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The Social Fabric: Deep Local to Pan Global

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Mashru Redux: From the Calico Museum in Ahmedabad to a Loom in the Great Plains

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Introduction

The Calico Museum in Ahmedabad, Gujarat, India has a small but stunning collection of warp ikat mashru fabrics on public view. Mashru is commonly defined as an Arabic word that means “what is ordained by the law” or “permitted.” The key characteristic of mashru relates to this prohibition for Muslim men. The fabric, also called *misru* or mixed, is typically made with a silk warp and cotton weft and is usually woven in satin weave, with the silk on the face of the fabric. When stitched into a garment the cotton touches the skin and the silk faces the world. The literature differs on why pure silk is not “permitted” for Muslim men, but is acceptable for women. Numerous hadiths speak to the use of silk fabrics and Yusuf Ali enumerates some of them in his monograph on silk, specifically stating “there is an exception to this rule in time of war and in time of necessity: e.g. to avoid great cold or the plague of lice; also in the case of borders of various kinds” if the border is narrower than four inches. Carpets, cushions, and book covers are also excluded as the “prohibition extends to wearing apparel alone”.¹ In addition to apparel, mashru was used for other interior applications such as cushion covers.²

Mashru was produced in many centers of India and had diverse possibilities for the patterning and naming of the cloth (fig. 1). Some types used warp resist dyeing, but not all. In 1878 George Birdwood wrote “These mixed stuffs are also found plain and checked and figured, and are largely made in the Punjab and Scinde, at Agra, and Hyderabad in the Deccan, and at Tanjore and Trichinopoly.”³ Some mashru fabrics include narrow warp strips of pattern weaving in between colorful bands of satin weave, either in solid colors or warp ikat. The fabric that I am most interested in, and have been trying to reproduce from a technical point of view, is warp ikat mashru, specifically the pattern known as *khanjari*.

Fig. 1. Fragment of mashru (silk faced, cotton-backed weave), with red, green and yellow stripes, Surat, c.1855; 0301(IS)
Transferred from India Museum 1879. © Victoria and Albert Museum, London

¹ Yusuf Ali, *A Monograph on Silk Fabrics Produced in the North-Western Provinces and Oudh* (Ahmedabad: Calico Museum of Textiles, 1974), 121-122.

² John Forbes Watson, *The Textile Manufactures and the Costumes of the People of India*, (London: 1866), 97.

³ George Birdwood, *Paris Universal Exhibition of 1878: Handbook to the British Indian Section*, (London: Offices of the Royal Commission, 1878), 85

Yashodhara Agrawal, writing in an essay titled “Mashru as a Trade Textile,” translates *khanjari* as “dagger” referring to a single arrowhead motif.⁴ *Khanjari* also describes a wavy line pattern. Agrawal notes that *alacha* or *alaja* was the word used for this fabric before *mashru* came into common use. She speculates that *alacha* may have been derived from the Sanskrit word *alasa* meaning “swan-footprint patterned creeper” and could refer to the arrowhead pattern found in many *mashru* fabrics of Gujarat. She and others point out that the lower garment of Queen Sivali in a painting in Ajanta Cave One from the fifth century AD is patterned with warp resist, suggesting that this fabric has been in production for well over a millennia.⁵

Indian Museum Collections of Mashru

The work in the Calico Museum is organized primarily by type, with the ikat *mashru* examples located with other resist dyed fabrics. Since it is impossible to take photographs inside the museum, I do not have any pictures from their collection. Sketching is difficult because the galleries are only available while on a closely timed public group tour. Elsewhere, I have never found examples of some of the ikat *mashru* patterns the Calico Museum has on display, although I have looked at many museum digital archives and downloaded examples of every type of ikat *mashru* I can find. According to a note to in an essay published in 1980 by Alfred Bühler “A large collection of old *mashru*-textiles has been presented to the Calico Museum, Ahmedabad, recently which could not any more be included in this catalogue.”⁶ According to Rahul Jain, these textiles came from the “Jaipur City Palace and the Jaipur City Palace Museum still holds the original *mashru* fabrics in its collection.”⁷

The best public catalogue documenting *mashru* artifacts is the volume titled *Textiles and Costumes from the Maharaja Sawai Man Singh II Museum* by Chandramani Singh. In it Singh identifies over 300 examples of mixed fabrics, with at least 200 noted as *mashru*. This part of the collection largely ranges from the eighteenth to nineteenth century, with the length of a typical fabric between five and seven yards and the width 20” to 26”. In spite of the numerous examples, only two of them are represented, both from 1800, and those are in black and white. Rahul Jain’s volume *Textiles & Garments at the Jaipur Court* reproduces a few color examples of the *mashru* from this collection.

Ikat Technical Research

In 2009 a Fulbright Nehru senior research award in Gujarat, India, allowed me to spend five months studying warp ikat from an artist’s perspective. I was fortunate to document master weaver, Vitthalbhai Vaghela, from the Surendra Nagar district of Gujarat while he prepared a warp for resist dyeing. He had learned the art of double ikat in Rajkot and brought the method to his village, Somasar, where currently they weave single weft ikat. Previously, the village wove *khadhi* cloth. Some weavers in this area maintain the knowledge of double ikat. What is important here, is the transmission of technique happened very quickly and is part of my argument for why I believe warp ikat *mashru* fabric was technically related to the warp resist

⁴ Yashodhara Agrawal, “Mashru as a Trade Textile,” Rosemary Crill, ed., in *Textiles from India*, (Kolkata, India: Seagull Books, 2006), 333

⁵ Ibid., 329.

⁶ Alfred Bühler, Eberhard Fischer, and Marie-Louise Nabholz-Kartaschoff, *Indian Tie-dyed Fabrics*, (Ahmedabad, India: Calico Museum of Textiles, 1980), 147

⁷ Rahul Jain, email message to author, October 20, 2018.

binding used to create double ikat, or the patola patterns from Patan, Gujarat, and may predate it. The Ajanta cave painting depicting chevron warp ikat predate wall paintings depicting patola in present day Kerala.⁸

I learned how the master weaver grouped the warp into basic units for binding the resist and dyeing. Typically, in Gujarat the size of each thread grouping is eight threads, however the number can vary. The groups of eight threads, or binding units, are systematically gathered together according to the structure of the repeating pattern as part of the preparation for binding. A warp 36" wide might be composed of six narrower warps, which would be interlaced together. None of the literature before 1945 mentions this step specifically, however this interlacing of the warp is the process that has been protected from documentation historically and is the first stage of warp preparation after winding out the full length of the warp in sections. That is, the full width of the weaving is wound section by section according to the pattern repeat. The warp threads of like patterns are interlaced together, grouping the consecutive binding units of each individual warp together so the binder has only to bind the pattern once in the width of the repeat. This stage has been documented sparingly because it has been a carefully guarded secret, as I discuss below. I had to surmise how this procedure is executed because the master weaver did it in my absence on the first evening of our work together after I had left, however I was able to question him adequately to ascertain the method before he moved on to the next step.

Secrecy and Interlacing the Warp

Eberhard Fischer and Alfred Bühler wrote in 1979 in the classic two-volume work *The Patola of Gujarat: Double Ikat in India*, the “stage of preparing the warp for resisting, i.e. of bringing together sections identical in pattern before tying, had not been studied in detail till recently.” Several twentieth century observers had briefly noted the warp was put on a rectangular frame. Further, Fischer and Bühler wrote, “patola weavers are reluctant to demonstrate this step of the process completely” and that “the individual steps are different for each part of the sari and also for different types of saris, it is practically impossible to give a complete description of this step of the process.”⁹ At the time Bühler and Fischer were observing the patola weavers, they were experts in the craft, having already published numerous essays on warp ikat. They go on to write in more detail than other published works about how the weavers assemble and fold the warp in preparation for the binding. It is this precise step of interlacing the warp that I believe historically the ikat mashru weavers would have used to produce such regular patterning.

The Historic Record

A handful of nineteenth and early twentieth century texts from the Colonial British report on mashru weaving, but provide little detail about the process. The firsthand observations published in the accounts of J. Forbes Watson, George C.M. Birdwood, Yusuf Ali, and Sir George Watt, dating from 1873, 1880, 1900, and 1903 are limited in specifics regarding the key technical points of the manufacture of warp ikat mashru. It is important to note that these authors were not originally experts in textile production.¹⁰ A primary goal *The Textile Manufactures and the*

⁸ Alfred Bühler and Eberhard Fischer, *The Patola of Gujarat: Double Ikat in India*, vol. 1 (Basle, Switzerland: Krebs AG, 1979), 228.

⁹ Ibid., 304. See discussion of early archeological evidence for Indian patola.

¹⁰ For example, Forbes Watson was a doctor by training. He served as assistant surgeon in the Bombay army medical service from 1850-1853. Yusuf Ali, born in Mumbai (Bombay) was an Islamic scholar and barrister.

Costumes of the People of India by John Forbes Watson was the expansion of markets for textiles produced in England.

Forbes-Watson writes in his introduction:

About two hundred millions of souls form the population of what we commonly speak of as India; and, scant though the garments of the vast majority may be, an order to clothe them all would try the resources of the greatest manufacturing nation on earth. It is clear, therefore, that India is in a position to become a magnificent customer. She may still be this, and yet continue to seek her supplies in part from herself; for to clothe but a mere per-centage of such a vast population would double the looms of Lancashire.¹¹

The most quoted of the above authors regarding mashru production is Yusuf Ali. In his 1900 publication, Ali says the khanjari pattern as “is obtained by dyeing portions of the warp threads in a peculiar manner” with no clarification of the nature of this “peculiar manner.” He reports “for *mashru* fabrics the warp threads are tied up in bundles of 10 to 14 together at intervals which vary with the fineness of the wavy pattern ultimately required.” This sentence is puzzling; he is not specific about this procedure. What “warp threads” and what “bundles of 10 to 14” are tied up together? How does this process determine “the fineness of the wavy pattern?”¹²

In the previous section he wrote “for a fabric of a width of 14 *girahs* [a girah is a unit of length] or 35 inches, a warp of 3,600 threads would be required.” For a warp of 3,600 threads we need to understand what the bundles are composed of, how many threads are in them, and how they relate to the work of the binder. Are they bound uniformly across or bound into the desired pattern? The threads of an entire warp are too bulky to bind at once and resist a consistent length. Ali goes on to say, “in fact the quality and price of superior qualities of *mashrus* are gauged by the number of undulations that there are in a given length of the wavy line. The standard length is generally taken to be a span of 7 ½ inches.” In weaving terms, length generally means along the warp direction, however here he seems to be talking about the width of the fabric. A fabric from the Metropolitan Museum of Art, dated eighteenth or nineteenth century has 43 undulations in a fragment 10” wide and an eighteenth-century plain weave example (fig. 2) from the Philadelphia Museum of Art has 68 peaks across a sample of 14 9/16.” This is consistent with Ali’s statement that “thirty *khanjaris* in that length would be considered to make ordinary *mashru*; 45 would be considered very fine.”¹³ These two examples would be “ordinary.”

¹¹ John Forbes Watson. *The Textile Manufactures and the Costumes of the People of India*. (London: 1866), 1.

¹² Yusuf Ali, *A Monograph on Silk*, 48.

¹³ Ibid., 47-48.

Fig. 2 Artist/maker unknown, Woven Textile (*Khanjari Mashru*), Indian, 18th century, Ikat-dyed silk plain weave
 5 7/8 × 14 9/16 inches (15 × 37 cm), Philadelphia Museum of Art,
 Purchased with the Keehmle Fund, 1928, 1928-29-20

Ali describes the binding in one sentence, “the warp threads are tied up in bundles by means of short strips of a well-known bark called the *Bhoj-patr* (the bark of a species of Birch), and then the whole mass of thread is put into the dye-stuff.” Indeed that the resist material is bark is interesting, but he provides no details about where the binding goes on the warp. The reader cannot decipher how the warp is set-up for the binding procedure—is it stretched full length in the yard, is it stretched on a frame, how many threads are enclosed in a binding?

The next brief section describes how the warp threads look after dyeing:

The threads having been dyed in portions only, it follows that each thread is, say, one-eighth of an inch yellow (the dye now given) and the same length red (the original dye). If the threads are now laid alongside, there will be alternate bands of yellow and red. In order to produce the angular wavy line, the ends of the threads are now arranged unequally. Suppose the threads are taken in systems of nine each. The points of the ends are so disposed that a line traced through them would form an acute angle of 36°. Thus:—

When the whole of the warp threads are thus spread out, the wavy *khanjari* pattern is obtained, yellow on a ground of red. The next process is weaving the fabric.¹⁴

This quotation seems to form the basic explanation of *mashru* production for future writers. Ali’s entire discussion of *mashru* production is less than a page long and is the most complete turn of the century record available.¹⁵ As of this writing in 2019, I was not able to secure a copy

¹⁴ Yusuf Ali, *A Monograph on Silk*, 48.

¹⁵ *Ibid.*, 47-48.

of the 1961 Census of India document on mashru production in Patan mentioned in several texts, but I believe it was written too late in the production of ikat mashru to get a dependable description of how such an important trade textile was produced, furthermore, it evidently does not offer new information regarding production. Bühler and Fischer indicate “the actual processes of making the ikat patterns are not mentioned” in the Census text.¹⁶

Bühler and Fischer pointed out that more than likely the original color of the yarn in Ali’s discussion above was yellow and it had been dyed red.¹⁷ Ali implied that the warp now was dyed uniform rows of red and yellow and all that needed to be done to make the mashru was to “arrange” the threads to make the angular pattern. However silk threads are not so easily shifted after they have been compressed, wetted, and dyed. I am skeptical that anyone could maneuver 18 threads into an acute angle, let alone 3,600 threads. At this point, Ali completed his discussion of mashru and returned to a general discussion of the weaving room, tools, and tying on the warp, with no specific mention of the tasks required to set this special kind of warp onto the loom.

Sir George Watt elaborated on binding the warp in his discussion of the exhibition of *Indian Art at Delhi 1903*. He wrote that it was not until Ali had written about ikat mashru in his monograph on silk weaving three years earlier that mashru fabrics received much attention, even though “they constitute one of the most significant of Indian textiles.”¹⁸ He observed the process of tying in Benares and wrote “the warp is stretched and held tight. The men have given them small strips of birch bark from 1/16th to 1 inch in breadth, according to the form of mashru desired. These strips they cleverly roll up and cause to encircle a certain number of threads of the warp.” Note the specific language “form of mashru desired” and “cause to encircle a certain number of threads of the warp.”¹⁹ The *tanbandhas*, the individuals who bound the warp, played a crucial role in the procedure, selecting which threads they needed bind to achieve the pattern, however, Watt did not elaborate on how the pattern was achieved. He also notes that the mashru pattern is determined at the binding stage. This could simply be the length of the resist, but it could also be the actual configuration of the chevron or dagger pattern. He said, “it is then dyed and the strips of bark removed and when being arranged on the loom it is so adjusted as to cause the dyed portions to produce wavy lines (called the *khanjari*) across the breadth of the cloth.”²⁰

It is unlikely Watt witnessed the development of the *khanjari* pattern after removal of the binding and the steps required to put the warp on the loom. Possibly he relied on Ali’s recently published account. The argument that the pattern was arranged from a single set of binding across the width of the warp after the resist was removed seems implausible to me. The sparse commentary on process found in late nineteenth and early twentieth century documents does not adequately detail what the writer means when he uses the word “arrange” the warp. I question the theory that the weaver or loom preparer would have been responsible for tying the warp onto the loom in such a way that the pattern would emerge systematically. This labor would require a

¹⁶ Bühler, Fischer, and Nabholz-Kartaschoff, *Indian Tie-dyed Fabrics*, 88, 90, 151.

¹⁷ *Ibid.*, 147.

¹⁸ George Watt, *Indian Art at Delhi, 1903: Being the Official Catalogue of the Delhi exhibition, 1902-1903*. (Calcutta: Superintendent of Government Printing, India, 1903), 255.

¹⁹ *Ibid.*, 256.

²⁰ *Ibid.*

consistently minute shifting of the end of the warp, in the desired pattern system, to create a uniform zigzag pattern down the length of the warp and across up to 3,600 threads.

A photograph of an older woman named Mani ma Darji supports the notion that the warp threads are bound in one bundle and somehow pulled or shifted after they have been dyed.²¹ By 1977 when Bühler and Fischer interviewed her in Patan, ikat mashru was almost non-existent. In fact, she was the only person binding yarn for mashru, although 40 years earlier she had bound warp for patola fabric. About mashru the authors wrote only that “the warp-sets are drawn in such a way that a pattern of angles or waves is produced when woven.”²² This description is remarkably similar to the text Ali wrote quoted above. Neither they nor any of the others whose writing I have found on this procedure have elaborated on how the warp handlers could accomplish an accurate shifting of the threads as they dressed the loom. While this method may have worked for fabrics that did not require precise patterns, it does not make sense historically.

The task of the craftsman who tied the new warp onto the preceding one in the required chevron shape seems an arduous a job when the work could be made much simpler if narrow warps were interlaced, divided into groups according to the desired pattern, resist bound, dyed as one warp chain, and then arranged into the pattern as the threads returned to their original winding order. In other words, could these early observers have overlooked, or been forbidden to see, the early step where the warp was interlaced and grouped, and only saw the binding process, the results of the dyeing, and the separating out of the silk threads? In this case, it would look like the warp handlers were “arranging” the threads as they returned them to their original thread by thread or threading cross order.

In the scenario I propose, the artisans would remove the bindings from the previously grouped threads, spread the warp apart, returning it to it’s original thread by thread cross so the desired pattern would be revealed. I further propose that the finest ikat mashru fabrics that show a clear, consistently repeating resist pattern across the warp or in groups with intervening stripes, must have been made using a systematic binding method that grouped units of warp threads together according to the desired pattern. The patola weavers did a sophisticated version of this in Gujarat to create complex figured designs. According to Fischer and Bühler’s text, the mashru weavers of Patan worked in the same streets as the patola weavers, winding out their warp.²³ It is easy to imagine that they would be familiar with each other’s methods.

An 1851 account in Gujarati states mashru was produced by 36 separate people.²⁴ This suggests that the process for manufacturing the older textiles involved a significant series of steps and expertise. It is possible that in the waning days of production various steps were simplified and eliminated. Alternatively, more economical production of ikat patterns could have relied on simplified procedures, including a simple binding process and shifting of the warp. Perusal of extant fabrics suggests that some examples could have been made using a uniform binding of the warp, relying on the person who tied the warp to arrange the pattern, however fabrics with a high

²¹ Bühler, Fischer, and Nabholz-Kartaschoff, *Indian Tie-dyed Fabrics*, photographic plate 51 B.

²² Bühler and Fisher, *Patola of Gujarat*, 261.

²³ Ibid., 250.

²⁴ Bühler, Fischer, and Nabholz-Kartaschoff, *Indian Tie-dyed Fabrics*, 147.

degree of regularity seem to follow a more systematic method. To support this idea, I began to analyze images of fabric fragments to see if I could find a repeat across the width. I am in the beginning stages of this analysis (fig. 3 and 4), but it appears convincing and will be the subject of future work, and fits with Ali's measurement of seven- and one-half inches for a span of undulations in the width of the fabric.

Fig. 3 Kanjari Mashru, 18th century, India

Ikat-dyed silk warp and cotton weft, compound satin with silk supplemental warp

10 5/8" x 7 1/8" (27 x 18.1 cm), Accession Number: 1928-29-30b

Philadelphia Museum of Art, Purchased with the Keehmle Fund, 1928

Section of top row of left side of fabric, columns 1-9, pasted over right side to show the similarity in the kanjari pattern between peaks in set one of columns 1-9 and the second set which is directly below on the right

Fig. 4. Textile, fragments, woven cotton and silk (mashru), Varanasi, ca. 1855

Museum number: 9741A/(IS); Transferred from India Museum 1879.

© Victoria and Albert Museum, London

Left section with selvedge pasted over interior section of fragment to show possible alignment of binding groups, red line added.

Contemporary Efforts at Ikat Mashru in India

I observed two different workshops attempting to recreate the mashru effect—in Hyderabad and in Patan—both areas where historically fine examples of ikat mashru were produced. In both cases the twenty-first century weavers' strategy was to resist dye warp in uniform bundles, put the warp directly onto the loom, and allow the natural shifting of the threads create the mashru

pattern. To my eye, these efforts were not successful. No regularity of design developed on the cloth. According to the theory that the warp bundle was dyed in uniform sets at intervals along the length of the warp, the real task of creating the design relied upon the effectiveness of the individual who tied the new warp onto the old warp or onto the front of the loom, depending the type of loom in use. This person must have tied each individual thread in accordance to the desired pattern and would require meticulous effort to consistently and systematically shift up to 3,600 threads as noted above. In the case of the example from Hyderabad the warp appeared to be tied onto the back beam directly with no attempt to create a pattern. Compared to the complex patterning of a patola, it would be a relatively simple matter to divide a warp into groups of two, four, or five and bind them to achieve a zigzag or khanjari pattern.

A Better System

Why use a less effective system for generating a repeating pattern when a better one is already in place? Not only did textiles migrate through trade, people also shifted locations, bringing their expertise with them. Within India weavers from Gujarat settled in other centers of mashru production. The *Gazetteer of Aurangabad* reports in 1881 the “settlers from Gujarat speak and dress in the Gujarati style, and are weavers of mashru.” Aurangabad was home to hundreds of mashru weavers split between males and females, Hindus and Muslims. Twenty-seven men and women sold mashru.²⁵ Textile scholars speculate that India introduced the ikat technique to Yemen as a result of trade with India at a very early date.²⁶ After visual analysis and reconstruction of a Yemeni ikat, I conjectured that the finer examples of the diamond and chevron patterns found in Tiraz fabrics were produced using counted thread groupings. While the precision of the ikat varies in examples I have examined in on-line collections, in a high-resolution image I was able to count threads in the diamond patterns (fig. 5) concluding that units

Fig. 5. Left: Ikat tiraz, 960-980, Yemen, San'a', Zaydi Imam period, resist-dyed warp (ikat); plain weave with inscription: cotton and gold leaf, Overall: 60 x 63.4 cm (23 9/16 x 24 15/16 in.). Purchase from the J. H. Wade Fund 1950.353 Cleveland Museum of Art Right: Ikat reconstruction, cotton, madder root and weld. 2018 by the author.

varied from six to eight threads per binding unit. If the procedures used for binding the warp in groups took root in Yemen as early as the ninth century, and probably earlier, it seems reasonable that the warp binders at disparate locations in India would be knowledgeable of the technique as well.²⁷

²⁵ His Highness, Nizam of Aurangabad. *Gazetteer of Aurangabad*. (Bombay: The Times of India Steam Press, 1884), 240-241, 258, 314. See Bühler and Fisher, *Patola of Gujarat*, for discussion on weaver migration, 326-334.

²⁶ Rosemary Crill, *Indian Ikat Textiles*, V & A Publications, 1998, 150; Bühler and Fisher, *Patola of Gujarat*, 334.

²⁷ Orit Shamir and Alisa Baginski. “The Earliest Cotton Ikat Textiles from Nahal ‘Omer Israel 650–810 CE,” in *Global Textile Trade*. Edited by Marie-Louise Nosch, Feng Zhao and Lotika Varadarajan, (Philadelphia: Oxbow Books, 2014), 65-73. Writing about a group of cotton ikat textile fragments found in Israel at a site called Nahal

Bühler and Fischer described the preparation of double ikat in far more detail than any discussion of mashru. In Patan, production of patola varied from exclusively in-house, which is certainly the case in the present day, to more typically before World War II, the work was parceled out. A clear division of labor existed with a master-weaver in Surat, Gujarat responsible for distributing the silk thread for binding, dyeing, and weaving to various specialists. The weavers in Patan received prepared yarn via mail from Surat. That is, specialists in Surat, typically, but not always Muslim, wound the warp, bound the resist pattern, dyed the warp and weft thread, and removed the resists before sending it out for weaving by the Hindu weavers. From Patan, they sent the woven fabric out by post to be sold through the master weaver. In other cases, interview subjects reported in Patan, the Hindu Darji, members of the tailor caste, both wrapped and dyed the warp thread for the Salvi weavers.²⁸

Ikat mashru has not been revived in India. In fact, the boom in international trade was centuries ago. Already in 1880, when *The Industrial Arts of India*, by George C.M. Birdwood was published, mashru was going out of style. Birdwood writes, “considerable quantities of silk goods are manufactured at Surat. Mashru and elaicha, of mixed cotton and silk, formerly much used, are now going out of fashion.”²⁹ At the peak of the trade, mashru was manufactured throughout India, however in the twentieth century production of ikat mashru declined sharply. In 1940 the Patan Weaving Factory began weaving mashru, causing the remaining handloom producers to suffer even further.³⁰ I visited one household in Patan in 2015 that was weaving loom-controlled mashru, however they were not able to tell me about ikat mashru.

Binding Systems to Reinterpret Ikat Mashru Weaving

The Victoria and Albert Museum has a substantial collection of mashru fabrics available on-line. I brought the images into my weave software program that automatically pixilated the file image. I made graphic representations of the patterns I found and generated templates for binding systems. As I analyzed the mashru images, I found systems common to shifting of one group of a fixed number of threads relative to another group. I tested out my idea for dividing the warp into binding groups to create a zigzag line effect with sets of warp threads gathered together into groups. In workshops I provided variations for participants to use to generate a larger set of samples testing out this theory. The most fundamental shift in ikat mashru appears to be based on two sets of threads: one group of a fixed number of threads form the top peak of the zigzag and the next group forms the lower extreme, with the two groups overlapping where the bottom of the first meets the top of the second. Thus, I began to generate multiple examples of resist bound fabric, executed by a range of people, novices to ikat, using this proposed binding system for mashru ikat.

²⁸ ‘Omer, carbon dated to 650 to 810 CE the authors state “although we have no conclusive evidence regarding their origin, we believe that they were brought to the site by travellers from Yemen or India.”

²⁹ Ibid.

²⁹ George C.M. Birdwood. *The Industrial Arts of India*, (London: Committee of Council on Education by Chapman and Hall, 1880) 277.

³⁰ A. B. Trivedi, *Post War Gujarat: Economic Survey After World War 2*, (Bombay, 1949), 101.

The fabric is tabby or warp faced plain weave.

Fig. 6. In this student example, you can see that four threads make each step of the pattern.

The 2015 Handweavers Guild of America Conference in Milwaukee (HGA) was the first venue I tested this idea (fig. 6). Participants were successful in creating resist dyed examples of patterns like mashru over the two and one half day course. This class ran the process from start to finish, with winding the warp, setting the warp onto a frame to create the system needed for the desired resist, binding, mordanting and dyeing in a natural dye bath, and finally weaving.

I again offered a two and one half day workshop for the MidAtlantic Fiber Association (MAFA) however, this time the group wove their samples afterwards at home, allowing more time to design and prepare the warp and dye it. Typically, I provided the students five-two or three-two perle cotton yarn, increasing the scale of the thread we used about 100 times from the historic examples, making the structure of the binding visible. Warp resist ikat produces a feathery edge of the motif, inherent in the shifting of threads. This factor should be considered when examining samples to determine if the threads shift in groups of two, four, six or eight threads, or if they shift individually. In our examples, we were able to generate ikat warp resist patterns that are similar to the historic examples, but on a much larger scale, where it is easier to see the basic unit of the resist.

Warp ikat is actively practiced in India, notably in Gujarat, Telengana, Andhra Pradesh, and Odisha. Any of those weaving centers could take up a revival in ikat mashru and adapt the patterning to the contemporary marketplace with great potential in the apparel and home décor sectors. Since the weavers in these areas are already using methods for grouping the warp or weft for their ikat work, they could easily apply this technique of grouping the ends, regardless of the historic method.

*Display of warp resist on cotton following a two-week workshop at Penland School of Craft, June 2018, right
Fig. 7. Dressing the loom with warp resist pattern styled on ikat mashru at HGA Convergence in Milwaukee, left*

Further Research

Analysis of extant samples would help establish more accurately whether the historic artisans used a binding repeat. Examination of an uncut length of mashru fabric could reveal the actual length of a typical ikat warp. It would also allow the examiner to determine whether the warp had been folded when the warp handlers prepared the threads for binding. I would like to look at the fabrics under adequate magnification to count threads in each peak and valley of the fabric to establish the degree of consistency across the width of the fabric and see if a pattern emerges. I would like to graph out counted and measured sections of ikat to see if I can find a perceptible shift in the warp pattern based on a consistent number of threads, which would support the idea of fixed binding groups in the warp and would compare positively with the Gujarati method. In my initial examination of fabrics the count across the width of the fabric is generally consistent.

The tiraz fabric I analyzed from a higher resolution image, suggested to me that the number of threads in binding units varied across the motif, but they seemed to be consistent across the fabric. When I reproduced the tiraz pattern it was a simple matter to gather the warp threads into the various groups of different thread counts in a symmetrical system to produce the lozenge motif.

We know that weaving in India is accomplished through the efforts of many people working on specialized tasks. In the case of mashru, I want to know the various types of looms the ikat fabric was woven on and who attached the warp and how this operation was completed. This step is critical to understanding how ikat mashru was produced and whether the design was created in the tying of the warp onto the loom or if it had been achieved in the division of the warp for subsequent binding.

This exciting fabric is worth future study on multiple levels: its artistic appeal, its historic narrative about division of tasks between the Hindu and Muslim artisans, and its future economic potential for contemporary ikat weavers.

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