Gilding Textiles and Printing Blocks in Tenth-Century Egypt

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The surviving portion of the tenth-century Egyptian Muḥammad b. Aḥmad al-Tamīmī's recently edited *Ṭīb al-ʿarūs* has several formulas relating to the dying and perfuming of textiles. Some refer to the use of carved molds to impress designs upon textiles. Tamīmī's formulas treat in particular the application of gold leaf and perfumed dye pastes with blocks, but presuppose the technology of using blocks to apply designs to textiles and include a vocabulary of technical terms for the process. This textual evidence provides additional context for surviving early medieval Islamic block-printed gilded textiles. The attestation of the use of blocks to decorate textiles is contemporary with the use of blocks to print Arabic amulet texts, known by the tenth century from extant specimens and some literary evidence.

It is generally recognized that printing on textiles is a forerunner of printing on paper.[1] Yet the history of printed textiles in the early medieval Middle East has not received the attention it deserves alongside the rediscovery of printing from that time. Block printing is in fact an ancient process: the earliest surviving block-printed textiles from the Mediterranean come from fourth-century Achmim in Egypt.[2] At least one wooden printing block from Achmim is known.[3] A textile with a block-printed image of Ganymede has been attributed to the Sasanians.[4] Many block-printed textiles were recovered from Egyptian sites such as Quseir al-Qadim.[5] A radiocarbon-dated collection of more than 1,200 block-printed textile fragments in the Ashmolean Museum has dates ranging from the tenth through fifteenth centuries,[6] but these are almost entirely imports from Gujarat in India rather than Middle Eastern productions.[7] Most are cotton and dyed using a resist-dyeing method or a mordant. They employ dyes such as indigo and madder, and thus are commonly blue, red, or a combination.

There are some distinctly different block-printed textiles from Islamic times that have been identified as Middle Eastern rather than Indian.[8] Among the collections of the Cleveland Museum of Art and the Metropolitan Museum of Art are fragments of an Islamic block-

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1. Tsien 1985: 310–11. Overviews of early European block printing in Posse 1962: 88–96; Robinson 1969: 7–17. G. Schaefer's short overview (1938) looks at Near Eastern block printing as well.

2. Forrer 1894: 10–12; Schaefer 1938: 856–57; Forbes 1964: 138; Robinson 1969: 8. See also Casson 1983: 201–2.

3. Forrer 1894: 11–13, illustration of its design on fig. 2, p. 13; Schaefer 1938: 857.

4. Schaefer 1938: 859–60. Forbes (1964: 139) claims that block printing was "one of the major techniques" in Sasanian times.

5. Pfister 1938. See also Eastwood 1982: 292; Handley and Regourd 2009: 145–49, 151 for examples excavated at Quseir al-Qadim. Many are printed with designs that include Arabic inscriptions specifically for a Middle Eastern market, although the blocks are "probably carved by someone with little understanding of Arabic," Handley and Regourd 2009: 149. I have not seen Vogelsang-Eastwood 1989.

6. Barnes 1997.

7. Gittinger 1982: 31–57; Barnes 1997, 1: 52–61, especially p. 61 on the distinctions between Indian and non-Indian block-printed textiles.

8. Watelin 1925: pl. 7 is an illustration of a textile with roundel design containing animals labeled "Fragment

printed textile.[9] M. S. Dimand, the mid-twentieth century curator, identifies the Metropolitan portion as linen and dates it to the tenth century. It includes six different stamps: for lions, one for the backgrounds of the squares in which they are enclosed, and one for the dots bordering the square backgrounds, of which Dimand writes: "Such elaborately stamped fabrics were probably substitutes for the more costly cloths, which were tapestry-woven or embroidered in gold threads."[10] The Cleveland piece is on *mulḥam* (silk warp and cotton weft), block printed with figures of lions in "dark-brown pigment" and with gold by using a pigment of powdered gold that was then, as the museum's catalog describes, "flattened with rubbing" to create the appearance of gold leaf.[11] Louise Mackie dates this piece to the eleventh or twelfth century and attributes it to Iran or Iraq.[12] Thus, alongside Indian imports, an indigenous form of block printing was indeed practiced in the medieval Middle East:[13] gold leaf and pigment were applied to textiles to decorate them. Fortunately, an unexpected written source throws light on the procedure.

Muḥammad b. Aḥmad b. Saʿīd al-Tamīmī (d. 370/980), born in Jerusalem, was a physician who worked in Egypt. Among his works is a book on aromatics called *Kitāb Ṭīb al-ʿarūs wa-rayḥān al-nufūs fī ṣināʿat al-ʿuṭūr* (The perfume of the bride and the sweet flower of the souls of the making of perfumes) or *Kitāb Jayb al-ʿarūs wa-rayḥān al-nufūs* (The bosom of the bride and the sweet flower of the souls).[14] Only part of this work, a manuscript in Andalusī script now in Tehran consisting of some chapters of the formulary, is extant; it has only recently become available through the publication of facsimiles and an edition.[15] This surviving portion includes 290 individual formulas for different varieties of perfumes and procedures involving aromatics, including the making of dentifrices and the dyeing and scenting of clothing. It is in this last category that we find the formulas with which this essay is concerned. Al-Tamīmī writes at the conclusion of his 241st formula: "Know that all of what I have told you in this chapter about designing with gold and sprinkling with it, with ambergris and musk, is what I have proposed by myself and is not what I have taken from a craftsman, or copied from a book." While al-Tamīmī claims that he invented these procedures, his work suggests that he was building upon procedures others had developed, and one of his formulas for designing on textiles using an imitation gold gilding procedure he credits to a certain Ibn Zirr. Further, that formula includes a comment by another figure named al-Ḥakīm.[16]

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de soie imprimée. Perse VIII[e] siècle"; see also Pfister 1938: 18 n. 5, who says it should be dated later, and Schaefer 1938: 855, who says it comes from Rayy and dates it to the tenth century.

9. Mackie 2015: 482 n. 104 notes that they are from the same cloth, and reports (483 n. 105) that there is a third, similar piece in Boston, citing Britton 1938: fig. 12.

10. Dimand 1958: 255–56 with fig. 166.

11. Mackie 2015: 158, 160 fig. 4.34.

12. Mackie 2015: 161. Barnes (1997, 1: 75) attributes her catalog numbers 430 to 461 to the Near East and dates some of them to the thirteenth and fourteenth centuries.

13. Pfister (1938: 18) cites Barthold 1928: 284, quoting al-Gardīzī, who gives a list of gifts from Maḥmūd of Ghazna including "rose-coloured stamped stuffs from Ṭabaristān." Barthold's text volume (1898: 16) has *muʿallam* ("marked" or "distinguished") as the Arabic word translated as "stamped"; the edition of al-Gardīzī (1984: 408 n. 4) reads *muʿlam*, which Steingass (1996: 1275a) renders as "distinguished by a particular mark or badge (a garment)." Neither reading necessarily refers to printing, and indeed Bosworth 2011: 95 translates "lengths of rose-coloured cloth from Ṭabaristān with designs on them."

14. Ullmann 1970: 315.

15. Al-Tamīmī 2014a. I have checked it against the facsimile of the manuscript published by Iḥsān Muqaddas (2014b). Another facsimile was published by Fuat Sezgin (al-Tamīmī 2011); the scans in this volume are not as clear as in the Iranian publication.

16. No. 242 in the edition.

Textiles were a central preoccupation of the medieval Islamic world (and indeed, the medieval world in general).[17] In the Middle East, the value of a textile, often very great, resided in the quality of the fibers that composed it and in the skill in its manufacture. Some of the most spectacular textiles were woven and embroidered with gold. The procedures described by al-Tamīmī may have been intended for lesser-quality textiles, to "dress them up" so they would approach the appearance of finer garments, but there are also fine quality textiles with gold leaf applied.[18] Why would this topic be treated in a book on perfumery? In Islamicate civilization, perfuming was considered an aspect of decoration; thus, in cookbooks, for example, procedures are given for decorating, coloring, and perfuming dishes for the table.[19] Likewise clothing was perfumed with incense and aromatic compounds and dyed for use.[20] Al-Tamīmī's formulas are not intended for permanent dyes, applied to textiles during the manufacturing before production of the garment, but for temporary perfumes, gildings, and pigments, applied after production, which would not necessarily survive washing. These procedures were the final stage of olfactory and visual ornamentation of a garment.

The first formula that we will examine (no. 240) is entitled "Formula for designing (*taktīb*) on clothing."[21] It begins:

> Muḥammad b. Aḥmad [al-Tamīmī] said: If you want to execute designs, then have molds (*qawālīb*) of teak (*sāj*) wood made, varieties of molds, such as "cups" (*jāmāt*) with horse designs, cups with predatory beast designs (*musabbaʿa*), fish, toys (*luʿab*), palm trees, and pine trees, as well as other [designs], such as varieties of birds, animals, and plants. The carving (*naqsh*) should be attractive; have the most skillful and deft-of-hand carvers carve it for you.
>
> Then avail yourself of those molds, whichever mold you want to design with, and have the garment dyed for you however the owner prefers, in red, blue, black, rose, or white.

The term *qālib* (pl. *qawālib*) for mold is the same as that used to describe the blocks (*ṭarsh*) for printing amulets, which will be discussed further on.[22] Tenth-century perfumers were also well acquainted with the practice of using molds to form aromatic pastes into shapes and figurines.[23] The editors of al-Tamīmī's text argue that *jāmāt*, which usually means cups or goblets, especially of precious metal, means here printing blocks (*qawālib al-ṭibāʿa*). This term may have been chosen because the blocks had the physical appearance of a cup, the widest part being the printing surface. As noted, extant block-printed gilded textiles from the period feature designs of lions, easily encompassed under al-Tamīmī's predatory beasts. One block-printed Arabic text, in the Gayer-Anderson Museum in Cairo, includes representations of animal figures.[24] Significantly, al-Tamīmī notes that carving the delicate images was a job for a professional carver, not one that the artisan decorating the textile would undertake.

The garment had to be dyed before the gilding was undertaken;[25] gilding and perfuming were thus the final steps taken before use. Al-Tamīmī describes many varieties of dyes in his

17. Mackie's work on the Cleveland collection provides an excellent recent overview; see also Lombard 1978 for the economic dimensions of the textile industry.

18. Mackie 2015: 123 illustrates a tenth-century Yemeni ikat in Cleveland with gold leaf applied as an inscription.

19. Marín 1994.

20. Indeed, perfuming textiles is found throughout the world. For Europe, see Johnson 2008.

21. The formula numbers refer to the numbering in al-Tamīmī 2014a. *Taktīb*, Form II of *k-t-b* "to write," has the specialized sense of designing a pattern, as when making intricate henna patterns on the skin. See Dozy 1927, 2: 441.

22. Bosworth 1976: 18 (text) and 201 (trans.); Bulliet 1987: 430–31. Schaefer 2006 provides a comprehensive study of Arabic block-printed amulets.

23. King 2017: 64, 291.

24. Mentioned in Schaefer 2014: 10; still unpublished?

25. Dyeing textiles is discussed in Lombard 1978: 117-45.

formulary.[26] In his formulas, however, "dye" (*ṣibgh*) denotes a compound that has aromatic qualities alongside a specific color. In fact, to judge by the formulas, the color produced was incidental to the scent. Most dyes would have produced yellows and oranges because of the saffron, *wars* (*Flemingia grahamiana*), and safflower that were prevalent. The dye formulas include a wide range of aromatic ingredients, including most commonly aloeswood, camphor, cardamom, cassia, distilled herbal waters, mace, mahlab, musk, nutmeg, rosewater, sandalwood, spikenard, and storax. Upon dyeing, a garment was censed with aromatics such as aloeswood, camphor, costus, onycha, and sandalwood. The dyes also sometimes included gum Arabic and ambergris to provide a gloss or polish to the finished garment.

Next, al-Tamīmī begins to describe the process of preparing the adhesive surface to receive the gilding:

> If white designing is desired, take gum ammoniac (*ashaj*) and crush it coarsely. Soak it in water for a day and a night. Then dissolve it with your finger until it attains the consistency of milk. Then put it in a spread-out (*mabsūṭ*) cup, and dip the mold (*qālib*) into it.

Ashaj is an alternate spelling of *ashaq*, "gum ammoniac," according to al-Bīrūnī and Ibn al-Bayṭār, who also report that it is called *lizāq al-dhahab*, "chrysocolla" or "gold adhesive."[27] A marginal note in the account of gum ammoniac in al-Bīrūnī's *Kitāb al-Ṣaydana* provides additional evidence for the use of gum ammoniac for gilding: "[Gum ammoniac] is the gum of the *ṭurthūth* [*Cynomorium coccineum*],[28] and perhaps it is called chrysocolla because papers (*kawāghid*) and cottons (*karābīs*) are gilded with it."[29] Gum ammoniac is the gum of various plants: *Dorema ammoniacum* of western Asia or different species of *Ferula* in northern Africa.[30] Pliny the Elder speaks of a chrysocolla compound made in part from weld (*lutum*) for its yellow color, but it is clear that Pliny, as well as Dioscorides (V.89), conceived of chrysocolla as a mineral substance;[31] both treat the vegetable gum ammoniac separately (Dioscorides III.84, Pliny XXIV.23) and neither mentions that it could be used in gilding.

The text continues:

> Muḥammad b. Aḥmad said: It is better for you to dip molds to gild (*tadhhīb*) the design with fish glue (*ghirāʾ al-samak*) than with the dissolved gum ammoniac, because the gum ammoniac burns the garment; and fish glue makes the gold stick just as well as the gum ammoniac makes it stick, so it is safer.

Here, where it is clear that he is critiquing an earlier procedure, from an unnamed authority, and improving it, al-Tamīmī notes the crucial technical step of using the mold to apply the adhesive. This procedure would produce a sticky surface to receive the gold leaf only in the places corresponding to the design. He considers fish glue as stable and equally suitable as an adhesive.[32]

26. Formulas 212 to 247 comprise dyes and related processes, such as gilding.

27. Al-Bīrūnī 1991: 55; Ibn al-Bayṭār n.d., 1: 34; Löw 1967: 457; more references in Dietrich 1988, 2: 436 (book 3, no. 79). On the natural history of gum ammoniac, see Stapf 1907.

28. This identification of the source of gum ammoniac is wrong. On *ṭurthūth*, see Dietrich 1988, 2: 153 (book 1, no. 66 n. 20).

29. Al-Bīrūnī 1973: 45 (text), and see 29 (trans.); not in Zaryāb's edition. Cf. Ibn Sīnā 1987, 1–2: 392.

30. Howes 1950: 314–15; Langenheim 2003: 412–13.

31. Pliny XXXIII.86; Bailey 1929: 205–6.

32. Ibn Bādīs (2007: 146, trans. 1962: 37) used fish glue in gilding for manuscripts, only calling for gum ammoniac in a formula for yellow colored ink (p. 89, trans. 23–24).

> Likewise, it is necessary to do this also during the "sprinkle" (*rashsh*) [process], after having set the garment upon the frame (*malban*)[33] upon which embroiderers (*muṭarrizūn*) set clothing for embroidery (*ṭarz*).

Rashsh, preparing garments with a sprinkled design, is the subject of the next formula, no. 241. The term for frame, *malban*, in this sense appears to be unique. The semantic range of the word, which usually means "door frame,"[34] suggests an open frame over which the garment is stretched. Such a frame was evidently regularly employed by embroiderers. While used for the "sprinkle," there were different supports for the textile during the block-printing procedure because of the weight of the blocks:

> Then dip the mold and smooth out beneath it what bears the garment, such as a leather pillow (*miswara*) or cushion (*mikhadda*). Then impress (*iṭbaʿ*) the garment with those molds, impressing upon a single section, not overlapping. Likewise, if it is a sash (*wishāḥ*) or "cups" (*jāmāt*),[35] then [impress] upon that.[36]

The appearance of *iṭbaʿ* (imperative of *ṭ-b-ʿ*) is noteworthy given that this word will become the ordinary word used for the printing process. The earliest instance of it in this sense may be in Ibn al-Abbār (1199–1260), who writes that Badr b. Aḥmad al-Khaṣṣī, vizier to the Umayyad caliph ʿAbd al-Raḥmān al-Nāṣir (r. 912–961), sent edicts to be printed (*li-l-ṭabʿ*).[37]

> When the gum ammoniac dries, paste gold leaf upon it, pasting it with your middle finger, tapping, just like gilders (*mudhahhibūn*) paste it until all traces from the molds are covered with the gold. Burnish it with hematite (*shādana*)[38] until it becomes like liquid (? lit. "until a water comes from it"), God willing.

Here al-Tamīmī mentions professional gilders; their method of applying gold leaf by carefully tapping it into place so that it was evenly applied was evidently familiar. The fifteenth-century Florentine Cennino d'Andrea Cennini also discusses burnishing gold for gilding with hematite.[39] Finally, al-Tamīmī mentions the remarkable step of using molds to apply perfumed paste:

> Then begin to divide it into sections with dissolved *sukk* together with musk and ambergris. You may prefer that it be divided into sections (*mufaṣṣal*): one section with gold and a section with ambergris-perfumed *sukk*. Dip the mold into *sukk*, musk, and ambergris dissolved in rosewater. When you dip it, blow on it so that its carving (*naqsh*) will not be blotted [and obscured] and it will be opened up.[40] Then stamp clothing with it as you want. The painter (*dahhān*) details those trees, cups, and images (*tamāthīl*) with *sukk*, musk, and ambergris dissolved with water of gum with a quill pen. God willing, it will come out marvelously.

33. My preferred transliteration; the text's editors have transcribed this as *mulabban*; see below.

34. Dozy 1927, 2: 515. Ullmann 1970–, 2: 178 renders *malban* with door-frame, door-post, gate-like framework; see ibid., 2: 180 for *mulabban*.

35. Perhaps an error for Persian *jāmah*, "robe"?

36. *Fa-ʿalā dhālika* in ms. but omitted in the edition.

37. Ibn al-Abbār 1963: 252–53; Bulliet 1987: 436; Schaefer 2006: 24–25.

38. Ibn Bādīs (2007: 146) mentions the use in burnishing gold leaf of something that the edition gives as *ḥamāḥim* and Levey (Ibn Bādīs 1962: 38 n. 267) as *jumāhun* or *jumāhum*. Perhaps this is an error for *khumāhan* or *khumāhān*, a synonym for hematite; see Käs 2010, 1: 559–61.

39. Cennini 1954: 82–83.

40. Meaning that the mixture must be evenly distributed upon the block. Cf. al-Tamīmī 2014a, no. 242: "Blow upon their surfaces so that their carving will be opened up."

Sukk was a dark-colored aromatic compound; in the tenth century it was made especially from the oak gall compound *rāmik*.[41] Al-Tamīmī's discussion of making *rāmik* and *sukk* survives only in quotation in al-Nuwayrī's fourteenth-century encyclopedia *Nihāyat al-arab*.[42] *Rāmik* was produced from aged oak galls that were cooked with raisins and dates in an herbal wine of lily and aromatics (*maysūs*), dried, and then ground. Making the *rāmik* into *sukk* involved combining it with many more aromatics into a paste and then drying it as pastilles. *Sukk* was often dissolved in rosewater or perfumed oil for use. One of the most important applications of *sukk* was in male perfumes intended to darken facial hair. The tannins in oak galls make them an important material for dyeing as well as making ink.[43] For al-Tamīmī's textile procedure, the *sukk* must be dissolved with rosewater to dilute it so that it can be applied smoothly. Additional musk and ambergris (some probably being present already in the *sukk*) were added to further enhance the perfume of the finished garment. Gum (*ṣamgh*) generically usually means gum Arabic, from the acacia tree.[44] Gum Arabic helps make inks smooth and shiny upon application and it is an important binding material.[45] Thus, al-Tamīmī is describing the application of a scented pigment using carved molds to produce designs upon textiles, a form of block printing.

The *rashsh* ("sprinkle") method described in al-Tamīmī's formula no. 241 involved sprinkling the garment with glue before applying the gold leaf rather than pressing the glue on it with a mold. While the technology is different from block printing, this description illuminates our understanding of the practice of designing upon textiles:

> If you want to sprinkle a garment with gold, or a garment with ambergris and musk, dye it with the dye that its owner prefers—musk-prepared (*mumassak*), sandalwood-prepared (*muṣandal*), safflower-prepared (*muʿaṣfar*), or perfumed (*muṭayyab*). Then dissolve *sukk* refined with musk and ambergris in rosewater. Dissolve some gum or froth (*luʿāb*) of quince seeds and mix this together with it. Beat it well in the sprinkler (*mirashsha*).[46] Then sprinkle it evenly on the garment while it is set upon the frame, without overlapping. Set it aside to dry and store it (*wa-irfaʿhu*).

This formula shows the range of scents of the dyes used. Two types of sprinkle are given; the first deals with the sprinkling of aromatics. Quince froth refers to the mucilaginous substance obtained by soaking quince seeds in water; it is used in other textile dyes (al-Tamīmī nos. 229 and 236) in a role similar to gum Arabic, that is, to provide substance and polish to the finished dye. In al-Tamīmī's formula no. 229, a formula by Ibn al-ʿAbbās for a sandalwood-scented dye, al-Tamīmī criticizes the use of quince froth and suggests replacing it with gum Arabic. In no. 240, the preparation of aromatics with rosewater includes neither gum Arabic nor quince froth; it is probable that this is an omission in the text.

The *rashsh* procedure continues by treating the application of adhesive for gilding. As in no. 240, the gold leaf is applied with fish glue:

> If you want to sprinkle it with gold, set it upon the frame and sprinkle it with the sprinkler or with the hair (brush)[47]—but the sprinkler is better—with dissolved fish glue and then set it

41. King 2017: 155–56.
42. Al-Nuwayrī 1923–1997, 12: 70–78.
43. See Lombard 1978: 144 for textiles; Schopen (2004: 189–92) summarizes the use of oak galls in Islamic inks.
44. Dietrich 1995. It was also employed to give silk textiles a shine, see Lombard 1978: 150.
45. Schopen 2004: 218–20.
46. Dozy 1927, 1: 529.
47. Hair brushes are described by Ibn Bādīs 2007: 148 (trans. Ibn Bādīs 1962: 38–39).

aside to dry. Paste gold leaf on it by tapping it with your middle finger while a stand (*kursī*)[48] is beneath it to support it until the gold can adhere to it and until all of what you sketched with the fish glue is covered with gold leaf; it comes out an unparalleled "sprinkle."

Multipart designs are also possible:

People may sprinkle it with *sukk*, musk, and ambergris, and then sprinkle it with fish glue. Then the glue retains the gold but neither the *sukk* nor the ambergris retains it. [In this way] the garment becomes sprinkled in two colors (*bi-lawnayni*), one of gold and one of ambergris, so understand this.

Evidently for it to work, the maker must not apply the perfume and fish glue in the same place. Drops of glue would retain the gilding, but the drops of perfume would not. In formula no. 242, copied from one Ibn Zirr, al-Tamīmī describes applying an imitation gold, also with molds. Thus, for al-Tamīmī, writing in the tenth century, the process of using molds to apply designs to textiles, both in adhering for gilding and with aromatic pigments, was well known.

At the same time as Egyptians were block printing designs on textiles, others were block printing text on paper. Dozens of examples of medieval Islamic amulets block printed on paper are known today, found in the dry conditions of Egypt.[49] The tenth-century poet and traveler Abū Dulaf describes the medieval Islamic underworld of the Banū Sāsān—hucksters, beggars, and street performers. Among their constituents were those who engraved *ṭarsh*.[50] As Richard Bulliet has shown, the *ṭarsh* were blocks for printing amulets. He translates from Abū Dulaf: "The engraver of *ṭarsh* is he who engraves molds (*qawālib*) for amulets. People who are illiterate and cannot write buy them from him. The seller keeps back the design (*naqsh*) which is on it [the *ṭarsh*] so that he exhausts his supply of amulets on the common people and makes them believe that he wrote them. The mold is called the *ṭarsh*."[51] There was thus more than a whiff of disrespectability about printing amulets;[52] a handwritten amulet text included a devotional aspect through the personal labor of producing it that made it more efficacious.[53]

Similarly, the printing of textiles labored under disdain. Lionel Casson argues that the νόθοι ("bastard") textiles of antiquity were, in fact, block printed. As part of his argument, he adduces the bias found in medieval times against printed textiles as cheap substitutes for properly woven and embroidered fabrics.[54] As noted above, the Metropolitan Museum curator Dimand's judgment of its Islamic block-printed textile was that it substituted for "more costly cloths." While al-Tamīmī's formulas nos. 240 and 241 call for actual gold in the gilding process, no. 242 uses an imitation gold applied with blocks. Al-Tamīmī includes other formulas for making imitation gold for use on textiles (nos. 243, 244, 246). Formula no. 243's imitation gold procedure concludes that what it produces is "undeniably of golden color" while no. 244 concludes, "It will be like gold; no one would deny it or have any doubt about it." Assurances like these are familiar from formulas for adulterated perfumes,[55] these procedures may therefore have been intended to deceive potential purchasers.

48. "Seat"; on the word's semantics, see Cl. Huart [J. Sadan] 1986.

49. A catalog of those identified up to 2006 is in Schaefer 2006. See also Muehlhaeusler 2008; Schaefer 2014.

50. Bosworth 1976, 2: 18, 201; Bulliet 1987.

51. Bulliet 1987: 430, slightly modified.

52. See also Schaefer 2006: 15–20 on the tenuous position of theurgy in Islamic culture, and 25–26 with examples of the use of amulets.

53. See Bulliet 1987: 438 on the Sufi production of amulets.

54. Casson 1983: 201 and n. 24; Robinson 1969: 11, 14.

55. Garbers 1948, nos. 4, 11, 17, etc.

Al-Tamīmī's procedures and the block-printed textile specimens noted above suggest that the use of blocks for printing textiles was known, at least in certain circles, in medieval Middle Eastern culture, just like the rediscovery of *ṭarsh* has shown that printing texts on paper was hardly unheard of.[56] Block-printing technology was manifold but there are important variations between the different applications. Blocks for printing text must be carved in reverse so that the text appears correctly when impressed. The designs specified for the block-print textiles would not require this stipulation. The numerous examples of block-printed text amulets from early medieval Islamicate times are printed correctly, and thus the blocks were carved in reverse. A crucial difference that sets al-Tamīmī's procedures apart from those for the block-printed textiles familiar from India is that they do not call for a mordant or resist dyeing procedure nor for the dyes used on contemporary Indian block-printed textiles such as indigo or madder. Al-Tamīmī instead calls for block printing perfumed dye paste or glue on textiles to which gold was applied.[57] Al-Tamīmī's textiles were not decorated to last. It is therefore all the more remarkable that we have a few precious vestiges of textiles that appear to be similar to those his procedures would make.

The ancient development of printing in China, starting with textiles by the Former Han and later moving on to texts, is well known.[58] Bulliet inclines toward an independent invention of printing in the Middle East, and bravely suggests that Islamic printing technologies may have influenced the development of printing in Europe.[59] The basic technology of impressing designs using blocks—as with seals—is very ancient both in the Middle East and in East Asia. Yet printing did not become common for either texts or textiles in the medieval Middle East despite the presence of the technology among some circles. The mere existence of a technology is not enough to guarantee its success. In the case of printed texts, cultural values about the superiority of the hand-crafted work of the scribe exerted a powerful influence on the deployment of the technologies of block printing texts.[60] Perhaps, as Casson suggests, a similar attitude existed vis-à-vis the work of the embroiderer, as textiles decorated as al-Tamīmī describes could not match the durability of the Indian productions made with mordant and resist dyeing. Another possibility is that the market was already saturated with Indian block-printed textiles, thus making their production in the Middle East less necessary.[61] For whatever reasons, the medieval Islamicate Middle East remained a society in which technologies of printing were known by some, but did not become familiar or commonly deployed.

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56. Schafer (2006: 38) also adduces stamped pilgrimage certificates as another form of medieval Islamic printing.

57. Ruth Barnes (1997, 1: 61, see also 1: 74) notes that the non-Indian block-printed textiles she studied (dating to the thirteenth and fourteenth centuries) were probably produced by printing with an iron-based substance and then immersing them in a liquid containing tannin; this calls to mind the oak galls in *sukk*. Resist dyeing using wood blocks is described earlier for China, see Barrett 2001.

58. Carter 1955; Tsien 1985: 311, etc.; Barrett 2008; Vainker 2004: 51–52.

59. Bulliet 1987: 435–36. But see Schaefer 2006: 33.

60. Bulliet (1987: 438) argues that the rise of organized Sufism came to monopolize the production of handwritten amulets, thus driving away the printed ones. See also Bloom 2001: 218–24, who argues that technical (the nature of the Arabic script) and social factors (especially the threat posed to copyists) delayed the acceptance of printing in the Islamic world.

61. I thank one of the *JAOS* reviewers for this suggestion. But note Burke and Whitcomb 2004: 92–93, where it is concluded that block-printed textiles from India were "somewhat rare and valued" at Quṣeir al-Qadīm at that time.

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