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"Some in Rags and Some in Jags and Some in Silken Gowns": Textiles from Iceland's Early Modern Period

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Abstract The Danish trade monopoly of the seventeenth and eighteenth centuries resulted in the implementation of strict regulations and controls on textile production, the introduction of weaving workshops equipped with new horizontal looms, and a deliberate attempt to phase out the production of homespun cloth on the warp-weighted loom. What was the fate of homespun cloth in this era of introduced industrialization in Iceland? Archaeological textile collections from Iceland's early modern period are abundant though understudied. This paper reports current research on these collections and suggests that homespun cloth did not die out in the late medieval period, but that it continued into the seventeenth and eighteenth centuries, declining slowly thereafter. Moreover, homespun cloth of the early modern period evolved into something that was structurally different than its earlier medieval version, possibly in response to increased climatic fluctuations during the Little Ice Age.

Keywords Early modern textiles · Homespun cloth · Imported cloth · Little Ice Age

Introduction

Iceland's textile history during the early modern period was heavily influenced by two significant, and related, social events that directly impacted weaving and the production of cloth. The first of these was the Reformation of the mid-sixteenth century. The second was the Danish trade embargo of the seventeenth and eighteenth centuries, which by the mid-eighteenth century resulted in the imposition of new policies affecting textile production and the introduction of a new technological implement to Iceland, the horizontal loom, which radically changed Icelandic society (Hoffman 1974; Robertsdóttir 2008).

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Throughout the medieval period Icelandic women produced homespun cloth (generally a 2/2 twill, though tabbies may also be included in this category) in great quantities, both for trade with Europe and as a form of internal currency within Iceland (Gelsinger 1981; Hayeur Smith 2012a; Þorláksson 1991). The majority of these textiles were locally produced on farms by women using the warp-weighted loom and the drop or high-top spindle (Hoffman 1974). Icelanders were reluctant to adopt new weaving technologies and retained the warp-weighted loom into the early modern period, unlike European centers where the horizontal loom—also known as the counterbalance treadle loom—was embraced from the eleventh century onwards (Crowfoot et al. 2001; Hoffman 1974). With this new technological implement, cloth production in Europe became a specialized urban industry run by town guilds, overseen by merchants, linked to monetized markets, and integrated into more extensive long distant trade networks for acquiring raw materials (Munro 2003). In contrast, in Iceland, cloth production remained a rural activity carried out on farms, completely free from oversight by guilds or centralized workshops, even though its products were highly standardized and legally regulated.

Things began to change by 1550 CE. The Reformation brought in new dress styles and modifications in garment construction that required new textiles and colors. Knitting was also introduced at this time into Iceland and the Faeroes, probably via German traders and merchants (Robertsdóttir 2008; Thirsk 2003). The earliest mention of knitting is found in written sources, circa 1580, after which it is clear that knitting caught on quickly and became another significant Icelandic export (Robertsdóttir 2008).

By the eighteenth century, Iceland—under Danish rule since 1380—witnessed Danish authorities showing a greater interest in its affairs and particularly in textile production. According to some historians this renewed interest resulted in part from the difficult conditions Iceland was experiencing at the beginning of the 1700s, ranging from cooling climates to increased poverty, starvation, and mortality (Hjálmarsson 1993). King Frederik IV of Denmark, who was crowned King in 1699, was invested in improving the state of the textile industry (wool and wool products had always been one of Iceland's main resources) and saw advantages to be gained from a wealthier colony and the revenues this colony could procure for the Danish crown. Several suites of new "modernization" policies were put into effect during the period 1720–90. The first, focused on improving knitwear, were followed by efforts to build centralized workshops in Reykjavík equipped with modern horizontal looms and textile workers trained in Denmark (1750–70). Eventually, attempts were made to change manufacturing policies that were directed towards production in rural, farming areas and domestic workshops (1770–90) (Robertsdóttir 2008). None of these attempts proved particularly successful, although they were effective in changing the nature of textile work and decreasing the importance of homespun cloth produced on the warp-weighted loom. As a result, warp-weighted looms disappeared progressively and by the late eighteenth and early nineteenth centuries they were no longer as common in households as they had once been; yet the new horizontal looms never became fully established in rural areas either.

Archaeological textile collections from Iceland are abundant, ranging from the Settlement Period (late ninth–early tenth century) to the early twentieth century in age. In this paper two sites, Gilsbakki and Skálholt, have been selected for a

comparison of their early modern period textile assemblages. Both of these sites are rich in textile remains, both were excavated recently, producing long and well-documented archaeological sequences, and both, as ecclesiastic centers, were occupied by households without long-standing genealogical connections to their farms. Unlike smaller, independent farms occupied by families whose ancestors may frequently have owned the land for generations, priests and clergymen were appointed to these ecclesiastic manors on a rotational basis, generally for tenures of a few decades. Each new occupant of the estate brought with him his own wife, children, and household with its own unique idiosyncrasies, although a few families established longer tenures at each site, with sons succeeding fathers to the estate's priesthood. While both Gilsbakki and Skálholt were elite sites, they also represent two different positions within the upper echelons of Icelandic society of the time: Skálholt was the episcopal see of Iceland's southern bishopric from 1056 until 1785; Gilsbakki was a regional estate and parish centre within Skálholt's domain, established as a church-owning farm in the late eleventh century and continuing in its role as a parish center until 1907.

In this paper, preliminary ideas will be presented with attempts to identify actual trends in domestic cloth production, the role of imported textiles on Icelandic sites, and the fate of homespun cloth in Iceland during the early modern period. As mentioned, the use and production of homespun cloth were both thought to have decreased throughout the early modern period, as Icelanders bought more imported cloth and/or adopted "industrialized" cloth produced on flat looms in the workshops of Reykjavík (Robertsdóttir 2008). However, prior research has focused largely on documentary records from Iceland and Denmark discussing the role of cloth during the eighteenth century and the success of Danish colonial reform efforts, while little attention has been directed at the actual textile remains founds on farms from this period.

Gilsbakki, Skálholt, the Sites and Their Textiles

Gilsbakki in Hvítársíða, Borgarbyggð, Borgarfjarðarsýsla

Gilsbakki was a chieftains' centre from the Viking Age until the early thirteenth century. When its dynasty (the Gilsbekkingar) was removed from power, circa 1208, the farm continued to be a wealthy, regional estate and ecclesiastic centre until 1907, when its church was decommissioned. Gilsbakki is still occupied, yet unlike many early elite sites in Iceland that remained local centers until recent times, Gilsbakki's retraction from its earlier role as a regional political centre has made it something of a backwater today. The farm was not subjected to extensive construction and modernization in the twentieth century and deeply stratified cultural deposits are well preserved over the central core of the farm mound (Smith 2009). In 2008, 31 samples of woolen textiles were recovered from excavations totaling less than 3 m^3 at a site with a conservatively estimated 1,500 m^3 of cultural deposits. An additional 64 woolen textile fragments were recovered from further excavations in 2009. The samples recovered in both years span a period of 500 years, and document textile production from the Reformation to the early twentieth century.

Excavations were carried out at Gilsbakki in 2008 by Kevin P. Smith and in 2009 by Kevin P. Smith and Michèle Hayeur Smith to determine whether intact cultural deposits of any age remained beneath the surface and to gain a better understanding of the extent and stratigraphic complexity of deposits that might remain at the site (Smith 2009). Two trial trenches were excavated to depths of 1.8–2.4 m in the suspected farm mound between existing structures and south of the last known turf house at the site. The deposits in both units included alternating sequences of sheet middens, representing occupation surfaces, and dumping zones capped by blankets of turf fragments from the demolition of major structures (Smith 2012a). Radiocarbon dates, tephrochronology, and suites of diagnostic artifacts indicate that deposition in both Trenches 1 and 2 spans a millennium from about 920 to 1920 CE.

Trench 1 sampled a detailed stratigraphic sequence through the farm's post-medieval midden. The majority of the textiles from Gilsbakki was recovered from these deposits and clearly document changes through a coherent period of textile production and deposition extending from ca. 1550–1790, with peak production during the latter half of that interval, ca. 1675–1790. This was followed by a rapid fall-off in textile deposition and recovery rates with just sporadic deposition of finer woven textiles in the nineteenth century. No textiles were recovered from deposits earlier than the late fifteenth century in Trench 1, and few textiles were recovered from Trench 2. The majority of textiles recovered from Gilsbakki represent 2/2 twills with occasional 2/1 twills, tabbies, loose fibers, and felts. There were very few knits and no patterned twills. The values displayed in Table 1 list frequencies of each textile type.

Skálholt, Biskupstungnahreppur, Árnessýsla

Skálholt was a more important elite farm site during the early medieval period and became the seat of Iceland's first bishopric in 1056. It played a crucial role during the Reformation as the leading center of this religious movement in Iceland (Lucas 2010;

Table 1 Distribution of weave types from Gilsbakki, sixteenth–twentieth centuries

	1550–1640	1640–1675	1675–1750	1750–1800	1800–1830	1820–1840	1830–1840	1840–1860	1860–1920
Trench 1									
Loose hair	2		25	7					
2/2 twill	1	1	11	5			2		5
Tabby			1	2			2		
2/1 twill	1	1	4	3					3
Clump of wool			1	2					
Knits				2					1
Felts			2						
Unknown			1	5					
Trench 2									
2/2 twill						2			2
Tabby									1?

Lucas and Snæsdóttir 2006). Skálholt's church and its estate were far more affluent and centralized than Gilsbakki. The cathedral at Skálholt served three-quarters of Iceland until the early 1800s, and by the late 1700s its complex of buildings, including bishop's residence, schools, printing shop, smithies, and clerical apartments, may have been one of the largest, wealthiest, and most town-like settlements in Iceland.

The site of the cathedral was investigated by Kristján Eldjárn from 1954 to 1958 (Eldjárn et al. 1988) and the residential complex by the Icelandic Institute of Archaeology *(Forleifastofnun Íslands)* from 2001–07 (Lucas 2010; Snæsdóttir 2009). Currently, analysis and research is ongoing under the direction of Gavin Lucas. Excavations since 2002 have uncovered one of the richest assemblages of post-medieval material culture available for Iceland (Lucas 2010). The primary focus of the long-term archaeological investigations at Skálholt was to document the eighteenth-century farm as it existed prior to its abandonment in 1785, when it had been ravaged by earthquakes and the episcopal center moved to Reykjavík (Lucas 2002, 2005; Lucas and Snæsdóttir 2006). These excavations were undertaken expressly to explore issues relating to the early modern period in Iceland, an area of research that has been overlooked due to greater emphasis placed on the Settlement and early medieval periods (Lucas 2010).

While the site has been divided into several major phases dating from the seventeenth to the twentieth centuries, its post-excavation research remains ongoing, with the textile analysis only partially complete. Skálholt, nonetheless, allows for interesting comparisons with Gilsbakki, especially regarding the textile data for the early modern period in Iceland.

The textile collection from the 2002–07 excavations includes an incredibly diverse range of material, including silks and foreign cloth types rarely seen elsewhere in Iceland. This is perhaps not surprising, given the importance and wealth of the Skálholt Bishopric, yet the roles of these products alongside Icelandic-produced textiles complicates any simplistic or ad hoc expectations for the relationships between wealth and textile consumption in post-medieval Iceland. For the purpose of this comparative study, a sample of 383 fragments of cloth was selected from excavations undertaken in the years 2006 and 2007. These textiles range in age from the seventeenth to the nineteenth centuries. Table 2 provides an overview of a sample of textile fragments from the 2006–07 excavation seasons.

Data from both of these sites suggest patterns of consumption and production of Icelandic homespun cloth, that concur, in general outline, with information gleaned from historical sources regarding cloth changes, weaving technology and the Danish weaving policies of the eighteenth century. Specifically, the seventeenth-century assemblages appear to be more prolific and more diverse in cloth types at both sites and there seems to be a significant investment in the production and use of homespun (2/2 twills, tabbies and rarely 2/1 twills) followed by a progressive decline during the eighteenth century. As noted before, this may be due, in part, to the phasing out of the warp-weighted loom and the lack of modern looms on local farms, as well as a general increase in knitted products, though these knitted items are nearly absent in archaeological assemblages of these two sites. This stands in contradiction to historical source-based expectations, a question that will be addressed below.

Table 2 Distribution of weave types from Skálholt, seventeenth–nineteenth centuries

Common weave types	Seventeenth century	Eighteenth century	Nineteenth century
2/2 twill	279	32	22
2/1 twill	1		7
Other type of twill			
Tabby	17	3	2
Knit	2		
Tablet woven	7		
Felt			
Ribbons	3		
Silk cloth	5		0
Unknown	3		2

Unfortunately, no looms are known to have survived from the eighteenth century and, therefore, debate exists about what sort of looms were actually used during this period and how common different types were, if more than one type was in use (Robertsdóttir 2008). Data from this study is beginning to suggest that some farms may have kept the old looms, given the amount of homespun that is present. Further analysis of these textile collections also suggests a greater diversity in textiles than was noted for the medieval period as will be addressed in the following sections.

Thread Counts, and Preliminary Data on the Fate of Homespun Cloth in Iceland

Thread counts are used to document the quality of textiles, both in the past and the present, and are useful archaeologically to track changes in textile production strategies, cloth standardization, industrialization, and more (Hayeur Smith 2012a). Thread counts reflecting the density of thread on both the warp and the weft were analyzed for both of these sites and have been charted to document variability between these sites in their production and consumption of cloth types, and also to seek information on changes seen at both sites during the early modern period.

Thread counts for both sites have been plotted together to illustrate similarities or differences between textiles from the late sixteenth to early nineteenth centuries (Fig. 1). Overall, the range and distribution of warp/weft counts from these sites appear to reflect similar patterning from century to century and both a greater range and more diversity in thread counts than the tight standardization that characterized cloth production in Iceland during the Medieval period (see below). This shift from standardized to diverse cloth production strategies is most likely due to the decline of cloth as a form of legal currency, its use for a wider range of domestic purposes, and increasing amounts of imports and influences entering the Icelandic market after the Reformation.

In Figs. 2 and 3, textiles from Skálholt and Gilsbakki are compared according to century. In the seventeenth century, both sites' assemblages incorporate a considerable amount of what appears to be homespun, visible as tight clusters plotted around 8–10 warp and 6–12 weft threads per cm. However, this is also coupled by a diversity in thread counts—with both finer cloth (high warp and weft counts), balanced textiles

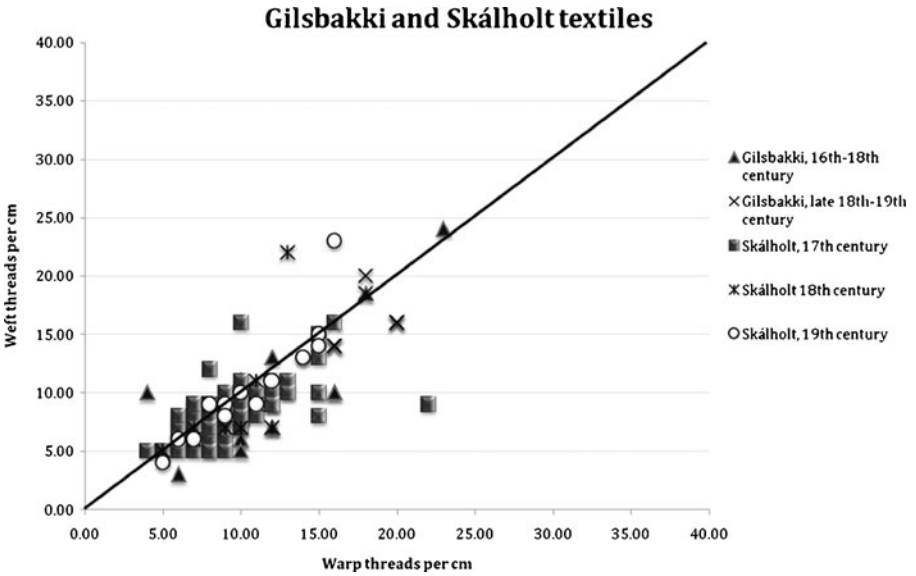

Fig. 1 Textiles from both Gilsbakki and Skálholt, sixteenth–nineteenth centuries

(equal warp and weft counts), and coarser textiles (low warp and weft counts) with both warp-dominant and weft-dominant variants (see below) and is in keeping with Tables 1 and 2 where comparable diversity of weave types was noted. The similarity of the seventeenth-century assemblages at both sites is striking, despite differences in the sites' status, and the relegation of homespun *vaðmál* (2/2 twill) to being just one component of the assemblages rather than their dominant textile forms, as it had been in the medieval period, clearly illustrates one aspect of the transformation of regional

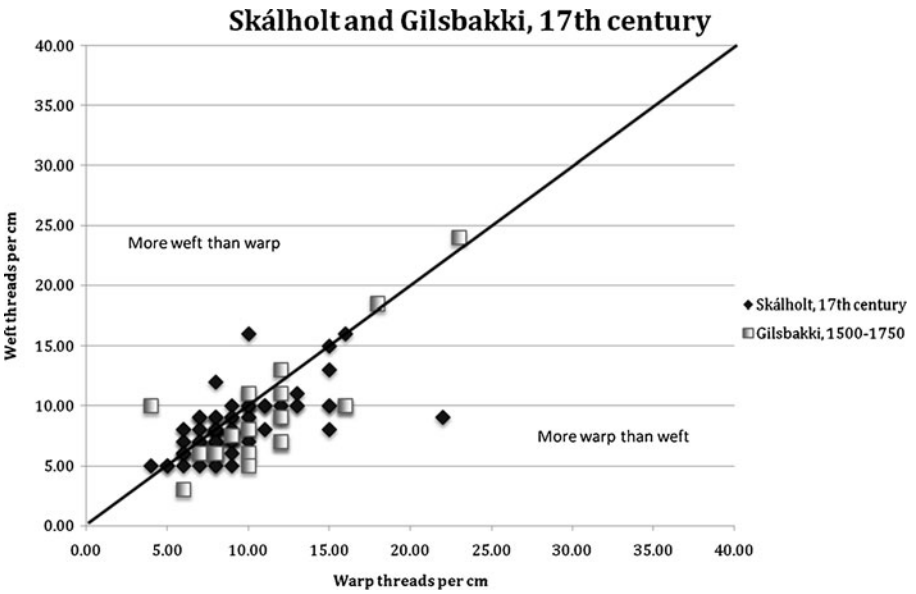

Fig. 2 Textiles from Skálholt and Gilsbaki, seventeenth century

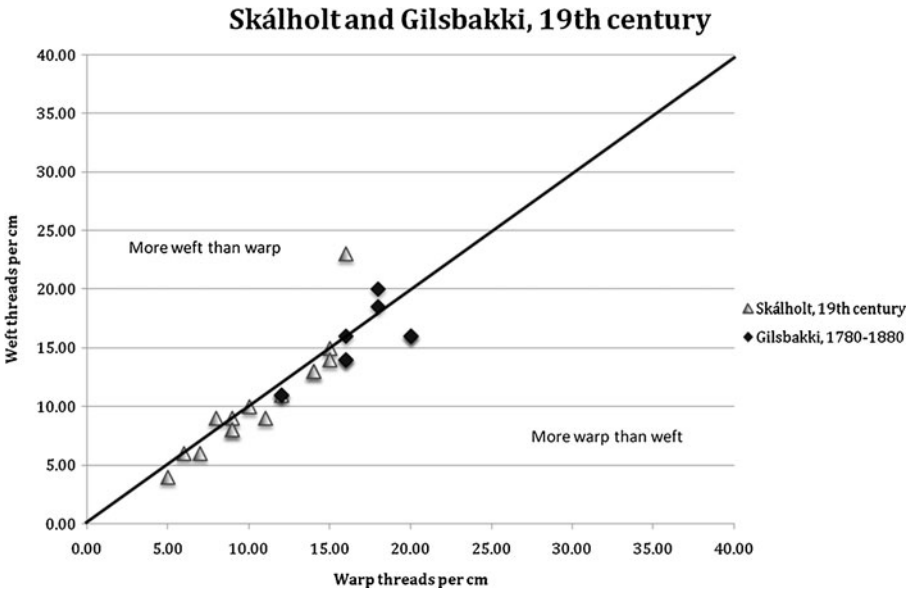

Fig. 3 Textiles from Skálholt and Gilsbakki, nineteenth century

textile assemblages as new policies were being introduced by Danish authorities trying to "modernize" Iceland's textile production.

By the nineteenth century, textiles at both sites appear to have been industrially produced (see Fig. 3) in a range of fabrics that vary across a continuum of quality (increasing or decreasing thread counts representing finer or coarser textiles, respectively) but were all produced in regular and balanced fashion with equal counts of warp and weft threads. Not only does this "balanced" structure differ completely from earlier Viking Age and medieval Icelandic textile production patterns, its simplicity together with other attributes seen in these assemblages (extreme regularity, high thread counts, finer fibers, different varieties of wool, as well as more diversity in spin directions) reflects characteristics of industrial cloth production and the introduction of imported textiles.

Climate Change and Modifications of Homespun Cloth in the Early Modern Period

Turning the focus specifically to the question of homespun cloth, several interesting anomalies in woolen twills from the seventeenth and eighteenth centuries raise questions whether textiles from these sites that looked like "homespun" were actually locally spun or were something else entirely. In the eighteenth century, this could be cloth produced in Reykjavík's workshops; from the seventeenth and eighteenth centuries it could be cloth imported from the continent, or cloth produced in Denmark from Icelandic wool. Further analysis, while not entirely conclusive without confirmation from isotopic analyses, suggests that this "new cloth" is a local development from homespun cloth that emerged in Iceland during the fifteenth and early sixteenth centuries, was particularly common during the seventeenth and early eighteenth centuries, but faded out over

the course of the late eighteenth century. Understanding how this early modern plied homespun fabric differed from earlier weaves and why it was produced first requires consideration of the earlier, medieval homespun from which it developed.

Medieval homespun cloth, or *vaðmál*, was produced in abundance during the medieval period for internal circulation as a commodity currency and international circulation as an exchange good. Medieval *vaðmál* was always a 2/2 twill with single yarns used in both the z-spun warp and the s-spun weft (Hayeur Smith 2012a). Weavers of this cloth were adept at separating and taking advantage of the different fibers provided by the Icelandic dual-coated sheep, using the long and coarse outer hairs of the sheep (the *tog*) for the warp threads that were held taught by stone loom weights (Bender Jørgensen 1992, 2003). The weft yarns were spun from the *þell*, the soft and fluffy inner fleece of the sheep, which napped naturally on the surface of the cloth to create a fabric that was both warm and water resistant. Medieval Icelandic *vaðmál* tended to be a warp dominant cloth with warp thread counts legally regulated in the range of 4–14 warps threads per cm, with different grades of legal cloth at roughly 6, 8, 10, and 12 warp threads per cm (see Fig. 4) (Dennis et al. 1980, 2002; Hayeur Smith 2012a; Hoffman 1974; Þorláksson 1991). Widths of this cloth varied throughout the medieval period, from 2 ells in width during the twelfth century to 3.5 ells in width by the late medieval period (Hayeur Smith 2012a; Hoffman 1974; Þorláksson 1991). In Fig. 4, the regularity and uniformity with which *vaðmál* was produced is apparent in the tight clustering and concentration of both warp and weft thread counts. Warp thread counts are focused between 6 and 12 per cm, while an equally narrow range of weft thread counts is present, ranging normally from 4 to 9 threads per cm. Comparing Figs. 2 and 4 provides a clear sense of both the degree of standardization found in medieval *vaðmál* and the wider range of homespun textiles produced and consumed at Gilsbakki and Skálholt after the medieval period.

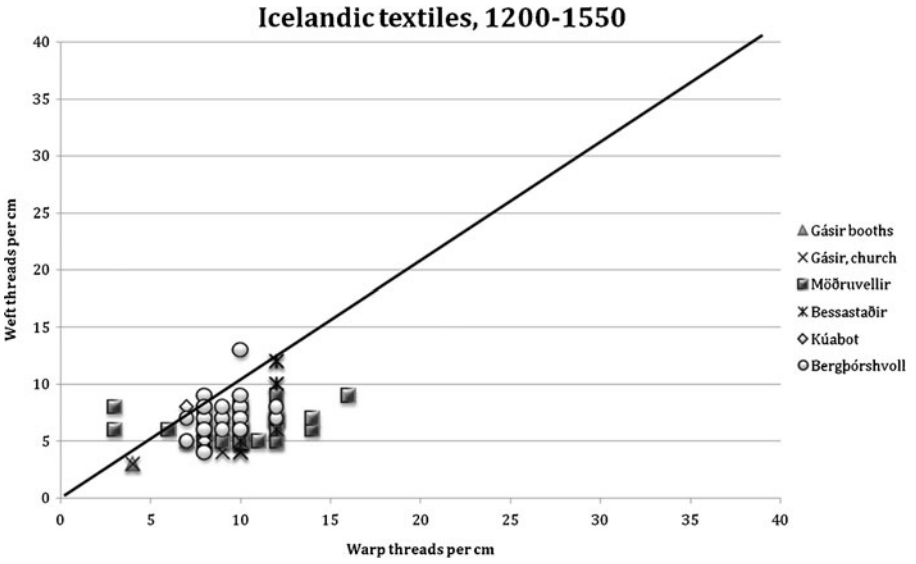

Fig. 4 Icelandic textiles from the medieval period

By the late fifteenth century, long before the horizontal loom was introduced to Iceland, significant changes began to emerge in how homespun was produced. Even as cloth lost its value as a legal currency within Iceland and was being traded far less internationally than during earlier periods—knits replacing it in foreign markets (Robertsdóttir 2008)—homespun 2/2 twills remained important. However, they were no longer woven with single yarns. Instead, the weavers incorporated plied yarns in the warp system, and in so doing produced a cloth that was far denser than earlier versions of the 2/2 twills.[1] Additionally, the cloth became more balanced with relatively even numbers of warp and weft threads per cm. While it still resembled the earlier cloth, it had become denser and slightly heavier than the older *vaðmal* and was produced with a less standardized number of warp and weft threads, presumably reflecting more diverse uses for the cloth in domestic contexts.

The earliest dated textiles exhibiting these traits come from the site of Reykholt, in Borgarfjarðarsýsla, 15 km west of Gilsbakki. Reykholt was another elite ecclesiastic center throughout the medieval and post-medieval periods (Sveinbjarnardóttir 2006), eclipsing Gilsbakki in regional affairs during the early modern period. RKH 2006-25-310, a fragment of a plied 2/2 twill, was found during the excavation of the church at Reykholt in layers dated to AD 1300–1400 (Guðrún Sveinbjarnardóttir and Oscar Aldred, pers. comm. 2012). The warp threads of this specimen are spun Z2S (single z-spun yarns with final plied-s). Although plying appears more commonly in later periods, the fragment from Reykholt suggests early experimentation with this modification or at least that plied yarn textiles were produced in earlier centuries but most likely in numbers so small that they are rarely recovered archaeologically. Plied warp threads are found ubiquitously on Icelandic sites from later, early modern contexts, at Bessastaðir (Hayeur Smith 2012c) and Bergþórshvoll as well as at Gilsbakki and Skálholt, although the dating on textiles from the former two sites is less secure.

While textile traditions are notoriously conservative, with manufacturing traits normally changing very slowly over time (Adovasio 1986; Carr and Maslowski 1995; Drooker 1992; Johnson and Speedy 1991; Kuttruff 1988; Minar 2001; Petersen and Wolford 2000), the shift to using plied warp threads became more and more widespread in Iceland during the post-medieval period and was eventually applied to other cloth types such as tabbies. Plying was also used occasionally in both the warp and the weft systems. Given that plying threads for cloth required both more labor and more wool to produce the same length of thread, this manufacturing change from single to plied yarn represents a considerable shift in the decisions made within households across Iceland about how best to deploy labor and to use household resources.

Figures 5 and 6 show changes in the proportions through time of textiles with plied warps or wefts and cloth made from single threads at Gilsbakki and Skálholt, respectively. While plied threads are present in the sixteenth- and seventeenth-century assemblages, they dominate the textiles at both sites during the eighteenth century, dropping out of Gilsbakki's assemblage completely in the nineteenth century and becoming far less common during this same time at Skálholt. Recalling that only

[1] In single yarns the fibers through the process of spinning or twisting are made to overlap each other and the addition of new fibers adds to the length creating a single strand of yarn (Minar 2001). When two or more strands of yarn are twisted together this is referred to as "plied" and is generally done in the opposite direction to the initial spin.

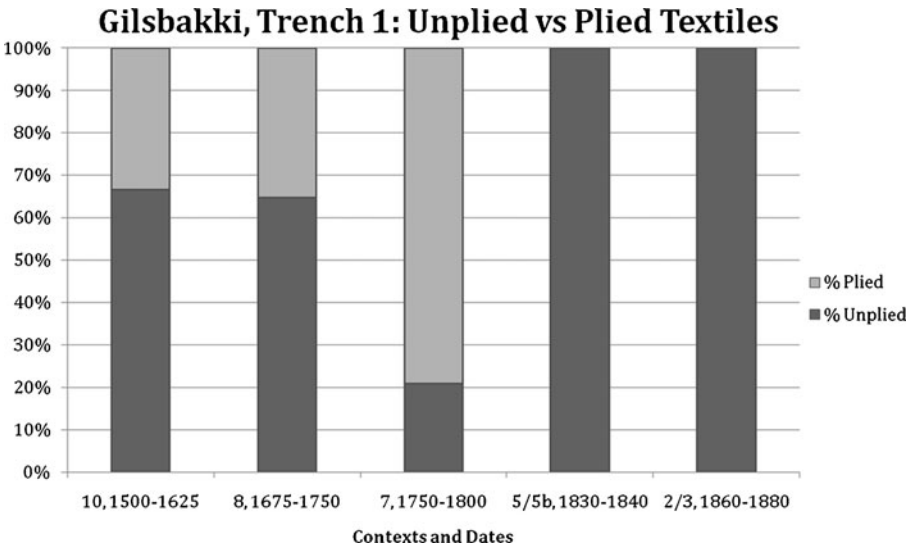

Fig. 5 Changing percentages of plied and unplied textiles at Gilsbakki

one plied textile is known at this point from pre-sixteenth-century Icelandic contexts, the appearance of plied textiles as a significant, if not dominant, part of Gilsbakki's sixteenth- and seventeenth-century textile assemblages, and as a dominant element in Skálholt's assemblage during this same period, represents an important change.

Given the early date (1300–1500) for the first known appearance of this type of cloth in the Icelandic archaeological record, it is clear that this was not an innovation produced on the new horizontal looms introduced to Iceland during the early modern period. Further, microscopic analyses of samples of plied cloth from Reykholt (RHK 2004-25-266, a 2/2 twill) and Skálholt (SKH2007-17743, a 2/1 twill) indicate that the wool from which it was made was Icelandic, implying that some, if not all of the plied

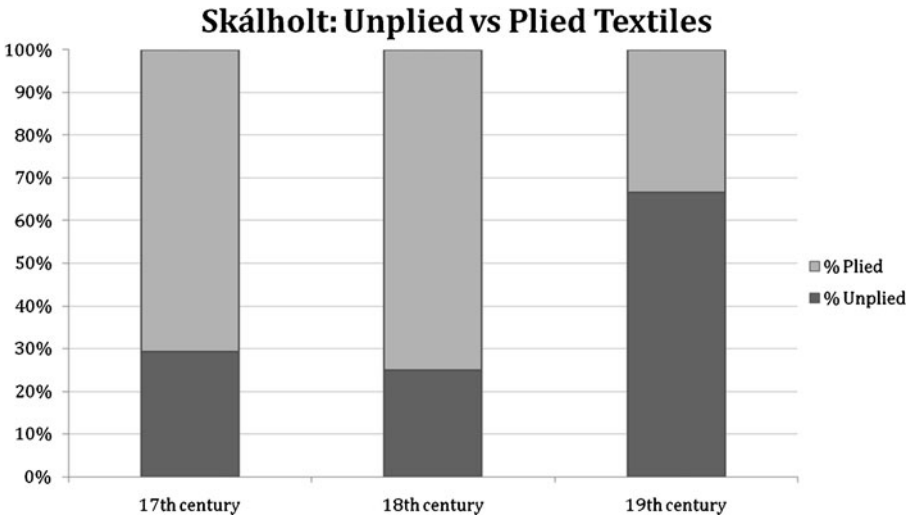

Fig. 6 Changing percentages of plied and unplied textiles at Skálholt

cloth was made in Iceland rather than representing imported cloth. Icelandic wool is identifiable by the different diameters of the fibres found on the Icelandic dual-coated sheep and were differentially used for the warp and for the weft yarns. While the former are quite coarse (between 60 and 100 μ), the latter are frequently very fine with smaller diameters of 10 μ and have long, pointed tips (Ordoñez 2011, 2012). The sample from Reykholt reflects all the characteristic Icelandic yarns and appears to have been produced on a warp-weighted loom with no napping or fulling on the surface (Ordoñez 2012). This sample produced an Early Modern AMS date of 140± 30 bp, with a calibrated date range of 1669–1891. If the true age of this sample falls within the later part of this date-range it would imply that warp-weighted looms continued to be used on some farms into the nineteenth century. Regardless of its specific age, however, the AMS date for this sample from Reykholt is consistent with the post-medieval and early modern dates inferred from the stratigraphic positions and artifacts found in association with the plied homespun textiles recovered from Gilsbakki and Skálholt. Together, these data suggest that plied homespun represents an innovation of the sixteenth–eighteen centuries, through which existing weaving techniques using the warp-weighted loom were combined with new approaches to yarn manufacture in order to produce cloth and clothing with new qualities and characteristics.

Such results are interesting and one might wonder why Icelandic women, who were the sole weavers prior to the eighteenth century, chose to increase the labor they had to expend in order to make cloth and to increase the amounts of wool that had to be used per piece of homespun textile during the post-medieval period. These centuries have generally been depicted as ones of poverty and famine in Iceland, so the choices to intensify labor and to allocate more resources to cloth used at home rather than expanding exports seem counter-intuitive.

Possible explanations for this shift in behavior and resource allocation include the cooling climates of the Little Ice Age or influences from other forms of textile work, such as knitting, in which plied yarns were frequently used. Some evidence suggests that a combination of these factors may provide the best explanation for the transformation of homespun cloth seen in post-medieval and early modern Icelandic assemblages.

Adding threads to the warp and/or the weft in order to produce warmer and more waterproof cloth makes intuitive sense and has regional correlates in earlier technological shifts within North Atlantic textile traditions (Østergård 2004). In Greenland, significant changes in cloth production appear to be correlated with the earliest onset of regional cooling at the start of the Little Ice Age (Hayeur Smith 2012b). There, changes in cloth production appear to have begun around 1308–60, when the Greenlanders began to incorporate larger numbers of weft threads into the 2/2 twills that they had been making since the eleventh century. This technological shift, which produced cloth that was more airtight and resistant to cold and moisture than earlier warp-dominant textiles coincides with the initial onset of rapid climatic deterioration marked by dropping temperatures and enhanced inter-annual variability in Greenland.

The fourteenth-century temperature drops experienced in Greenland may not have been as severe in Iceland, yet cooling intensified across the North Atlantic regions, especially from the sixteenth through the nineteenth centuries (Dugmore et al. 2007; Hayeur Smith 2012b; Mann et al. 2009). The transformations in Icelandic homespun production that began during the fifteenth and sixteenth centuries with the incorporation of plied warp threads in some textiles appear to have become the new Icelandic

standard for homespun cloth as the instabilities and general cooling trends of the Little Ice Age intensified during the seventeenth and eighteenth centuries. Thus, in both fourteenth-century Greenland and post-medieval Iceland, it appears that women adapted their cloth production techniques to climatic conditions in different ways—in Greenland they added more soft-spun weft threads into traditional single-thread *vaðmál* to produce a fabric with greater loft; in Iceland they doubled the warp and sometimes the weft threads by plying them. In both cases, their efforts made their cloth thicker, denser, warmer, and more weather-proof.

In early modern Iceland, the benefits of producing warmer cloth for a colder period may also have been facilitated by changes in the economy. In particular, the decline of cloth currency as a legal currency and export staple may have made more wool available for home usage, while technological changes occurring in Icelandic textile production, particularly an increasing focus on the production of knits for export during the seventeenth and eighteenth centuries, may have encouraged the production of plied yarn. During the seventeenth and eighteenth centuries, Icelandic exports of woven cloth progressively decreased at the same time that exports of knitwear increased (Robertsdóttir 2008). In Europe, knitted stockings were in high demand as the height of fashion during the seventeenth century (Thirsk 2003). Icelanders responded to this need by supplying Europe via Danish merchants with the knitted stockings needed to clothe its population.

By the eighteenth century, the role of knits in the Icelandic export economy was so great that Danish authorities began attempts to improve the quality of Icelandic knits, imposing regulations, standard models, and fixed prices on exported knitted products (Robertsdóttir 2008). According to Robertsdóttir (2008), the Icelanders found it difficult to comply with these the rules. Although numerous complaints arose from merchants irritated by the poor quality of the Icelandic products, documentary records from 1760 to 63 show that Iceland exported vast numbers of knitted stockings, mittens, and sweaters made from both 2-ply and 1-ply yarns. If 2-ply yarn was being used for knitting in the eighteenth century, it is likely that it was already being used by knitters in the seventeenth century. Plying yarn and using it for both knitting and weaving may have been a more efficient use of time than plying some wool for knitted goods and spinning only single threads for weaving, especially if the benefits of using plied thread for making warmer clothes was becoming more frequently apparent. The possibility that the increasing role for knitwear in the Icelandic export economy made the shift from single spun thread to two-ply yarn economically rational within the domestic sphere seems intuitively likely. However, there are too few knitted textiles represented in these archaeological textile collections to verify this hypothesis statistically, but as more samples from the seventeenth and eighteenth centuries, and earlier, become available from well-dated contexts it should be possible to trace patterns of borrowing and inter-relationships between these linked, but separate, textile production techniques.

Imported Cloth in the Seventeenth and Eighteenth Centuries

The infrequency of knitted textiles in the archaeological record, compared to their frequent mention in early modern documents, inevitably leads to questions about

trade, exports from Iceland, and the role of imported textiles within Iceland. In the data sets analyzed the numbers of knits recorded are surprisingly few given the importance knits are said to have had in Iceland's seventeenth- and eighteenth-century economy. This discrepancy most likely reflects the fact that knits were so important to the economy that they did not play a great a role in local consumption but were reserved for trade.

Imported textiles from Gilsbakki and Skálholt include both silks and woolens. No cellulose-based textiles (e.g., linens and cottons) have been found, but these do not survive well in the acidic soils of middens nor in the bacteria-rich soil matrix of archaeological sites. Very few silken textiles have been identified from Icelandic early modern contexts. To date, these have only been identified at Skálholt, reflecting not only the wealth of this ecclesiastic center but also its extensive role in Iceland's medieval and post-medieval commerce, and perhaps also the clergy's need for such fine fabrics.

Four of the five silk fragments from Skálholt were tested by Dr. Margaret Ordoñez at the Textile Conservation Laboratory of the Department of Textiles, Design and Fashion Merchandising at the University of Rhode Island. These samples (SKH 2006-9623, SKH2007-15730, SKH2006-9635, and SKH2007-15701) all came from seventeenth-century contexts at the site. Two were silk velvets: SKH2006-9623 is a cut velvet while SKH2007-1570 has both cut and uncut loops and was dyed purple (Ordoñez 2011). A third, SKH2006-9635, represents a silk satin a 4/1 weave, and the last, SKH2007-15701, is a gold silk yarn that could have been embroidered on a cotton or linen blouse using the *Baldýring* or raised band work (Asplund, pers. comm. 2011; Ordoñez 2011). Ordoñez (2011) concluded that these imported textiles would have represented the height of fashionable textiles used in Europe for apparel or interior design during the seventeenth century and would have only been available to those with considerable financial resources or as very expensive gifts.

Robertsdóttir (2008) in her comprehensive study of wool and its production in eighteenth-century Iceland, discussed the issue of imports of cloth into Iceland during this period. Looking at northeastern Icelandic merchants' account books, she was able to establish how much cloth local inhabitants actually purchased in the late eighteenth century and what types of cloth were available to them. Sacking was the largest textile import product consumed in this region and was possibly used for packing. This was followed by textiles used for clothes, which included three main categories: woolens and worsteds, linen flax and tow, as well as ready-made shirts. Textiles used for clothing came in both cheap and expensive varieties and many were black woolens. These have been recovered archaeologically in late eighteenth- and nineteenth-century contexts at Gilsbakki, Reykholt, Skálholt, and Bessastaðir. Samples of the textiles sold by merchants (Hörmangarafélagið) in Iceland have been preserved from 1742 and together with a letter from the trading company suggesting a list of textiles thought suitable for dress (Robertsdóttir 2008), these provide insights into the roles and varieties of imported cloth types available to eighteenth-century Icelanders that considerably expands knowledge gained from archaeological sources alone.

Black woolens show up on many sites in late eighteenth- and nineteenth-century contexts and generally display telltale characteristics of industrial production. They tend to be far more uniform and regularly woven than homespun, with even warp/

weft balances, and high thread counts. The nineteenth-century textile assemblages from Gilsbakki and Skálholt (see Fig. 3) show clearly this new industrial focus on balanced thread counts, with few deviations towards either warp- or weft-dominant textiles. The fibers are regularly spun, with no marked differences in the kinds of wool used for the warp and the weft threads as was found in Icelandic homespun due to the use different types of fleece from the Icelandic sheep for different structural purposes. The absence of these differences in warp and weft threads' wool indicates that most of these textiles were made of wool from non-Icelandic breeds, rather than being woolen cloth sold back to Iceland from Danish merchants using raw wool exported from Iceland. The thread counts on these textiles can also be quite high, which is more easily achieved using spinning wheels and horizontal looms than with drop spindles and the warp-weighted loom. Nevertheless, as Fig. 3 indicates, balanced industrial cloth from nineteenth-century contexts includes a broad continuum of textiles, from finely woven fabrics with 18–20 warp and weft threads per cm to balanced but coarse cloth with just 5 warp and weft threads per cm. Several fragments of these dark, balanced-weave woolen textiles from Skálholt (SKH2007-15743) and Gilsbakki (2008-34-120a; 2008-34-206a-c) were subjected to dye analysis, and were positive for either indigo or black dyes, suggesting that they were imported products as the materials from which these dyes were made are not native to Iceland (Ordoñez 2011).

Discussion and Conclusion

The early modern textile assemblages from Gilsbakki and Skálholt provide some preliminary data and insights into the continuing role of homespun cloth in Iceland through the late eighteenth century, the creativity of Icelandic women as weavers and spinners adapting their products to changing environmental and economic circumstances, and into the role of imported textiles in Iceland during the early modern period.

Robertsdóttir (2008) addresses the issue of homespun cloth production and its demise from an historical perspective, stating that further research is required to determine its role in the seventeenth and eighteenth centuries. While Icelandic homespun does not appear among the products merchants sold in Iceland or abroad during this period, and while the Danish authorities appear to have encouraged Icelanders to abandon its production, she argues that surely people continued to produce it for their own personal household needs and that it seems very unlikely that they abandoned the warp-weighted loom completely (Robertsdóttir 2008).

This same conclusion is suggested by the archaeological analyses presented here. Icelandic homespun was clearly still produced into the seventeenth and eighteenth centuries, despite the mid-eighteenth-century Danish policies intended to modernize textile production and propel Iceland into the industrialized world, or the earlier attempts to focus Icelanders' production on knitted goods for export and household use. Differences, though, between the sites of Skálholt and Gilsbakki in the roles of homespun, imported goods, and fabrics of different qualities provide details and nuances that complicate any simplistic attempts to spin a unilineal picture of either

gradual or abrupt replacements of homespun cloth by industrial imports during this period.

Results from Skálholt appear quite clear in this regard. Homespun cloth, including forms with both plied and unplied yarns, was present in abundance at Skálholt during the seventeenth century, as it was at Gilsbakki, complicating any expectations that Iceland's highest elites and their retainers living at the episcopal see would have dressed more opulently than the residents of smaller estates and farms.

Skálholt was the Bishop's residence from the twelfth century onwards and in the seventeenth century housed a seminary or Latin school for the sons of the Icelandic elite, who were preparing for the priesthood or for university (Lucas 2010). The school is said to have housed as many as 40 students, while the estate itself had a population of more than 100 people including the Bishop and his household, the school's teachers and students, as well as a large number of servants and farm hands (Lucas 2010; Lucas and Snæsdóttir 2006). It was strategically placed near the trading harbor of Eyrarbakki, from which foreign imports could easily be brought to the estate, and the bishops of Skálholt had been actively engaged in foreign trade for centuries, owning some of the only sea-going vessels in Iceland during the post-medieval period (Eggertsson 2005).

The seventeenth-century homespun cloth found at Skálholt may have come from the garments worn by these students, and need not have been produced at the site. This might explain the diversity of weaves, thread counts, and cloth types reflected in the samples analyzed, as well as the range of woolens, silk ribbons, tablet woven bands, etc., that have come from the site. Further analyses of samples from later years' excavations and additional contexts at Skálholt will confirm whether this sample of textiles from the 2006–07 excavations is truly representative of the overall distribution of cloth types and weaves present at Skálholt, as well as how these textiles correlate and are spatially and temporally associated with other items of dress from this period, such as buttons and beads (Lucas 2010).

The Icelandic elite who resided at Skálholt were well aware of the styles and fashions in vogue with their contemporary elites in Europe (Lucas 2010), and some of the imported fabric from Skálholt, especially the silk velvets and satins suggest elements of intentional conspicuous consumption at this site. These were expensive forms of cloth in Europe during that time, typically worn only by royalty, nobility, and high courtiers (Rothstein 2003). Silk ribbons, however, were said to be more commonly viewed as falling within a lower grade of fine textiles and were in demand by lesser nobility, gentry and merchants. So without reaching the heights of wealth encountered in Europe, Skálholt's occupants were expressing their authority by adopting a regional variant of this pattern far away in the North Atlantic and sending clear messages about their status and their position in seventeenth-century Europe.

By the eighteenth century, homespun cloth appears to have been in slow decline at Skálholt. This was a period in which the settlement was plagued by natural disasters. A fire swept through Skálholt in 1630 after which the site was rebuilt (Lucas 2010), but in 1784 an earthquake demolished the site again and it was deemed advantageous to move the bishopric and its school to the emerging town of Reykjavík. The decline noted in the textile data may reflect overall shifts in Iceland away from the production of homespun, but it may also be reflecting changes in the composition of the site from an important religious elite centre to a large but less important farm.

Gilsbakki offers glimpses into cloth production and consumption patterns that are nearly as interesting and as complex as at Skálholt. This was a much smaller farm and one that was also slowly losing its regional influence during the seventeenth, eighteenth, and nineteenth centuries. At the start of the seventeenth century, nearly one-third of its parish was annexed to the parish of Reykholt and in 1907 Gilsbakki lost its position as a parish centre, although it remains occupied to the present day (Smith 2012b). Despite these suggestions of slow decline in regional affairs, Gilsbakki's post-medieval archaeological record is one of increasing material opulence, despite its distance from regional harbors or commercial centers. Its connections to the outside world during the seventeenth century can be seen in the presence of Dutch or Danish tin-glazed dishes, Rhenish stoneware bottles or jugs, fragments of glass drinking vessels and wine bottles, a cloisonné enameled bronze knife handle from the Netherlands, and a probable English pocket knife. Textiles and homespun found in the seventeenth-century deposits at Gilsbakki mirror those found at Skálholt, except that a few textiles were recovered with extremely high thread counts (see Fig. 2). These textile fragments, with counts of 20 or more warp threads per cm, are more likely imported cloth than homespun and finer weaves than those found from contemporary deposits at Skálholt, despite the far larger size of Skálholt's assemblage. One could question why these were found at Gilsbakki, rather than at Skálholt which was a far wealthier settlement with easier access to such imports. Perhaps the need for conspicuous consumption was more strongly felt at Gilsbakki because it was not the primate centre that Skálholt was. Or were its occupants perhaps more invested in affirming their social status as elites, given that changes at the district level were slowly reducing Gilsbakki's influence and challenging its authority within its region.

Similar patterns characterize the archaeological record at Gilsbakki in the eighteenth century. Throughout this century, its middens are full of imported ceramics, decorative glassware, and an abundance of discarded decorative elements and attachments associated with traditional and emergent "national" costumes of the late eighteenth century (Smith 2012b). However, the volume of ceramics, glassware, and other imports at Gilsbakki skyrocketed in the decades immediately after the elimination of the Danish trade monopoly in 1787, and from that period through the early twentieth century, Gilsbakki's archaeological record mirrors the arrival, popularity, and discard patterns for material culture seen on both sides of the Atlantic Ocean and beyond. From pearlware to whiteware, porcelain dolls to celluloid combs, Gilsbakki's households were directly linked to the consumer revolutions, fashion trends, and emerging world systems that characterized late eighteenth-and nineteenth-century mercantile capitalism. These trends towards fashionability extended into textile consumption patterns, as well. Homespun cloth disappeared entirely from Gilsbakki's archaeological assemblages after the 1750s, and the imported fabric found at the site after that was entirely representative of finely woven imported black woolens with higher thread counts than were found in contemporary deposits from Skálholt.

Late nineteenth-century visitors to Gilsbakki reported in several travel narratives its household's desire to appear stylish and to treat guests well, with all the material symbols of opulence and good taste that a farm so deep in Iceland's interior could muster (Morris 1969; Oswald 1881; Smith 2009). A desire to maintain the outward manifestations of privilege, taste, and familiarity with the fashions of the wide world

may have had its roots in its' occupants attempts at forestalling the slow erosion of regional authority that Gilsbakki had long had and it is noteworthy that for most of the seventeenth–nineteenth centuries, Gilsbakki was in the hands of just three families, whose sons and grandsons inherited the estate and its income from their fathers and grandfathers for spans of 75–150 years (Smith 2012b). This degree of stability, unusual for parish farms, may also explain the apparent accumulation of wealth at this site, as evidenced in the material record of its occupants' opulent pretentions.

Homespun cloth is also present at this site, with the unique feature of the plied warp threads noted elsewhere. Gilsbakki like Skálholt, also displays this feature increasing progressively from the sixteenth century, reaching its peak by the eighteenth century and declining thereafter.

Further research is required on these collections and others from the early modern period in Iceland to verify some of these hypotheses, and explore the consumption and production of both homespun and foreign imports. This will hopefully add another dimension to the study of early modernity in Iceland and Iceland's progressive integration into the industrialized world.

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