This pdf of your paper in *Global Textile Encounters* belongs to the publishers Oxbow Books and it is their copyright.

As author you are licenced to make up to 50 offprints from it, but beyond that you may not publish it on the World Wide Web until three years from publication (December 2017), unless the site is a limited access intranet (password protected). If you have queries about this please contact the editorial department at Oxbow Books (editorial@oxbowbooks.com).
Contents

1 Textiles and Elite Tastes between the Mediterranean, Iran and Asia at the End of Antiquity
   Matthew P. Canepa ................................................................. 1

2 Palla, Pallu, Chador: Draped clothing in ancient and modern cultures
   Mary Harlow ........................................................................... 15

3 From Draupadi to Dido: The duties of dress in paintings inspired by the Mahābhārata and the Aeneid
   Linda Matheson ....................................................................... 25

4 The Kaftan: An unusual textile encounter in the Scandinavian Late Iron Age
   Ulla Mannering ...................................................................... 33

5 Ancient Running Animals: Tablet-woven borders from China and Norway
   Lise Ræder Knudsen .................................................................. 37

6 The Development of Pattern Weaving Technology through Textile Exchange along the Silk Road
   Zhao Feng .................................................................................. 49

7 The Earliest Cotton Ikat Textiles from Nahal ‘Omer Israel 650–810 CE
   Orit Shamir and Alisa Baginski ................................................... 65

8 Northerners: Global travellers in the Viking Age
   Eva Andersson Strand ............................................................... 75

9 Unravelling Textile Mysteries with DNA Analysis
   Luise Ørsted Brandt ................................................................... 81

10 The Traceable Origin of Textiles
    Karin Margarita Frei ............................................................... 87

11 The World of Textiles in Three Spheres: European woollens, Indian cottons and Chinese silks, 1300–1700
    Giorgio Riello ......................................................................... 93
12 Chinese Silks in Mamluk Egypt
   Helen Persson ................................................................................................................. 107

13 Woven Mythology: The textile encounter of makara, senmurw and phoenix
   Mariachiara Gasparini ................................................................................................... 119

14 Textile in Art: The influence of textile patterns on ornaments
   in the architecture of medieval Zirikhgeran
   Zvezdana Dode ............................................................................................................... 127

15 Coromandel Textiles: The changing face of consumer demand
   and weavers’ responses 16th to 18th century CE
   Vijaya Ramaswamy ........................................................................................................ 141

16 The Jesuit Dilemma in Asia: Being a naked ascetic or a court literate?
   Selusi Ambrogio .............................................................................................................. 151

17 The Colourful Qualities of Desire: Fashion, colours
   and industrial espionage
   Vibe Maria Martens ........................................................................................................ 159

18 Fashion Encounters: The “Siamoise”, or the impact of the Great Embassy
   on textile design in Paris in 1687
   Corinne Thépaut-Cabasset ............................................................................................. 165

19 The Chinoiserie of the 17th to 18th-century Soho Tapestry Makers
   Mette Bruun ................................................................................................................... 171

20 Exoticism in Fashion: From British North America to the United States
   Madelyn Shaw ................................................................................................................ 177

21 Textile Symbolism and Social Mobility during the Colonial Period
   in Sydney Cove
   Judith Cameron ............................................................................................................. 189

22 The Impact of British Rule on the Dressing Sensibilities
   of Indian Aristocrats: A case study of the Maharaja of Baroda’s dress
   Toolika Gupta ................................................................................................................. 199

23 Re-imagining the Dragon Robe: China chic in early twentieth-century
   European fashion
   Sarah Cheang ............................................................................................................... 205
24 Sari and the Narrative of Nation in 20th-Century India  
Aarti Kawlra ................................................................................................................... 213

25 From Cool to Un-cool to Re-cool: Nehru and Mao tunics in the sixties and post-sixties West  
Michael A. Langkjær ..................................................................................................... 227

26 Too Old: Clothes and value in Norwegian and Indian wardrobes  
Ingur Grimstad Klepp, Lill Vramo and Kirsi Laitala ..................................................... 237

27 A ‘Stinging’ Textile: Cultivation of nettle fibre in Denmark and Asia  
Ellen Bangsbo .................................................................................................................. 245

28 Fist-braided Slings from Peru and Tibet  
Lena Bjerregaard ........................................................................................................... 255

29 Parsi Embroidery: An intercultural amalgam  
Shernaz Cama ................................................................................................................. 263

30 The Navjote Ceremony and the Sudreh Kushti  
Lotika Varadarajan ........................................................................................................ 275

31 Globalization, Identity and T-shirt Communication  
Karl-Heinz Pogner .......................................................................................................... 283

32 India to Africa: Indian Madras and Kalabari creativity  
Joanne B. Eicher .............................................................................................................. 295

33 Textile: The non-verbal language  
Jasleen Dhamija .............................................................................................................. 303

Dedication ........................................................................................................................... 309

Acknowledgements ............................................................................................................ 311
Ancient Running Animals: Tablet-woven borders from China and Norway

LISE RÅDER KNUDSEN

On finishing high school, Lise Ræder Knudsen first worked as a tablet weaver 8 hours a day producing copies of ancient tablet-woven borders in the textile reconstruction workshop at Moesgård Museum, Denmark. Hereafter, she obtained her master’s degree in conservation at the Royal Danish Academy of Fine Art, The School of Conservation and is currently head of the Regional Conservation Centre in Vejle, Denmark. Her main fields of expertise are conservation and the technical analysis of archaeological textiles. She has conducted technical analyses of ancient tablet-woven bands and borders since 1981, is involved in publishing most of the earliest and most complicated finds of tablet weaving throughout Europe as well as working on new interpretations of tools used for tablet weaving. Many working hours of practical weaving combined with a scholarly approach have revealed that it is possible to delve deeper into the methods of production and obtain new information on new finds as well as old finds. The author received her PhD from the Royal Danish Academy of Fine Art, The School of Conservation for her thesis entitled, Teknologihistorisk analyse af brikvævning fra ældre jernalder – (Technology historic analysis of tablet-woven textiles from the Early Iron Age). Readers of this chapter may find her website <www.tabletweaving.dk> of great interest, especially for research, techniques and reconstructions of tablet weavings.

Tablet Weaving Around the World

Tablet weaving is an ancient technique for making bands and borders. Very simple tools are required and patterns can be made, which no other weaving technique is able to produce (Fig. 5.1). What is unique is that the warp threads of a tablet weave often are twisted around each other in cords of four threads. This makes it, for instance, possible to produce straight diagonal lines and thus many different patterns, which are not possible to obtain using other looms.

The earliest known finds come from Italy and are dated to the 9th–8th centuries BCE. These borders are mainly edgings of woven garments and they adorn the garments with edges of different colour and tidy the left over fringes from the weaving process in a solid and handsome way. From Iron Age Europe, there are a number of marvelous finds of borders with elaborate tablet-woven patterns in intricate techniques. In Hochdorf in Germany, a Celtic chieftain’s grave contained several tablet-woven borders made in intricate techniques. The material was very fine 2-ply threads in blue, purple,
red and yellow colours. Most material was wool but surprisingly some yarn was made of the fine hair of a badger. In the salt mines in Dürrnberg and Hallstatt in Austria, thick layers of waste from the Iron Age were found and different worn out textiles were excavated. Among these were woolen pattern-woven tablet borders dated before the late 3rd century BCE. In Scandinavia, the first tablet-woven borders are dated shortly before the beginning of the Common Era. Tablet weaving was at this time primarily a helping technique for holding the warp of the warp-weighted loom in place. Mostly very simple techniques were used in Scandinavia until around the 2nd century CE where occasionally borders made in more complex weaving techniques and finer yarns are found. Around the 5th century CE, highly complicated tablet-weaving techniques are used, as for instance in the finds from two chieftains’ graves from Norway, Evebø-Eide and Snartemo with borders decorated with animal figures and geometrical patterns. At this time, also a very special tablet weaving technique is seen in the archaeological material in Scandinavia and England. A simple tablet-woven border was given a surface of coloured horsehair wrapped around the warp threads in patterns while weaving. Some scholars have seen this technique as a way to imitate a silk surface (Nockert 1991, 103). This points towards a quite new technique of tablet weaving – the brocaded borders, where a simple tablet-woven ground weave is adorned with a brocade thread of silver or gold often covering most of the surface with geometrical patterns. The first tablet-woven brocade bands in Northern Europe derive from the 5th century CE. Numerous sites in 6th to 7th-century England attest that, the brocade material comprised flat strips of gold, later throughout Europe the metal threads were often very thin, flat metal strips wounded around a silk core, but also samples with solid silver brocade are known. Well-preserved samples of both types are known from Viking Age Birka in Sweden and Mammen in Denmark. Later such tablet-woven brocade bands were used on liturgical vestments like mitres, maniples, chasubles and stoles throughout the Middle Ages. One of the most famous finds is the Anglo-Saxon vestments of St Cuthbert from Durham dated around 916 CE where the maniple and stole were embroidered and along the edges tablet-woven borders of red silk and gold had been sewn (Fig. 5.2).

Fig. 5.1: How to weave using tablets: A: Four warp threads are put in each tablet. Twisting the tablet around makes some threads move to the top of the tablet and some to the bottom. B: When put together, several tablets form a band loom. They hang freely in the air and after a weft is passed, the tablets are twisted around a horizontal axis and the weft beaten in (© Lise Ræder Knudsen).
Museums with ethnographical collections often have samples of brocaded tablet weaving. Examples from Yemen, Israel, Spain and Sicily, among many others, are known. Even today, the same weaving methods and patterns are used in, for instance, Morocco and Tunisia.

To my knowledge, not many finds of tablet weaving from an archaeological context are known from outside Europe, but very many examples of tablet weaving are known from modern times throughout the world. To mention just a few: In Turkey rather coarse bands in simple techniques with patterns in different colours are used, for instance for bridles. The same weaving technique but used with finer yarns is part of the Norwegian traditional costume from Telemark (see chapter by Klepp et al., in this book, where in Fig. 26.3, the lady who is 2nd from right wears a traditional costume from Telemark with a wide tablet-woven belt, and also a smaller tablet-woven one twisted around in a spiral as a headband). It is also found as belts from China and Nepal (Fig. 5.3). In Iran, fine silk bands with double-faced weave bearing verses from the Koran are known. From Indonesia, bags made of many colourful double-woven bands sewn together are known and in Gondar, Ethiopia, huge silk wall hangings woven in a double tablet weaving technique are seen. Curtains from Gondar found partly at the British Museum’s collections and partly in those of the Royal Ontario Museum seem to be the largest tablet-woven textile in the world (Figs 5.4 and 5.5).
Moreover, there are bands woven in variations of the same double weaving technique from Tibet, Burma, India, Bulgaria, Caucasus, Greece, Israel and Java. Tablet weaving is found everywhere from Japan to North Africa and Iceland. But there is no evidence of tablet weaving from Australia, South Africa and the Americas (Schuette 1956). As can be seen here, tablet weaving is an ancient technique with many different pattern techniques. And a very interesting feature is that at times, ancient tablet weaving was made in very intricate and unknown techniques requiring a high mathematical ability on the part of the weaver.

The Technique of Tablet Weaving

In tablet weaving, little square plates of about $5 \times 5$ cm with a hole in each corner form the loom. In each corner of a tablet, a thread is drawn and a number of tablets each having 4 threads is collected in a bunch like a set of cards (Fig. 5.6). Another name for tablet weaving is card weaving. The tablets can be made of different material: bone, wood, leather and recently cardboard and plastic. One end of the threads is secured and fastened in the end to a fixed point, the other end is secured and fastened in the belt of the weaver. The bunch of tablets is raised on their edge and now it is possible to turn the tablets around a horizontal axis parting the upper and lower
5. Ancient Running Animals: Tablet-woven Borders from China and Norway

Layer of threads and thus making a shed. A weft thread is passed through the open shed and the tablets turned again. The four warp threads of each tablet are thus twisted around each other and the many twisted threads of the border are kept in place by the weft thread. This is the simplest and most common variation of tablet weaving, but using different colours in different holes of each tablet, a different colour in different tablets or turning the tablets in different directions make it possible to make endless amounts of different and very complicated patterns. In modern times, mostly the more simple variations are seen, but in ancient times highly complicated techniques were also used. Indeed, some of these techniques have puzzled researchers for years.

Figs 5.4 (left) and 5.5 (right): Details of silk hanging used to conceal the entrance to the Holy of Holies (Q’edus Q’edusan) of a church in Gondar, Ethiopia measuring 3.06 m × 0.63 m; No. Af1868,1001.22AN295853 and No. Af1868,1001.22AN295855. The curtains are divided into panels each woven using more than 300 tablets. They may have been woven by Jewish or Arabic weavers using Chinese silk and it shows, among other things, King Bakaffa (r. 1722–1730 CE) and his family wearing blue ribbons as a sign of their Christian faith. Furthermore, the soldiers guarding the family are carrying weapons of Indian manufacture. This textile kept at the British Museum is an example of a truly global textile encounter; yet another curtain from the same church kept at the Royal Ontario Museum in Canada is believed to be the largest tablet-woven textile in the world measuring 5.22 m × 2.18 m (© Trustees of the British Museum).
A Case Study – Running Animals from China and Norway

Near the Silk Road at Fort Miran, south-east of the Taklamakan Desert in the western part of China a collection of textiles was found by the archaeologist Sir Aurel Stein in 1907 (Stein 1921). Although this was one of the earliest expeditions along the ancient Silk Road exploring archaeological remains, the excavations were carried out very carefully and the results published in both popular and scholarly books. Due to the careful excavation, it is possible to see that the textiles were found together with many paper scraps with Tibetan writing. This is why Stein concluded that the textiles, too, were of Tibetan origin. Today these textiles are on loan in London, at the Victoria and Albert Museum, and the British Museum. More than eight colourful fragments made in the tablet-weaving technique were found. The colours of the textiles are even today fresh, bright and colourful in pink, blue, yellow, red and green. The size of the fragments varies between a few square cms and larger fragments. The dating of the borders is 8th century CE. The textiles are extremely well preserved, even though textiles and other organic material normally will disintegrate and disappear after just a few years of burial. But the climate of the Taklamakan Desert is very dry as it is one of the places in the world that lies furthest from the sea, and the climate thus prevented the textiles from degradation.

The most spectacular item of the tablet weavings from Fort Miran is a beautiful broad textile made of two borders sewn together (Fig. 5.7) (Stein 1921, 483). At the
smallest and upper part of the border, running animals in white on a blue background are seen. The animals are nearly identical and they are running at full speed to the left. The animals are depicted in a lively manner, and both fore- and back legs are raised high to show how fast they are running. It is not immediately clear which animal it is, but the legs have two toes each and at the back of the head something curly is seen. The tail is curved and slim, and curled at the end. In scholarly literature, these animals are interpreted as lions.

The yarn used to produce the border is thin and evenly spun (Fig. 5.8). It looks like very fine sheep wool, but in fact it is made out of yak wool (Ryder 1999). The yak is common in some parts of Tibet, and both a large, brown or black wild form – and a smaller domesticated yak is known. The domesticated yak can have wool of many colours, among them white. The yak is used for travel, for working the sparse fields, for transport, for meat, milk and butter, for wool, skin, and as a pack animal. The wool of the yak varies in quality: The coarsest fibres come from the belly and are used for felt needed for, e.g. tents. The middle quality wool comes from the sides and the rear part of the animal and is used for bags and blankets, while the wool of the neck is extremely fine and resembles the finest wool like Kashmir or Pashmina. The wool used to produce the fine borders from Fort Miran was white and it is obvious that it must have been dyed even though we do not have any dye analysis of the yarn. The dyestuff used to produce the very fine colours was normally from plants and sometimes insects.

Fig. 5.7: Tablet-woven border dated about 800 CE from Fort Miran in the Taklamakan Desert in China. The border with the animals is sewn together with another border in a red geometrical pattern also woven using tablets. The yarn is made of the finest white yak wool and dyed. The border with the animals was woven using about 40 tablets and the border with its geometrical pattern needed at least 180 tablets, in all about 880 threads were used. This fragment is at present in the British Museum, MAS.622. At the Victoria and Albert Museum, London, another fragment of the same border is kept, and even if it is less well preserved, it is wider than this one. The entire width of the two borders is at least 20 cm (© Trustees of the British Museum).
The pattern with the running animals is woven in a complex tablet technique called 3/1 double faced broken twill, where the warp threads jump over 3 weft threads and then go under one weft thread. The tablets each had 2 white threads and 2 blue threads. If one tablet threaded like this is turned twice forwards – twice backwards – twice forwards and so on while inserting a weft for every turn, the colour will remain white on one side and blue on the other. If you displace the turning sequence of the tablets but still turn the individual tablet twice forwards, twice backwards you will still have a band which is white on one side and blue on the other, but now with a diagonal structure. If you then change the turning direction of single tablets, and do it at exactly the right time in the turning sequence, then it will be possible to make a pattern like the running animals. Likewise, the geometrical pattern on a pink and red background on the other border under the running animals can be achieved in somewhat the same way. For the edging of the running animals, 11 tablets of different colours were used at the upper edge and for the animal pattern, 29 tablets were used – all in all 40 tablets. This border was sewn together with the tablet-woven border with the geometrical pattern. This border was woven using at least 180 tablets and each tablet was threaded with a yellow, a dark blue and two red or pink threads.

There are more tablet-woven borders in the same technique preserved from Sir Aurel Stein’s excavations in Fort Miran, but to my knowledge there are no other finds.

Fig. 5.8: Detailed close up of the tablet-woven border dated about 800 CE from Fort Miran in the Taklamakan Desert in China at present in the collection of the British Museum, MAS.622 (© Trustees of the British Museum).
in the special 3/1 double-faced broken twill in China. From Urumqi on the north-eastern part of the Taklamakan Desert, a tablet-woven band was found, which seems to belong to an earlier period. It is made in a double weave with a lozenge pattern and is well preserved with yellow, red and brown colours (Schorta 2001, 100).

Some of the fragments from Fort Miran seem to be scraps and cuttings left over from the starting point of a tablet weaving. This fact makes it probable that these borders were actually produced at Fort Miran, although the yak thread could not have been produced in the area near Fort Miran, as the yak lives in altitudes higher than 3000 metres while Fort Miran is situated near the basin around 600 metres (kind information from anthropologist Ellen Bangsbo). However, it is reasonable to believe that yak fibres were traded as a regional commodity along this part of the Silk Road.

Such tablet-woven borders woven in the complicated 3/1 double-faced broken twill technique are very rare in archaeological finds from prehistoric times, but small fragments are occasionally found. In Scandinavia, we see the first finds from around 200 CE, and around 450–500 CE some of the most spectacular and complicated borders produced by tablet weaving are found – and among these, a well-preserved 3/1 double-faced broken twill border from a chieftain’s grave in Evebø-Eide in Gloppen, Norway – a dark blue border with red animals (Fig. 5.9) (Nockert 1991, 94–96). The animals of this border are all different and some of them seem to have the legs downwards and some the legs upwards. It is not immediately obvious which kind of animals they are but one of them has many details in common with the animals on the Chinese border from Fort Miran. This animal depiction has four legs with two toes each, a tail which points up and backwards and something on top of the head which could be horns or ears and an open mouth and an eye very like the running animals from Fort Miran, even though it does not seem to be running as fast – it merely tiptoes (Fig. 5.10). The technique used to produce the band is exactly the same and also in this band, the pattern is produced using threads of two different colours. Here, the tablets are threaded with two blue threads and two red threads.

The material used to produce the Norwegian border is sheep’s wool and the quality of the border and the other textiles of the grave leave no question of the place of production. It was homemade in Norway. Also borders with geometrical patterns are found in 5th-century CE graves of Norway, for instance from a chieftain’s grave in Snartemo (Nockert 1991, 63–64). Here, a pattern-woven tablet border was found with a geometrical decoration made in nearly the same technique and with a resemblance to the geometrical pattern on the Fort Miran border.

The tablet-woven borders from Fort Miran and Evebø-Eide have so many details in common that it is tempting to look for a connection. In favour of a connection is the relationship between the geometrical animal designs – even if we cannot fully identify the animals – and the technical opportunities of the 3/1 double-faced broken twill. It is intriguing to note that the weavers in Norway and Fort Miran have chosen exactly the same technical solutions for depicting details like the eyes, the shape of the legs, and the way the diagonal lines break the basic structure of the weave in order to enhance the shape of the animals – something which is not at all easy to achieve.
So is this a coincidence or is there a connection? It is difficult to say – a safe answer would be that this is an example of parallel evolution and that these phenomena occur in cultural history as well as in natural history.

Yet, a more interesting assumption would be that this textile-technical ‘encounter’ could be an indication of trade routes and long-distance connections still to be investigated. Many other materials, techniques and crafts were developed several thousand kilometers away but still found their way to the other end of the world. For instance, the fact that silk came to Northern Europe via the Silk Routes could indicate that techniques, patterns and artefacts also travelled in the opposite direction.
A tablet-weaving technique known in Norway around 450 CE becomes evident in Fort Miran, made in yak wool, a few hundred years later – at the same time where silk becomes an available commodity in Northern Europe – why not?

Acknowledgements

I thank Sophie Desrosiers, Ecole des Hautes Etudes en Sciences Sociales, Paris, who first invited me to study technical analyses of the tablet-woven borders from Fort Miran; Helen Persson, Victoria & Albert Museum, London for kind help and information while studying the fragment; Svein Indrelid, Bergen Museum for permission to use pictures from Evebø-Eide; Veronika Ronge, University of Bonn for discussions on tablet weaving in Tibet; Mogens Koch from the Royal Danish Academy of Fine Arts, School of Conservation for digitalization of pictures from Evebø-Eide; and many thanks to Michael Højlund Rasmussen and Bjørn Højlund Rasmussen for inspiring discussions and help with digital improvement of the pictures.

Further Reading

The record of the Chinese border with running animals at the V&A: http://collections.vam.ac.uk/item/O91172/fragment-the-stein-collection/
Free download of Sir Aurel Stein’s books on the excavations along the Silk Road: http://dsr.nii.ac.jp/toyobunko/creator/marc_aurel_stein.html.en