Inscribed Cotton Ikat from Yemen in the Tenth Century CE

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Compress Resist: Shibori, Clamp-resist, and Ikat 2.5 防染印花
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Abstract
More than a thousand years ago, Baghdad was capital of the Islamic empire under the Abbasid caliphs, and Yemen was a flourishing center of agriculture and trade. Among its famous products were dyestuffs, and cotton cloth with warp stripes, patterned using techniques of compression resist. As the strength of the Abbasid caliphate declined and claims to power gained hold in the provinces, regional artistic styles began to emerge. The rulers of Yemen adopted one of the prerogatives of the Abbasid caliphs, bestowing honor by rewarding their subjects with inscribed textiles called tiraz. From burial sites in Egypt, many such textiles have survived in fragmentary condition, often with warp fringes, and occasionally with Arabic inscriptions bearing historical names and dates, Qur’anic excerpts, and pious invocations. Acquired by dealers in the middle of the 20th century, they found their way to museums in Europe and North America (The Textile Museum, The Metropolitan Museum of Art, Cleveland Museum of Art, Royal Ontario Museum, Victoria & Albert Museum, David Collection, etc.). The carefully wrought Arabic inscriptions are executed in white embroidery or in black ink outlining an application of gold leaf applied to a plant resin. This paper presents the results of research and analysis of the outstanding holdings of The Textile Museum in Washington, DC, using microphotography, fiber and dye analysis, along with close visual observation, which yielded clear indication of sophistication and refinement of methods, suggesting collaboration among skilled dyers, weavers, embroiderers, and calligraphers in the manufacture of these elegant textiles, of which only fragments remain. The warp-resist patterns, the ornate Arabic calligraphy with serifs, flourishes and palmettes, and embroidered geometric ornament, all contribute to the definition of a strong regional style and emergent local identity in Yemen in the tenth century.

1. Introduction
1.1 Collections and Attributions
Numerous striped cotton textiles attributed to Yemen in the ninth and tenth centuries are held in museum collections today (figures 1–5). These textiles are distinguished by their characteristic multi-colored stripes effected by a warp-resist dye process, and Arabic inscriptions executed in hammered gold leaf or embroidery. With fewer than twenty fragments, The Textile Museum’s holdings comprise one of the largest collections in the world (Kühnel and Bellinger 1952).

Other important collections are held by the Islamic Museum in Cairo (Wiet 1935; O’Kane 2012, 304), Royal Ontario Museum in Toronto (Golombek and Gervers 1977), and The Metropolitan Museum of Art in New York (Schimmel 1992, figure 16), with additional examples in the Museum of Fine Arts, Boston (Britton 1938), and the Cleveland Museum of Art (figure 2).
The Textile Museum’s collection was acquired by the museum’s founder, George Hewitt Myers, between 1928 and 1952 from dealers in Egypt and Europe. Purportedly found in Egypt, these striped textiles are today attributed to Sana’a on the basis of inscriptions in which that city is referenced (Wiet 1935). Dating and attribution today is based both on inscribed historical data and calligraphic styles, which find parallels in contemporary coinage (Golombek 1988, 35 and figures 20-22) (figure 3).

The date range of ninth and tenth century is absolute, based upon inscriptions on several fragments, which provide dates from AH270/883AD – AH310/923AD (Lamm 1937, 144-47; Blair 1997, 100). Early archaeological finds of ikat-dyed cotton fabrics in Israel, also attributed to manufacture in Yemen, are dated by C-14 analysis to the early ninth century (Carmi and Segal 1995). Although an internal chronology has not yet been firmly established, Blair notes the names of imams and amirs of Yemen on three late tenth-century textiles. The correlation of these groups of textiles to the striped cloths of Yemen referred to in historical sources is presumed.

1.2 Ikat and ‘aqada
Woven in plain weave – the simplest interlacing of warp and weft – these Yemeni textiles bear striped patterns that are rhythmic and visually intriguing. The patterns are effected by a resist process known as *ikat*, in which sections of the warp yarns were selectively dyed in bundles before weaving (figures 1-5). Ikat is often considered to be a Malay-derived word commonly used to refer to warp-resist dyed textiles produced locally in Indonesia. Today the word *ikat* is used to denote such textiles from anywhere in the world (India, Guatemala, Uzbekistan), and even applies sometimes to printed textiles the patterns of which emulate this resist-dye process and historical technology. However, the patterns may come via Arabic as *‘aqada* is the root for the verb, “to tie” or “to bind,” and the derived nouns, *‘uqd/*‘uqud, occur in classical Islamic sources referring to knot or knotting (as in carpets). It is possible that Arab traders introduced ikat-dyeing techniques to Southeast Asia as early as the eighth century (Lamm 1937, 144; Bier 2001).

1.3 Arabic Inscriptions in Gold Leaf
Many of the textiles are inscribed in Arabic, executed calligraphically with applied gold leaf outlined with black ink (figures 1-3). Several of the Arabic letters are decoratively embellished and elaborately plaited (figure 3), sometimes rendering the inscriptions illegible. Blair (1989; 1997) has treated issues of legibility. Apart from aesthetic intent, some of the inscriptions convey historical data, pious expressions, good wishes, and Qur’anic excerpts (Kühnel and Bellinger 1952; Blair 1997; Blair 1989; Golombek and Gervers 1977; Britton 1938; Wiet 1935). Taken as a whole, the body of gilt inscriptions documented on Yemeni ikat of the ninth and tenth century are often dedicatory, bringing recognition to individual rulers and subjects (Blair 1989; Blair 1997). With decorative calligraphic flourishes, including interlacing, these inscribed textiles stand out not only as the products of advanced technologies in fiber preparation and dyeing in their time, but they also reflect the specialized art of the calligrapher (Bier 2001).
1.4 Embroidered Arabic Inscriptions

Other striped cotton ikat textiles from Yemen in this period have Arabic inscriptions carefully embroidered using undyed cotton yarn (figures 4-5) (Kühnel and Bellinger 1952; Lamm 1937). These inscriptions are executed in a much simpler unelaborated style of script, the writing often combined with an array of geometric patterns that are likewise embroidered (figure 5). Although simpler in style, embroidered inscriptions carry messages with the same level of pious significance; the embroidered shawl (figure 5), for example, bears both the opening chapter of the Qur’an (Fatiha), and chapter 112 (Ikhlas), a statement of faith and the oneness of God.

1.5 Historical Context and tiraz

Taken together, this group of inscribed cotton ikat textiles from Yemen preserves for us a unique view into Yemen’s historical position in classical Islamic times. Although fragmentary, these textiles with their inscriptions, extravagant use of gold, and florid calligraphic styles, represent new forms of cultural expression in the early Islamic world.

Yemen at the advent of Islam was a flourishing land of agriculture and trade. By camel caravan north to central Islamic lands and maritime trade with India to the east and Africa across the straits, Yemen’s ports of call along the Red Sea and Gulf of Aden were emporia for textiles, dyestuffs, and spices. Today more often recognized for the early conversion of Muslims, and as a source for gum Arabic, incense, and coffee, Yemen then was most famous for the export of luxury fabrics. When Baghdad was capital of the Islamic empire, the striped cotton garments and textiles from Yemen were sought far and wide (Serjeant 1972, 123-34; Baldry 1982). Contrary to general notions today that textiles were commodities produced for economic enterprise, the striped textiles of Yemen in the ninth and tenth centuries may be viewed as expressions not only of economic importance and artistic production, but also as leading forms of cultural expression and political influence.

Figure 4 Fragmentary scarf with warp fringe; plain-weave cotton with warp-resist patterning and embroidered Arabic inscriptions; Sana’a, Yemen, 10th century. The Textile Museum 73.213. Acquired by George Hewitt Myers in 1935.

Figure 5 Fragmentary scarf; plain-weave cotton with warp-resist patterning and embroidered Arabic inscriptions and geometric patterns. The Textile Museum 73.494. Acquired by George Hewitt Myers in 1940.

Considering the relationship to the official tiraz of Abbasid Baghdad, these textiles from Yemen and contemporary tiraz produced under the patronage of the heterodox caliphs of Fatimid Cairo represent challenges to the authority of the Abbasid caliph. They give evidence for local production of honorific textiles and the use of costly gold leaf, formerly the prerogative of the caliph. And they contribute to a growing body of evidence that supports our understanding of the strength of local authority and its challenge to centralized Abbasid rule, the emergence of which is reflected in the development of regional artistic styles in the tenth century (Bier 2001). Each fragment was once part of a mantle or scarf; several retain evidence of a long warp fringe, two selvedges and a centerfold. In their time, we may presume that they would have been worn with a special pride, portraying the displayed value of inscribed opulence derived from a prerogative of the ruling imam.

Figure 6 Embroidering the finial of an Arabic letter (diagram by S. B. Krody).

2. Calligraphy on Cloth

2.1 Calligraphic Styles

The elaborate calligraphic inscriptions that decorate this group of cotton ikat of Yemen convey meaning through content; they also communicate through
elegance of line, and the extravagant use of gold leaf (figure 1).

Although gold leaf is a rare occurrence in textiles, what is particularly significant here is that it is applied in a manner similar to that used by calligraphers working on parchment. Such techniques have been used, for example, in an early ninth-century Qur'an (figure 7), executed in ink and gold on vellum in an elegant manuscript formerly among the special collections of Johns Hopkins University, which has been repatriated to Turkey. The details of craftsmanship, quality of materials, and calligraphic techniques that appear on the textiles inscribed using gold leaf (figures 1-3) suggest that this work represents the efforts of calligraphers, rather than that of textile workers. The calligraphic style is very ornate; the embroidered inscriptions of cotton ikat textiles, similarly dated, show a much-simplified script. The embroidered inscriptions, rather than being the work of calligraphers, appear to be the work of embroiderers (see below, 4. Embroidery).

The process of inscribing textiles with gold leaf is also similar to the techniques used by calligraphers working on paper. Yet these textiles were manufactured at a time when paper, introduced from China, was just beginning to be incorporated into the technologies of the Middle East (Bloom 2001). For the textiles with applied gold leaf, first, the cotton fabric seems to have been sized and pressed. Then a resin was laid onto the face of the fabric, roughly according to the forms of the letters to serve as an adhesive (figure 1). The gold leaf was then quickly and carefully set. Finally, black outlines were drawn, defining each letter. Neither the resin nor the black outlines show evidence of absorption, suggesting that the fabric may have been heavily starched. In some of the textiles, the fibers clearly have been flattened; pressing would have further contributed to preparing the surface to receive the inscriptions.

On some of the textiles, the black ink that outlines the gold leaf shows masterful curved and straight lines, betraying the sure hand of a calligrapher (figures 1-3). At least five styles of calligraphy may be recognized. Three are executed in gold leaf with black ink outlines; two are embroidered using undyed (?) cotton yarn. One calligraphic style (figures 1-3) shows squat letters with concave triangular features; some letters, such as dal or sad are dramatically extended horizontally and interlaced or plaited (figure 3). The letters are run together, without spacing to separate words, and many letters are richly embellished with an ornate flourish of a split palmette leaf or floral motif. Sometimes, the letters are so decorative that reading of the text becomes especially difficult (Blair 1989; Schimmel 1992). This style of writing, in general, presents difficulties in reading because some letters are squished and others are dramatically elongated. Enough can be read, however, to identify formulaic expressions in Arabic, several names, and short passages from the Qur'an. Pious expressions tend to be more elaborately treated than historical inscriptions. Blair proposes that this reflects the intent that historical inscriptions be legible, because of their specificity. Inscriptions associated with this style indicate Sana‘a as the place of manufacture (Blair 1989).

A similar calligraphic style with elaborately interlaced letters (figure 3 [right]) and ornamental finials appears on Yemeni silver coins minted in Sana‘a in the ninth and tenth century (Michael Bates, personal communication). These details also appear on gold and silver coins from northern Iran in the ninth and tenth centuries (Golombek 1988; Volov [Golombek] 1966). Since the Yemeni ruling family, the Zaidis, arrived in Yemen from the north in Tabaristan, this visual relationship may reflect a historical link yet to be explored.

Another calligraphic style, executed in gold leaf outlined in ink shows tall, skinny vertical letters with bifurcate ascenders. This stylistic feature may be associated with coins minted in Zabid in the tenth century (Michael Bates, personal communication). A third style, less elegant, also shows divided finials, more bulbous than the first two, with gold leaf or gold ink that appears dull and abraded.

Two distinct styles of writing are present in the embroidered inscriptions. One style (figures 4 and 6) shows tall straight letters with triangular finials, aligned horizontally at the top edge; the other shows simple Kufic lettering (i.e. angular with right angles), unembellished but for a split fork at the top of vertical strokes (figure 5).

2.2 Fabric Treatment and Application of Gold Leaf

Microscopic analysis of the calligraphy on cloth, executed in gold leaf with ink outlines (figure 1), confirms that the process of its application was straightforward and relatively simple. A view of the
cross-section of the fabric with calligraphy shows an amorphous non-crystalline, resin-like substance that is present between the cotton fabric and a thin layer of gold leaf on top (figure 1 [bottom]). The resinsous material has somewhat penetrated the fibers of the fabric, but not consistently. The warps appear circular in cross-section; the gold leaf is quite flat. From analysis of a small sample of the gilded fabric, it can be seen that the brown weft appears circular in cross-section; the gold leaf is quite flat. This correlates well with our assumptions that it is natural cotton (i.e. undyed), consistent with the results of dye analysis in which no dye chemicals could be ascertained. The blue ikat warps, in contrast, do not show consistency in color. The color is variegated, and does not seem to have thoroughly penetrated the fibers, which is consistent with the characteristics of indigo (Böhmer 2002, 217-19). The blue colorant of indigo dye does not bond chemically with the fibers, but rather sits on the surface and is subject to abrasion. Indigo-dyeing is a reduction process; the blue color emerges on oxidation during drying.

Combining information from the sample itself and from analysis of the cross-section, the actual procedures for applying the calligraphy can be determined: The woven fabric was prepared by pressing; the flattened fibers are clearly evident under binocular microscopic examination at low magnification. A viscous resinous material was applied to the fabric; it is not entirely clear as to whether the pressed fabric was treated with a starch or egg glaze, but no such layer is evident in the cross-section studied (figure 1). This could be elaborated, perhaps, by chemical analysis for fats (lipids) and proteins. It is also not clear whether the pressing was undertaken with the aid of heat.

The resin would have been applied with a brush, by analogy to modern methods, and deposited roughly in a manner corresponding to the intended forms of the letters. When the resin had achieved an appropriate tackiness, by exposure to air-drying, the thin film of gold leaf would have been applied, sticking only to those areas in which there was resin. All other areas could be trimmed off, and the gold would not have adhered except in the presence of the resin. Finally, an ink outline was drawn with a reed pen, according to then contemporary methods. This outlining serves to delineate each letter or group of letters, and also defines and highlights the gilded areas, making crisp the effect of each form.

The gold leaf is thin, measuring only 1-2 microns. This is consistent with the thickness of modern hand-beaten gold. It does not seem to have received an overcoat of varnish. According to William Lewin, the resin is likely from the Acacia arabica, which grows plentifully in Yemen as well as in Western India (personal communication). Its gum makes a shellac-like resin, which is a natural product that was often exported.

Since these fabrics were removed from the ground, where they were presumably buried for more than a thousand years, it is difficult to surmise what agents of degradation may have been at work over time. One should probably assume extremes of humidity and aridity, as well as fluctuations in temperature, would have subjected these materials to considerable damage. What remains astounding is that they have survived at all; their surprising state of preservation surely attests to the original high quality of the gold leaf, and evinces a sophisticated knowledge and familiarity with its manipulation for calligraphic purposes on cloth. Under magnification, although somewhat cracked, the gold seems almost pristine.

The inscriptions consistently appear at the upper and lower edges of shawls or mantles. The use of gold leaf would preclude their use in daily life without damage. Gold leaf on fabric would not have worn very well, abraded fairly easily and worn off. If these scarves were worn on any regular basis, surely, they would show more signs of degradation. It therefore seems reasonable to assume that they were ceremonial and honorific, as suggested by the content of the inscriptions. They would have been worn to receive and express the honor for which they were made.

3. Cotton Yarn Preparation and Weaving

\textbf{3.1 Fiber, Spin, Ply, Weave Structure}

In comparison to the traditional textiles of Egypt, which are linen spun in an S-direction, this group is highly unusual because the yarns are cotton, finely handspun in a Z-direction. Subtle variations may be noted in the yarn dimensions of the warps, a natural result of hand-spinning. In most of the ikat textiles, the warps are single yarns without ply; in some instances, the yarns are two-ply, composed of two strands, plied together. Less variation is evident in the weft yarns, which are of uniform density and dimension (figure 1).

The inscribed cotton ikat of the ninth and tenth centuries are coarse in comparison to other woven cotton textiles from Yemen. One group of related textile fragments in The Textile Museum, bearing tiny repeated woven patterns in similar colors (blue; tan; yellow; beige; white), bears witness to exceptionally finely spun warps and wefts, and the expressiveness of woven repeat patterns (TM 73.353a-b, 73.401, 73.496). Small overall repeat patterns are woven at the loom by means of supplementary wefts that progress forwards and backwards as well as upwards, suggesting the use of bobbins. In some cases, there is no continuous weft. But the chronological relationship of these finely woven Yemeni textiles to those with striped patterns and inscriptions is uncertain.

\textbf{3.2 Cotton Production}

Most textiles from the Near East are spun in S-direction, which is the natural inclination of linen. Cotton spun in the Z-direction is typical of textiles from India, which is often considered the land in which cotton was first cultivated. Although cotton cultivation expanded dramatically in the Near East after the advent of Islam, an alternative theory posits early cotton cultivation in Yemen, Ethiopia and Sudan (Watson 1983; Baldry 1982, app. A).
Yemen’s mountains serve as a barrier to the moisture carried by the monsoon winds; beyond them lies the Rub‘ al-Khali, Arabia’s Empty Quarter. It is the precipitant humidity in steep, terraced valleys, and the harsh mountainous landscape, combined with a fertile coastal plain, that makes Yemen’s climate so variable and its land so fecund. At the time these textiles were made, land that boasted agriculture from the rains was taxed twice as heavily as land irrigated with “water from a bucket” (Hitti 1966, 108-09). Unlike the rest of the Arabian peninsula, Yemen could host cotton production because of the rains. In the early centuries of Islam, cotton was exempt from tax, and cotton remains an important agricultural crop.

### 3.3 Local Dyes and Other Agricultural Products

Wars, a yellow dyestuff unique to Yemen, was also exempt from tax in early Islamic times; it was exported from the port of Aden on the south shore (Serjeant 1972; Baldry 1982). There is also mention in classical Islamic sources of madder (Arabic, nila [Indigofer sp.]), exported from Aden and the Yemen. It is thus likely that these were the dyes most readily available locally (Serjeant 1972, 131-32; Varisco 1994). Archaeological finds of striped cotton ikat in Israel revealed indigo for blue and madder for red, as analyzed by Z. Koren at the Shenhan College of Textile Technology and Fashion in Ramat-Gan (Baginsky and Shamir 1997, n.4; Baginsky and Shamir 1995). Indigo dyeing is still widely practiced in Yemen today (Balfour 1997; Balfour-Paul 1998). Nuts, fruits, wheat, barley, and cotton, contributed then as they do today to making Yemen into what the Romans called Arabia felix (“happy Arabia”) as distinguished from Arabia deserta.

### 3.4 Warp-Resist Dye Processes

What particularly distinguishes this group of textiles visually are splashes of color forming rhythmic patterns arranged in stripes. The mesmerizing quality of these textiles relies upon the resist-dyeing technique today called ikat, in which particular sequences of tying and dyeing may yield a range of striped patterns with variegated colors that define chevrons and lozenges (Pfister 1938; Buhler 1972; Larsen 1976). Yemeni ikat textiles are characterized by such patterns, which depend upon resist-dyeing the warp yarns before weaving. The process involves repeatedly tying bundles of warp yarns, and dyeing them before the loom is dressed.

The bundles are dyed in one, two or three sequential dye baths. For each submersion in the dye, sections of the yarns are selectively bound; the bound sections resist the dye. For each color, at least one submersion is required. For darker colors, more than one submersion in the dye is likely. Areas that are white presumably remained bound during each of the submersions in the dye, and may have been bleached (this, however, was not tested). Dye analysis revealed no colorant in the brown fibers, suggesting that the weft and brown sections of the warp are natural undyed cotton. If this is the case, it is likely that white was achieved through a bleaching process, which will require further study. For solid color warp stripes, the yarns would have been fully submerged without any binding or resist; for white warp stripes, similarly, the yarns would have been bleached and not dyed. Once the warp yarns were dyed, they were strung up on the loom in an ordered sequence that corresponds to the pattern that is visually present in the finished cloth. As weaving progressed, with the insertion of each weft, interlacing with alternate warps, the final splashed patterns emerged.

Two or three different methods may be suggested for how the patterns were planned. One method required binding a standardized length; warps would then have been positioned at different heights when dressed on the loom. The other method required binding different lengths, corresponding to the final designs at the time of dyeing. The simplest method required binding a large bundle of yarns, using a standardized length for each bound section. The splashed effect would then result from differential placement of the warp yarns at the loom, positioning various colors at different heights in a repeated order. Repeating the processes of binding and dyeing, and then dressing the loom, would yield the observed color sequences of blues, browns, yellow, and white. An alternate method required binding differential sections of yarns in bundles, more closely related spatially to the final pattern. Each yarn would then be positioned at a standard height on the loom. Again, the interlacing of warp and weft would produce the resulting splashed patterns. Regardless of which method was used, bundles of warps would have been bound and dyed, repeating the sequence of binding and dyeing at least twice to obtain the observed color sequences of blues, yellow, white, and brown.

The visual appearance of the repeated pattern could be varied by the selective placement of yarns on the loom. After dyeing sets of yarns in a bundle, each set corresponding to the broad stripes of splashed colors, the bundles could be separated in two, and strung on the loom in an opposing sequence to produce the reflected arrangement of colors forming patterns with a mirror image along a central axis.

### 3.5 Weaving Cotton Cloth

The weaving of these textiles could not be simpler, as they represent the logically most elemental interlacing of warp and weft in an under-one, over-one sequence that requires only a single alternate shed. But an astounding sophistication is evident in this group of cotton ikat textiles from the Yemen in the deployment of resist-dyeing techniques. Numerous variations among the patterns result simply from varying and repeating counted sequences of selectively dyed warp yarns before weaving took place.

### 4. Embroidery

Some of the striped cotton textiles from Yemen bear embroidered inscriptions and small-scale geometric motifs, which are repeated to form space-filling patterns, deceptively simple in their
execution (figure 5). The stitch repertory is different from that of Europe, the Middle East, or Central Asia (Sumru Belger Krody, personal communication). What is notable among the varieties of stitches is how efficiently and economically they achieve a surface ornamentation, with minimal use of thread on the reverse, and optimal use of thread on the obverse. This is true not only for the embroidered patterns of geometric shapes that are repeated, but also for the Arabic letters that make up the inscriptions, which use the same range of stitches, yielding an apparent simplicity that achieves both clarity and embellishment (figure 6).

4.1 The Embroidery of Arabic Inscriptions

The elegant solutions offered by the variations in stitch construction suggest that individuals thoroughly familiar with the embroiderer’s art executed the embroidery, rather than calligraphers. In contrast to the gilded inscriptions, which are probably the work of calligraphers on cloth, the embroidered inscriptions are more likely the work of embroiderers. Considering the relative status of calligraphers and embroiderers in the classical Islamic world, this distinction may be a subject worthy of further study. The Arabic words exhibit exuberance in the treatment of individual letters with numerous flourishes. The triangular tops of the tall vertical letters lend a rhythmic pattern to the lines of inscription (figures 4 and 6). Whereas the gilded inscriptions show dramatically extended letters that stretch the length of individual words, the embroidered texts are often compressed; they are also very difficult to read.

4.2 The Embroidery of Geometric Patterns

Bands of embroidered decoration (figure 5) show panels of geometric ornament with tessellations – patterns formed by a repeated element that covers the plane with no gaps and no overlaps.

The embroidered designs complement the chevrons, lozenges and stripes of the ikat patterns, but they are not aligned. Minimalist in appearance, the embroidered patterns represent ingenious variations of the running stitch to achieve such a simple visual effect. Parallels for the space-filling geometric patterns are found in contemporary Yemeni architectural decoration.

Repeated patterns of chevrons and lozenges, visually related to the warp stripes of cotton ikat also appear in contemporary furniture, executed in other materials such as wood inlaid with bone and ivory, perhaps indicative of stylistic preferences derived from warp-resist patterning (figure 8).

5. Conclusions

The group of inscribed cotton ikat from Yemen in the ninth and tenth centuries comprises a particularly distinct category of textile production. Drawing upon diverse technologies and regional patterns of trade, it provides physical evidence to document collaborative efforts of individuals at different ends of the social spectrum, bringing together the professional work of calligraphers, dyers, weavers, and embroiderers, all engaged in the production of textiles designed to bring honor to a ruler and his subjects. Analysis of fibers, dyes, weave structure and embroidery, along with documentation of the style and content of the gilded inscriptions, and analysis of the gold-working methods, together lead us to better understand these textiles as significant forms of cultural expression in their time (Bier 2007).
definitively known, and the relationship between
the use of this technology in Yemeni ikat textiles to
the use of this technology in India still remains
uncertain (pace Crill 2000).

The inscribed cotton ikat textiles from Yemen relied
on both active cultivation of cotton, and the
economic output of textiles imbued with dynastic
significance and honorific value. The pursuit of
dyeing trades, weaving, and embroidery, coupled
with the elevated status of calligraphy, maneuvered
these textiles into positions of status within the
economy as markers of wealth and beneficence.
Whoever had the opportunity to wear them could
thus display their constructed value, based upon
the extravagant use of gold leaf and calligraphy,
and the content of their inscriptions, as well as the
prestige of cotton ikat textiles, which exhibit artistic
value that depended upon quality of materials and
advanced fiber and dyeing technologies.

As the Abbasid caliphate declined and multiple
claims to power gained hold in the provinces,
regional artistic styles emerged. The rulers of
Yemen adopted one of the prerogatives of the
Abbasid caliph, bestowing honor by rewarding
subjects with elaborately inscribed textiles called
tiraz. At the time, Yemen was active in maritime
trade, well situated at the southwestern extension
of the Asian continent, with India to the east,
central Islamic lands to the north, and Africa to the
west. At the southern tip of the Arabian peninsula,
Yemen was in a unique position for transshipment
and transcontinental exchange. Steeped in
tradition, and separated from its northern neighbors
by high mountains and dry, sand-blown stretches of
territory today still in dispute, Yemen remained
relatively isolated from cross-currents of world
history. Today as in the past, political hegemony in
Yemen has relied upon tribal alliances and
allegiance. Unlike elsewhere in the Islamic world,
however, tribalism as a means of social
organization is not concomitant with nomadic
pastoralism. In Yemen there is sufficient rain, and a
suitably stable water supply, to sustain pastures for
animal husbandry. But it was crop cultivation and
trade, more than sheep and goats, which sustained
Yemen’s economy.

Careful analysis of this group of cotton ikat as
products of several distinct technologies (yarn
preparation, resist-dyeing, gold-working,
calligraphy, and embroidery) enables a broad
synthesis within a historical context that
ecompasses the impact of cloth as a unique from
of cultural expression and conveyer of meaning at a
critical moment in the history of Islamic civilization.

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7. References

Ikat, Ikat 95, 86-87; 116.

(Jerusalem) 26, 21-42.

References to Trade and Commerce in Textiles
in Yemen from Antiquity to Modern Times,
British Museum Occasional Papers 27. London:
British Museum.

Richmond, Surrey UK: Curzon.

Museum.

Cotton Ikat from Yemen (exhibition brochure).

Bier, C. (2007) Patterns in Time and Space:
Technologies of Transfer and the Cultural
Transmission of Mathematical Knowledge across
the Indian Ocean, Ars Orientalis 34, 174-96.

Blair, S. (1997) Inscriptions on Medieval Islamic
Textiles, in Islamische Textilkunst des
Mittelalters: Aktuelle Probleme. Riggisberger

Blair, S. S. (1989) Legibility versus Decoration in
Islamic Epigraphy: The Case of Interlacing, in
World Art: Themes of Unity in Diversity, ed. I.
International Congress of the History of Art.
University Park.

and Impact of Paper in the Islamic World. New
Haven: Yale University Press.

Textiles; A Color Journey from Turkey to India
and Beyond. Ganderkesee, Germany: REMHÖB-
Verlag.

Britton, N. P. (1938) A Study of Some Early Islamic
Textiles in the Museum of Fine Arts Boston.
Boston: Museum of Fine Arts.


Carmi, J. and D. Segal (1995) Radiocarbon Dating
of Early Islamic Textiles in the ‘Arava Valley,
‘Atiqqot (Jerusalem) 26, 55-56.

Westward,” International “Ikat” Weaving
Forum: Kuching, Sarawak, Malaysia, 11th –
16th June 1999, pp. 1-7. Society Atelier
Sarawak.

in Content and Context of Visual Arts in the
University Park: Pennsylvania State University.

Golombek, L. and V. Gervers (1977) Tiraz Fabrics in
the Royal Ontario Museum, Studies in Textile
History. Toronto.

Hitti, Philip Khuri, tr. (1966) The Origins of the
Islamic State, being a Translation...Kitab futuh
al-Buldan of al-Imam abu-l Abbas Ahmad ibn-

8. Author
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