Bronze Age weavers used a range of different fibres: flax, nettle, hemp, and a variety of baststhat had been used for millennia (Rast-Eicher 2005). Sheep’s wool, however, was a novelty and the introduction of wool as an important raw material for textiles caused changes in the way textiles were produced and used. It also caused changes in animal husbandry, land use, social structures, and in the mind-set of people but most of all, the sheep themselves, and in particular their wool, were changed. Early domesticated sheep were kept for their meat and possibly skin, but they did not have wool in our sense of the word. Like other mammals they had a coat of hair that included soft downy under-wool that grew when winter was approaching and was moulted in early summer. What the early domesticated sheep did have was a potential; their fuzzy under-wool had the genetic capacity to develop into wool.

BECOMING WOOL

Shepherds must have recognised that some of their sheep had a coat with more and better under-wool than others: longer, stronger, and shinier fibres. At some point they began to encourage this by selective breeding. Eventually white wools became especially sought after as this is a prerequisite for dyeing. By the fourth millennium BC, breeding had resulted in sufficient genetic
changes for woolly sheep to have emerged in the Near East. Three morphological changes occurred to early domesticated sheep: the horn shape changed and the ewes became hornless, the tails became long and fat, and crucially the woolly fleece developed with different coloured fleeces appearing, including white (Breniquet 2008; Clutton-Brock 1989: 57; Rast-Eicher 2008: 121–2). This is testified both by archaeological sources and textual evidence from the Near East (Barber 1991: 23–5). The European Mouflon still found in Corsica, Sardinia, and Cyprus are remnants of the early domesticated sheep (Scheu et al. 2012: 51) giving an impression of the changes that took place.

A piece of sheep skin with wool of different colours from the Neolithic, mid-fifth-millennium BC site of El Omari in Egypt (Mortensen 1999) has been reported as one of the earliest examples of preserved wool (Barber 1991: 25; Kemp and Vogelsang-Eastwood 2001: 34). Regrettably the piece is now lost and cannot be re-investigated (Bodil Mortensen pers. comm.). Close in date are a number of finds of wool dated to the fourth millennium BC from Turkey, Mesopotamia, Iran, and the northern Caucasus (Frangipane et al. 2009; Gleba 2012: 3643; McCorriston 1997: 521; Shishlina et al. 2003). Cuneiform texts from the Archaic period of Uruk clearly mention wool sheep (Green 1980: 4), and by the late third and early second millennium BC records from Ur III and Old Assyria specify sheep breeds whose wools were assessed according to their quality and colour. The wool of fat-tailed sheep was the best, that of ‘mountain sheep’ was of poorer quality, while a third kind, uli-gi sheep, yielded very coarse wool. Up to five different qualities of the wools were recorded. Further distinctions were made between new and old wool. As regards colours, the wool of fat-tailed sheep was recorded as black and white, while other sheep breeds appear to have yielded black, red-brown, or multi-coloured wool (Waetzoldt 1972: 3–9, 46–50).

Wool has a range of properties that makes it very well suited to use as a textile fibre (Cook 1968: 102–8; Gleba 2012; Harris 2010). Modern wools are elastic, have a good stretch and recovery, and are fairly resistant to abrasion. Wool fibres have scales that cause them to felt easily. Together with crimp, a wavy structure unique among natural fibres, this makes wool an excellent insulating material against heat as well as cold. Wool is highly absorbent and can hold moisture up to about a third of its weight before it feels wet. Wool remains warm even if damp. This is caused by the release of heat as moisture is being absorbed. The tenacity of wool is 1–1.7 g/denier when dry, 0.8–1.6 g/denier when wet, and its tensile strength 17,000–29,000 lb/square inch. Wool becomes weak and loses its softness when heated to boiling point for long periods; at 130° it decomposes and it chars at 300°. If stored carefully it hardly deteriorates, but the keratin that it consists of decomposes if subjected to strong
sunlight over long periods. Wool has a natural lustre that reflects light although the degree of this varies between sheep breeds. Significantly, wool appears in a range of natural shades – white, grey, brown, and black. Furthermore, as wool dyes easily, it offers a wide palette of potential colours. Not all of these special properties were found in the wools of wild and early domesticated sheep, but they emerged through breeding. Crimp, for example, is first attested in Iron Age wools (Rast-Eicher 2013).

In Europe, woolly sheep seem to have entered the scene more or less on the threshold of the Bronze Age in various regions. Hornless sheep turn up in Early Bronze Age finds from Switzerland (Rast-Eicher 2015, forthcoming). In central Hungary, changes in the composition of faunal assemblages, as well as slaughter patterns for sheep bones, suggest a shift after 2000 BC towards sheep being kept for their wool (Vretemark 2010: 157). Currently, the earliest examples of wool in Europe are a sprinkling of textile finds dated by relative chronology or radiocarbon dating to around 2000 BC and early in the second millennium BC from the Czech Republic, Denmark, France, Germany, Italy, Switzerland, and the UK (Bender Jørgensen and Rast-Eicher 2015). By the Middle Bronze Age, after c. 1600 BC, we find wool textiles turning up regularly, and seemingly all over Europe (Gleba 2012; Rast-Eicher 2005, 2008; Rast-Eicher and Bender Jørgensen 2013; Ryder 1990a).

The emergence of woolly sheep was only a beginning. Fibre analysis shows that the fleeces of early sheep consist of several types of fibres: fine underwool with diameters up to 25 microns, medium hairy or heterotype fibres, and kemp (i.e. coarse, brittle hair with a wide medulla) (Rast-Eicher 2008; Rast-Eicher and Bender Jørgensen 2013). These differences were explored and responded to resulting in further genetic changes. For instance, the wool of a mid-second-millennium textile from Pustopolje in Bosnia-Herzegovina proved on analysis to consist of all these fibre types; coarse kemp fibres are conspicuously sticking out of the yarn and the fabric must have been quite itchy to the touch (Figure 1.1a). Similar wool with a high proportion of coarse hair and kemp has been recorded in a number of textiles from the Lüneburg region in north-west Germany dated c. 1500–1200 BC (Bender Jørgensen and Rast-Eicher 2016). The Pustopolje and Lüneburg wools show that by the Middle Bronze Age, sheep in Europe still had fleeces whose composition was little removed from that of hairy sheep. Analysis of Scandinavian Bronze Age woollen textiles demonstrates that they were similarly mainly made from a combination of very fine fibres with a few coarse fibres and kemp, showing that the wool was from the hairy Bronze Age sheep. This type of sheep is further documented by a number of sheepskins found preserved in the salt mines of Hallstatt, Austria, offering a rare glimpse of Bronze Age fleeces. They show that
Middle Bronze Age fleeces were short, with coarse medullated fibres and fine unmedullated under-wool. The coarser fibres have natural pigmentation and would have appeared as dark, whereas the under-wool only had a low degree of pigmentation and was lightly coloured, at times even white (Rast-Eicher 2013; Rast-Eicher and Bender Jørgensen 2013). The breeding of sheep had two main aims: to produce white wool and longer fibres.

The wool from the Bronze Age textiles from Hallstatt generally corresponds with that of contemporary fleeces. A few of these Middle Bronze Age textiles are, however, made of wool that is virtually unpigmented. In other words, it is white or almost white. These wools also have a different fibre composition (Figure 1.1b). This suggests selection or breeding of sheep with more evolved wools, or, alternatively, that a very careful sorting and selection of light fibres from different animals was carried out in order to obtain white wool for specific purposes. This shows that the potential of sheep for developing wool was being exploited and their capacity for producing specific fleece types and colours was being pushed. Here it is important to emphasise that white

Figure 1.1 Bronze Age textile and fibres. a) The Pustopolje textile from Bosnia-Herzegovina. Wool with coarse kemp fibres sticking out. This wool has hardly been processed; b) Nearly white Bronze Age wool from Hallstatt; c) Late Bronze Age linen fibres from Switzerland indicating combing after retting.
Photos: a) Gordana Car 2010. © Hrvatski Restauratorski Zavod; b) and c) A. Rast-Eicher.
wool is genetically dominant, which is important for purposeful breeding as partly white sheep could have been used to produce fully white sheep (Ryder 1990b: 143).

Regina Hofmann–de Keijzer et al. (2013) have shown that several Middle Bronze Age textiles from Hallstatt as well as the Pustopolje textile were dyed. These are all made of pale or almost unpigmented wools and indicate that Bronze Age people began to use dyes as a way of enhancing the range of colours in textiles. The breeding for white sheep and the development of dyes appear to have been mutually enforcing innovations at this time.

Late Bronze Age wools are rare, due to the prevalent funeral rite of cremation that does not preserve textiles. A few exceptions do, however, exist. Margarita Gleba examined wool samples from Radfeld in Austria dated to 1100–1000 BC and found they represent a further transitional stage in the development of the fleece (Gleba 2012: 3648). In contrast, in Scandinavia by the Late Bronze Age no signs of changes have as yet been observed (Rast–Eicher and Bender Jørgensen 2013). Changes in the fleece may thus to some extent take place at regional levels as shepherds had differing access to breeding animals as well as different expertise and knowledge. Access to, and control over, sheep with wool of desired qualities may therefore have been much valued.

The development of the fleeces, and through that the types of wool used in textiles, was an on-going process. Iron Age fleeces from the Hallstatt salt mines are more varied than those of the Bronze Age. One type is almost the same as those found from the Bronze Age but with less coarse as well as less fine fibres (Rast–Eicher 2013; Rast–Eicher and Bender Jørgensen 2013). They may be understood as a reflection of the Bronze Age fleece type being in the process of development and a standard being established. The Iron Age saw a further development towards distinctive sheep breeds (Gleba 2012; Rast–Eicher 2008; Rast–Eicher and Bender Jørgensen 2013).

FLAX IN A STATE OF FLUX

Flax has been used for almost 12,000 years and was introduced in Europe at the beginning of the Neolithic. Since then it has undergone many modifications. Among the first was the transformation of the wild flax species *Linum bienne* into the domesticated *Linum usitatissimum*. Further genetic changes led to subspecies especially suited either for oil or fibre production (Karg 2015; Zohary et al. 2012: 2, 100–6).

Flax is a very strong fibre, with excellent tensile strength that becomes stronger by as much as 20% when wet. This makes it well suited for items like fishing nets, tents, or sails. Flax is a fibre that is particularly inextensible,
stretching only slightly when tension is increased. Nonetheless it is an elastic fibre that tends to return to its original length when tension is relaxed. It has a high degree of rigidity and resists bending, causing linen fabrics to crease easily. It is highly resistant to heat up to about 120°C but gradually loses strength if exposed to sunlight. Flax is a good conductor of heat, which makes linen fabrics feel cool. Working clothes for smiths, for example, used to be long linen shirts that warded off heat and sparks. Linen is also crisp and smooth, and has the ability to absorb moisture such as sweat. These aspects make flax highly suitable for clothing and for household linens. Flax fibres appear dull but become lustrous when beaten or smoothed; its natural colours vary between white, yellowish and grey (Cook 1968: 9–11; Harris 2010: 105–6). It is difficult to dye although textiles from Pharaonic Egypt show that this had already been mastered by the Old Kingdom (i.e. the third millennium BC), and was further developed during the Eighteenth Dynasty (Barber 1991: 223–5; Kemp and Vogelsang-Eastwood 2001: 152–5). Flax can be used to make fine, light, virtually transparent fabrics as well as very coarse sackcloth or tarpaulins (Cooke et al. 1991). The natural properties of flax are exploited when woven in tabby due to the density of the interlacing or binding points that make the fabric firm, strong and, if densely woven, rather stiff.

The earliest archaeobotanical evidence of flax from Europe derives from sites of the Linearbandkeramik (LBK) culture and dates to the second half of the sixth millennium BC (Zohary et al. 2012: 103). It arrived as part and parcel of Neolithisation, along with farming, domesticated animals, and pottery. Flax seeds or capsules have been found in many parts of Europe, including Austria, Britain, Germany, Italy, the Low Countries, Poland, Spain, Switzerland, and the Balkans including Greece (Karg 2011, 2015). In the Alpine area, flax cultivation started in the seventh and sixth millennium BC. Until the second half of the fourth millennium BC, winter flax was cultivated. It was accompanied by weeds deriving from the Mediterranean. Then it was replaced by a new flax type that is found along with local summer weeds (Jacomet 2013; Karg 2015). After c. 3400 BC a new flax species with smaller seeds was introduced and became the norm (Maier and Schlichtherle 2011: 571–2). The excellent preservation conditions in the Alpine lakes mean that we can connect this change in the properties of the plant with changes in flax cultivation and processing. This suggests that cultivation was explicitly aimed at enhancing the properties most important for fibre production; the new flax variety was better suited for fibre production than the earlier type with large seeds. The change to a new flax type is said to have been caused by influences from the Danubian area (Herbig and Maier 2011). At this time, preserved fibres with remains of stem fragments
attached to them become rare, suggesting that the processing becomes more meticulous. These two observations suggest a ‘flax-boom’ from around 3000 BC (Maier and Schlichtherle 2011: 571–3).

Flax appears to have been the most common fibre in Bronze Age textiles from southern and western Europe; about two thirds of all textile finds from France, Greece and Italy, all Spanish, and most of those from the UK are considered to be made of flax (Alfaro 2012; Alfaro 1984; Bazzanella and Mayr 2009; Gleba 2008a; Grömer 2007; Henshall 1950; Hedges 1973; see also the online CinBA textile database, http://cinba.net/outputs/databases/textiles/). Nonetheless, a number of these textiles were found and published as flax in the nineteenth or early twentieth century; some are now lost, and fibre identifications cannot be ascertained. It is therefore likely that the picture was more varied.

The use of flax in northern Europe is less clear. In the literature there are references to two examples of Bronze Age linen from northern Germany. One is a plaited tassel from Vaaler in Schleswig-Holstein, dated to Montelius Period II (Middle Bronze Age), and the other is a textile fragment from a Late Bronze Age grave from Schaliss in Mecklenburg (Ehlers 1998: 221, 468; Möller-Wiering 2012: 126). New fibre analyses have, however, shown that the Vaaler tassel is made of bast and the Schaliss identification is difficult to verify (Bender Jørgensen and Rast-Eicher 2016). For some reason, flax does not seem to have been much used in Scandinavia before towards the end of the Bronze Age. Archaeobotanical evidence in the form of flax seeds and capsules have been found in bogs and settlements dated to c. 800 BC (Andresen and Karg 2011: 519–20; Viklund 2011: 509–10); a single flax seed dated c. 1000 BC was found at Bjerre Enge in Denmark (Robinson et al. 1995: 14).

Neolithic flax fibres were processed much like the bast and grasses that had been used for various forms of basketry and even clothing since the Palaeolithic; as unretted strips as well as retted fibres (Rast-Eicher 2005: 119). Experiments indicate that fine Neolithic linen threads were made by stripping fibres from stems that had been field retted for up to 10–12 days. The wet fibres were then divided into finer strips and joined by rolling the fibre ends between the fingers, rolled around a spool, and left to dry. Two such yarns could then be spun into a plied yarn, for example using a drop spindle (Leuzinger and Rast-Eicher 2011: 537). Investigations of Middle Bronze Age linen samples from the salt mines of Hallstatt show that fibres at the site were also processed in this way. Late Bronze Age linens from Switzerland, however, are made from fibres that were processed more carefully; each fibre was now separated from the others, suggesting they were combed after retting, making it possible to make softer threads (Figure 1.1c) (Leuzinger and Rast-Eicher 2011: 540).
The above discussion shows that it is possible to trace changes in flax plants as well as in the processing of flax fibres throughout the prehistory of flax cultivation in Europe. Farmers and textile workers had been attentive to plants and fibres, encouraging and acting upon changes in their properties. The aim was obviously to obtain better, finer, and softer fibres that could be turned into fine yarns, increasing the range of fabrics and textures that could be produced from them.

FLAX AND WOOL

To a great extent wool took over from flax as the dominant raw material for textiles around the beginning of the Bronze Age. Investigating evidence of early textile production in Mesopotamia, Joy McCorriston (1997: 517) has called this change the ‘fibre revolution’, arguing that the shift from flax to wool led to changes in land tenure, social relations, labour roles, and labour specialisation. Flax production requires prime arable land as well as substantial input of labour. Cultivation of flax involves preparation, fertilisation and watering of the soil, and weeding (Valamoti 2011: 556). Flax harvesting and processing involves several different processes before the fibre can be spun: pulling, rippling, retting, breaking, drying, scutching, and heckling (Andresen and Karg 2011: 518–19). If the fibres are spliced, the procedure should be adjusted to: pulling, rippling, retting, breaking, wetting, stripping, splicing, and drying.

The production of wool does not require good arable land; sheep can be herded on marginal land. McCorriston (1997: 523) mentions the steppes and deserts of Mesopotamia as grazing grounds documented in Sumerian texts. In Europe, sheep have been (and to some extent still are) grazed in mountain pastures, heathlands and other forms of marginal land (Bender Jørgensen 2012a: 179). An increase in open lands during the last phase of the Neolithic period in the Alpine regions of Europe points to a change in animal husbandry at that point (Schibler 2008). Land requirements also differ. McCorriston (1997: 524) estimates a yield of 335 kg hackled flax fibres per hectare. By contrast, based on an estimated 4.5–8 hectares needed per sheep for grazing, there would be an average yield of 0.125–0.450 kg of wool per hectare in the steppe or desert. For Scandinavia calculations suggest 300–440 kg flax could be produced per hectare on good arable land and 1–2 kg wool per hectare of coastal heathland (Bender Jørgensen 2012a: 179). Flax has, however, a major disadvantage as it is only possible to sow it on the same ground every seventh to eighth year, whereas sheep can graze the same pastures for years if a degree of rotation is possible.
The labour invested in prehistoric fibre production is difficult to assess. McCorriston has estimated that up to 58 days of work would be needed for the production of 2 kg flax and 15–20 days of work per 2 kg of wool (McCorriston 1997: 524). Although these calculations have to be understood as guestimates, the difference may, nonetheless, explain why wool proved to be a very attractive new raw material for textile production, in addition to its many other useful properties outlined above. The properties of these two main types of fibres, in many ways, are complementary; wool never came to replace flax but rather should be seen as adding exciting new avenues for the ideas and creativity of Bronze Age textile craftspeople. The two fibre types were both used in Bronze Age Europe, with various local preferences. In the north, for example, there was a tendency for wool to be dominant.

MIXING FIBRES

In most cases, raw materials are not mixed in the production of Bronze Age textiles. We do, however, have a few cases where this was done. The earliest example of a mixed textile is a find from Wiepenkaten, Kreis Stade in northern Germany. A flint dagger, complete with scabbard and wooden handle, was found by peat diggers in 1935. Textile remains, wedged between handle and flint, were identified by Walter von Stokar as partly wool, mixed with hairs from other species. Only one yarn system, ostensibly the wool weft, was preserved. The warp had consisted of vegetable fibres and had disintegrated (Cassau 1935: 205; von Stokar 1938: 103). Unfortunately, the wooden handle has been glued back on the dagger (and over the remains of the textile), making re-investigation of the fibre impossible. The presence of thick, coarse fibres does, however, indicate that von Stokar’s identification of the wool fibres was correct (Rast–Eicher 2014: 16). The Bronze Age burial at Unterteutchenthal in Sachsen-Anhalt (Schlabow 1959: 118–20; von Stokar 1938: 44–5, 105) has been mentioned as another example of mixed fibres from the Early Bronze Age. Recent re-dating has, however, shown that it is not a Bronze Age textile (Friederike Hertel pers. comm.).

Interestingly, on one of the pieces of flax textile from the site of Molina di Ledro in Italy, wool was used to sew a buttonhole and a fringe onto the long and narrow belt (Bazzanella 2012: 206). In this case, wool was applied to flax as decoration rather than mixed with it. This shows that textile makers played with the new material. Finally a woven band from Chania, Crete has been found to consist of no less than three different fibres: the warp is flax, the weft
consists of goat hair, and supplementary weft threads were made from nettle fibres (Spantidaki and Moulherat 2012: 189).

There is thus a surprising lack of mixing of the different fibres. It appears that textile makers during the Bronze Age separated their raw materials rather than exploring their shared properties and learning about new fibres by joining them with familiar ones.

FURTHER FIBRES

Further fibres that were exploited for textiles in the Bronze Age include hemp, nettle, a variety of bast, and horsehair. Some Bronze Age textiles from Europe have been claimed to be silk but have proved unable to stand up to scrutiny (Bender Jørgensen 2013b).

Hemp is stiffer and coarser than flax, it is strong and durable, and therefore well suited for making string, cord, and rope. It has also been used for coarse fabrics such as canvas or sacking. If processed with care it may, however, obtain an attractive lustre similar to that of flax, and may indeed be used for many of the same purposes as linen fabrics. Individual fibre strands may be 6 ft or more in length (Cook 1968: 17–18). Although flax and hemp are difficult to distinguish, it is thought that hemp has been identified in Middle Neolithic settlements from Latvia (Zeiere 2012: 268), and in textiles from the Eneolithic/Early Bronze Age from Italy (Bazzanella 2012: 207, 210), Spain (Alfaro 2012: 337–8), and the Ukraine (Gleba and Krupa 2012: 402). A Late Bronze Age find from St Andrews in Scotland has also been suggested to be hemp (Heckett 2012: 432). The history of the domestication of hemp is much less clear than that of flax; so far linguistic and cultural evidence suggest that it was grown in China by the mid-fifth millennium BC (Zohary et al. 2012: 106–7).

Nettle fibres are soft and pleasant to handle. They are creamy white to grey in colour, depending on how well it has been retted; strands may be up to 3 ft in length. Nettle fibres have been used to make sailcloth in Late Medieval and Early Modern Scandinavia, but have also been used for clothing, furnishing fabrics, canvas, or as twine and rope (Cook 1968: 25–6). Nettle fibres have been identified in a textile from Minoan layers in Chania, Crete (Spantidaki and Moulherat 2012: 189), and are suggested for a Late Bronze Age find from Pyotdykes in Scotland (Heckett 2012: 432). Nettle fibres were also used for the fine fabric found wrapped around the cremated bones in the Late Bronze Age burial from Lusehøj, Voldtofte in Denmark (Koie 1943). Strontium isotope analysis of the origin of this fabric has recently been suggested to be
Kärnten-Steiermark in Austria (Bergfjord et al. 2012), indicating wide-ranging trade in either fibres or finished textiles.

Bast from various species of wood such as lime (Tilia sp.), elm (Ulmus sp.), oak (Quercus sp.), juniper (Juniperus sp.), and willow (Salix sp.) have been exploited throughout history, especially for cordage and basketry but even for fine, flexible, textile-like fabrics, along with reeds and various grasses (Gramineae) (Dimbleby 1978: 45–7). Basts of these species were chosen for their combination of volume, strength, and pliability. The strength of lime bast is superior to the bast of the other species, making this the most popular. Its tensile strength is 40% that of hemp. It is particularly strong if not retted; it is 47% stronger when wet, has low water absorption, limited swelling when wet, low weight, low extensibility, and low resistance to wear, although it does not decay lightly. It also floats on water, dries quickly and – if retted – is soft to the touch (Harris 2010: 107; Myking et al. 2005: 65–70).

Bast artefacts are known from Palaeolithic, Mesolithic, and Neolithic sites in Europe (e.g. Alfaro 2012: 338; Bender Jørgensen 2013c; Méard 2012: 368; Rast-Eicher 2005; Rast-Eicher and Dietrich 2015). The best-known example is the clothing of Ötzi (or Similaun man), the ice mummy from the Alps (Bazzanella 2012: 205). In the Pre-Pottery Neolithic Near East bast cords were even used to create pots by gluing the horizontally rolled strings with asphalt (Schick 1988: pl. XIV). The use of bast continued in the Bronze Age, particularly for netting and basketry (Broholm and Hald 1940; Ehlers 1998; Rast-Eicher 2005: 127).

Horsehair is strong, stiff, lustrous, and resilient, but also coarse – especially when compared to other fibres used for textiles. Horsehair has at various times been used for interlining or stiffening for tailored garments and millinery, stuffing in mattresses, and for upholstered furniture. A fine hairnet of horsehair covered the head of the young women interred in an oak-log coffin at Skrydstrup, Denmark (Broholm and Hald 1940: 99); the find is radiocarbon dated to 1175 BC (K-3873; Jensen 1998, 191 note 25). Horsehair was also used for strings attached to a pot found with a clothed bog body radiocarbon dated to the ninth century BC from Damendorf Ruchmoor in northern Germany (Ehlers 1998: 421). A woven, tasselled ornament from Cromaghs in Ireland dating to the ninth to eighth centuries BC is made of horsehair and shows that this was also a raw material that could be used for textiles. It closely resembles horse trappings depicted in Assyrian reliefs from the first half of the first millennium BC (Heckett 1998, 2012: 433–5).

The prime importance of the raw materials used for textiles is how they responded to human interaction during prehistory. By the beginning of the
Bronze Age, specific properties had emerged which were further pushed and different fibres came to co-exist making it possible for different traditions and different desired outcomes to affect production. Within textile fibres were innate properties that made them fundamentally different to the inorganic materials found in metal and potter’s clay.