The interpretive panel in English states they "were knitted using straight needles starting at the top and working



down dropping stitches until the toe" which implies that it is evidence of decreasing which suggests the working direction; it also says: "The closure seam is at the centre back" which suggests they were knitted back and forth and sewn together (Palazzo Pitti 2018). In Italian, the wording may be interpreted differently: "*Le calze di seta indossate da Eleonora erano lavorate dall'alto su ferri diritti scandalo I punti fino alla punta del piede, quindi cucite nel mezzo dietro*" (Palazzo Pitti 2018). In the light of these imprecise and conflicting accounts, it is not possible to know how they were made, and into this void have fallen many assertions about them. To date, Eleonora's stockings stand as mute reminders of the dangers of making assumptions about knitwork without supporting evidence. A thorough examination according to a protocol which addresses all the evidence available is long overdue.

Recent temporary exhibitions such as those in Leeuwarden, Netherlands (*Breien!*) and Nürnberg, Germany (*In Mode*) have confirmed the existence of lesser known early knitted items and put them more firmly in the public domain. Illustrated online museum catalogues also reveal knitted items to a wider audience, even if examination is not possible. Other important evidence is unavailable because museum storage and inventories need updating: for example, the whereabouts of archaeological knitting needles in Nîmes (France) are currently unknown (Gagneux-Grenade 2016, 90).

### Scientific reporting of knitted items

There are three main avenues of research: craftwork, general history, and material evidence. All three draw on similar concepts and vocabulary but do not agree on definitions. This uncertainty is compounded in an international context and is even problematic in English because UK-English and North American-English diverge on key points. There is a geographical specificity to the language used to discuss knitting which sometimes contradicts its current location – for example, immigrants brought the traditions of their homelands to new countries, and marriages across different communities then reinforced or rejected them. This has resulted in the same words meaning different things, and different words meaning the same thing across international, national, regional and local boundaries (Hemmons Hiatt 2012, xiii). It should be noted that, despite the challenges it presents, this linguistic variety has great cultural value.

Not everyone who has the responsibility or opportunity to examine archaeological or historical evidence is a knitter or expert in identifying knitting

techniques. Nevertheless, they may be called upon to catalogue what they see. It is desirable that this be achieved in as reliable a way as possible. The lack of a conventional system for describing what may be observed in knitted items makes it difficult to produce a report that is immediately comprehensible to others. A recording protocol is required to provide reliable descriptive detail for people who may not be able to view the item for themselves and offer a sound foundation upon which later observers can build with further insights.

Another difficulty is the extent to which authors assume their readers' knowledge of knitting techniques. Specialist audiences for textile history are not necessarily knitters and it should not be necessary to be so to understand the evidence for the development of the activity or what it produces. Knitters who are not textile historians/archaeologists should likewise be able to access information about objects from which they may gain technical insights or artistic inspiration. Finding an approach and a language which engages and satisfies all is a challenge.

The geographical spread of the evidence, the lack of a detailed inventory for it, and its relative invisibility have all contributed to the absence of a comprehensive scientific overview of the development of knitting and a practical guide to identifying and studying it. Comparative analysis of the evidence is also hampered by the lack of an established terminology and protocol which facilitates an exchange between and among practitioners, academics and other interested parties (Gilbert 2012, 105, n3).

There have been attempts to make sense of the many diverse terms used in knitting. Hemmons Hiatt explained her method of naming techniques as follows: "Identical techniques were often referred to by different names or symbols in different books. In some cases, I have simply abandoned all of them and settled on a term that conveys a sense of the operation performed or the resulting appearance" (Hemmons Hiatt 2012, xiii).

The priority for the study of archaeological and historical knitted items is to describe the resulting appearance accurately by separating the objective examination from the interpretation (Prown 1982, 7-10). Knitting may be performed in different ways which result in the same structure and it is safest not to speculate on the performance but to concentrate on the appearance of the evidence, which is all that can be recorded with certainty. The adoption of a standard for recording knitted items will also facilitate communication and dialogue about it. This themed 60th issue of the *Archaeological Textiles Review* (ATR)



Fig 2: An early prototype for a three-dimensional representation of a knitted cap at Platt Hall, Manchester, Inventory number 1952.3413, created by Theis Jensen (University of York) using Agisoft Photoscan Pro (Visit <https://sketchfab.com/models/ef2b60d5cfbb4e-67a1c78e5a77cbfa0c> to see the animation)

demonstrates a proposed protocol and terminology in action by revising reports of knitted items which deserve more thorough description and providing previously unpublished evidence for Early Modern knitting. It also reports a test of citizen science in an experimental archaeology project investigating fleece and finishing. It is hoped that the articles offer a helpful road map. It represents a first step on a new path towards a rigorous approach to the scientific study of non-woven textile artefacts. Anticipated future improvements will embrace other European languages, diagrammatic representations of the knitwork, and specially-commissioned, good quality, high-resolution digital photographs, including three-dimensional images (fig. 2) to capture the constructional details and surface textures.

There has been far-reaching and friendly collaboration on the journey thus far thanks to the networks of scholars and craftspeople who share expertise via the Knitting History Forum (KHF), the North European Symposium on Archaeological Textiles (NESAT), and the *Knitting in Early Modern Europe* (KEME) project. The next step on the road is rigorous application and testing of the protocol and terminology followed by

constructive suggestions as to how it can adapt and expand to embrace all the evidence for knitwork – not only for the High Middle Ages but from the earliest evidence up to the present day.

The focus on knitwork here is intended to lead the way for renewed study of other textiles such as those looped with a single needle, on a bobbin, or a hook. It is time for the many poor cousins of textile history to rediscover their rich legacies.

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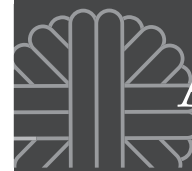
Thanks are due to a wide and generous family of scholars who have contributed to these knitted articles. The editorial board took a leap of faith in agreeing to devote the 60th anniversary issue to knitted textiles. The authors of the articles that follow were patient and generous with their time and expertise as they wrote and rewrote their articles as the terminology and protocol evolved. The many equally generous contributors, collaborators and reviewers are acknowledged for each article. In particular, Ruth Gilbert is to be applauded for her patient support with technical details and Lesley O'Connell Edwards likewise for her bibliographical corrections. Stefania



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