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ANATOMY AND EXECUTION
OF COMPLEX MINOAN TEXTILE PATTERNS
IN THE PROCESSION FRESCO FROM KNOSOS

Among the most impressive displays in Gallery IV of the Herakleion Archaeological Museum today are the large fragments preserved from the Procession Fresco from the Palace of Knossos, shown there also in a modern restoration which is comparable to that published by the excavator, Sir Arthur Evans (PM II 2, 704-736; suppl. pls. XXV-XXVII). Sadly, of the more than 500 hundred human figures apparently once depicted, parts of only about two dozen remain. Yet, it is not difficult to imagine the grandiose character of the original composition. This is evident in the life-size scale of the human figures, the precious objects they carry, their jewellery, and their luxuriously patterned clothing. Impressive is also the apparent extent of the mural. According to Evans it started at the southwestern entrance to the Palace and continued on walls of linked corridors leading to the South Propylon and up to the Piano Nobile.

The fragmentary condition, nevertheless, leaves many questions about the fresco unanswered, such as the nature of the procession, which is thought by most to be a religious ceremony (Hagg 1985), and whether there are grounds to believe Evans' suggestion that the figures, men and women, were arranged in two superposed registers (PM II 2, 720). The latter raises questions of whether the fresco was inspired in this and other respects by contemporary Egyptian paintings (Hood 1978, 65. Immerwahr 1990, 89), or, perhaps, had a Mycenaean character, one imposed by the tastes of Mycenaean overlords assumed to have taken control of the Palace at the end of LM IB. Naturally, the date of the mural remains vague. It was still on the walls of the Palace at the time of its destruction by a fire that left its marks on the painting itself. But how much earlier was the mural made?

This study concentrates on a little examined aspect of the Procession Fresco that may help define its artistic status and affinities and, by doing so, perhaps provide some incidental insights into the above questions. For the first time, this paper attempts a detailed examination of the more complex textile patterns that appear on the kilts and dresses in terms of the drafting devices used to render them. More specifically, it examines the use of a squared grid. A comparative analysis with related techniques both in the Aegean and Egypt places the fresco in perspective to the artistic traditions in the respective areas. The particular approach follows one I adopted in a study of the painted plaster reliefs from Pseira, which also feature patterned textiles on women's dresses (Shaw 1998). The present study is not primarily an iconographic one, but one that concerns itself with the technology of actual textiles. Such matters have been extensively treated in three excellent studies (Szamová - Sakkalavratak 1967. Barber 1991. Tzachili 1997). The more extensive analysis of individual textile patterns in all areas of the Aegean remains the unpublished dissertation of H. Reusch (1945), but without the benefit of the Theran frescoes which were discovered later.

Pertinent here are five patterns (A-E) from the Procession Fresco, the complexity of which required the use of grids. Five drawings (fig. 1, A-E) illustrate the stages of the composition of each pattern: the laying out of the grid (at the top of each drawing), the outlining of the basic motifs (middle), and the addition of final details (bottom). Pls. 2, A-E show the patterns without the grid to allow for an uncluttered appreciation of them. There is naturally a degree of schematization inherent in the computer-generated illustrations, but the primary aim here was to clarify the character of the patterns, rather than to produce a record of irregularities normal in any execution carried out by the human hand. Absolute accuracy in the reproduction of colour cannot be claimed either, given the unevenness in the degree of dilution of pigments and their poor preservation in the original. As usual, the Minoan palette is simple, consisting of four basic colours besides black and white: red, blue, ochre and orange. The last was used on the kilt of the Cupbearer and was apparently produced by applying diluted red strokes over an ochre background (PM II 2, XII).
The information in the Catalogue below focusses on technical aspects, but basic iconographic comparanda is provided by pottery (for its potential as a dating tool) and by Minoan and other Aegean frescoes depicting textiles. The evidence from Egypt, both iconographical and technical, is treated in a subsequent section.

CATALOGUE OF THE PATTERNS

The term “artist’s grid”, or, alternatively, “squared grid”, is used here to differentiate between an inherently grid-like pattern (like a chequerboard) and a grid-like drafting device that helps render complex patterns correctly. “Rapport pattern” refers to a composition constructed along diagonal lines, which are drawn or implied by the orientation of the component motifs that are systematically arranged at regular distances. This definition was first used to describe its use in pottery decoration (Furumark 1972, 114-115. Walberg 1976, 84-85), then to patterns in frescoes (cf. Barber 1991, 317-18). “Surface pattern” is a related term involving motifs like chevrons, and zigzags that may derive from plait work (Furumark 1972, 114, n. 2). “Guidelines” which are usually impressed, are variously used, as for instance to separate consecutive bands that are part of the upper frame typical in LB I Aegean paintings, or in representations of buildings shown in miniature frescoes, where the lines guarantee proper alignment of the architectural features (PM II.2, 63, fig. 36).

In the Procession Fresco, as in fact in most Minoan wall paintings where artists’ grids and guidelines were used, the lines were rendered by snapping a taut string against a still damp plaster surface to produce a permanently impressed line. The grid’s vertical and horizontal lines must have been impressed after the kilt or dress (or even the entire human figure) were outlined. We must assume that, besides the two people needed to hold the ends of the string, a third one would have assisted by covering the wall surface surrounding the costume, to prevent the string from leaving its impressions elsewhere. Some flexible material (leather, felt, or cloth) was probably used. White impasto was used for rendering some decorative motifs against a usually darker background. White could be their final colour, or could serve as a foundation for another light-coloured pigment, like ochre, to be added on top. For obvious reasons, the uppermost layer of pigment is not always preserved.

All measurements below are in centimetres, unless otherwise stated.

PATTERN A (fig. 1 A; col. pl. 2 A)

(PM II.2, suppl. pl. XXV, no. 7). Lower part of the skirt of a woman moving right followed by six male figures in long robes, at the start of the procession. Surface badly damaged.

Pattern and Grid: Because of poor preservation, there are uncertainties. The motif repeated in rows approximates the shape of a tricurved arch (Furumark 1972, motif 62, fig. 66), but the fact that the open ends curl inwards, as if to form spirals, also suggests an ivy (Furumark 1972, motif 12, figs. 35-36). This motif is in white impasto added onto what appears to have originally been a blue background, later turned grey and black by a fire. It is not clear whether another colur was added over the white, as may have been the case in Pattern C discussed below.

Exceptionally in Pattern A, the artist’s grid is made up of rectangular rather than square units. The size of each varies: 1.4 to 1.8 for the horizontal side, and 1.9 to 2.2 for the vertical, depending on the location in the area of the dress thus decorated. In fig. 1 A, I have adopted the more standard size, 1.5×2.1. Each arch/ivy spans two units width-wise, the dividing line between them marking its centre. Its height is equal to one unit, except for the curling ends which drop slightly below the bottom line of the row of grid units. It is clear that the grid here helps maintain the bilateral symmetry of each motif and its correct alignment in horizontal and vertical rows. The resulting overall pattern is rather simple, compared, for instance, with the network effect of the scale pattern (fig. 1 B), which is created by alternating the vertical alignment of the motifs every other line.

Comparanda. Given the ambiguity of the shape of the repeated motif, it is difficult to find comparanda for it. If intended as a tricurved arch, examples of the motif range in Minoan pottery from LM IB to the later LM III periods. The same dates apply to cases where the motif is detached and shown either singly or in rows, and mostly pendant, rather than with the points up as in the fresco (Betancourt 1985, pl. 22 G, p. 167, fig. 119 L, Popham et al. 1984, pl. 152, 2, Furumark 1972, 114).

PATTERN B (fig. 1 B; col. pl. 2 B)

(PM II.2, suppl. pl. XXVII, no. 20 and p. 729, fig. 456 b; Σαπουνά-Σακελλαράκη 1971, pl. B, b). The pattern appears on the kilt of one of three men walking to the right. The curving hems of the kilts are decorated with the barred pattern, at the end of which seems to be attached a net that hangs down the front of the kilt weighed down by beaded floral ornaments attached to the ends of the strings. The lines of the net were incised with the help of a straight edge and painted black. Little horizontal lines and dots fill the corners of each lozenge. Incision, rather than string lines, was used, for the aim
1. Grid and stages of execution of Patterns A-C from the Procession Fresco from Knossos, scale 85% of original (M.C. Shaw and M. Nelson).

2. Patterns A-C from the Procession Fresco from Knossos, scale 85% of original (M.C. Shaw and M. Nelson).
1. Grid and stages of execution of Patterns D-E from the Procession Fresco from Knossos, scale 85% of original (M.C. Shaw and M. Nelson).

2. Patterns D-E from the Procession Fresco from Knossos, scale 85% of original (M.C. Shaw and M. Nelson).

was to render the way strings can bunch up in a real net, while the organization of a woven pattern is fixed.

**Pattern and grid.** The repeated element is an arch outlined twice, the resulting band filled with round red dots. A red painted schematized derivative of the foliate plant motif is the filler, its basal leaves curved, the rest drawn as parallel horizontal lines. The scale pattern is created by avoiding a vertical alignment between arches in the successive rows (Furumark 1972, motif 70, fig. 70). The background is ochre. The grid consists of square units that vary from 1.5 to 1.7, the more standard size, 1.6, being the one adopted in fig. 1 B. Each semicircle occupies two units of the grid both width and height-wise, again with the dividing line between the grid units defining the centre of the motif.
Comparanda. The scale pattern is among the most commonly used in Minoan and other Aegean art. In Minoan pottery it goes back to Kamares ware (Walberg 1976, 189, fig. 44, motif 16: 1, 2, 4) and continues into the Postpalatial period (Betancourt, 1985, 167, fig. 119 G). In fresco, the pattern occurs on fragments found under the floor of the Corridor of the Processions and was suggested by Evans to have the same theme as the later fresco (PM II 2, 679-681, fig. 430 c. Sapouna-Sakellarak 1971, 169, fig. 71, a). It also occurs on the dress of the kneeling woman in the fresco from the Villa at Hagia Triada, there rendered in dots, and on plaster fragments without clear contexts from scattered locations in the Palace of Knossos (Sapouna-Sakellarak 1971, 169, fig. 71, b-d; 171, fig. 72, b). On the Mycenaean Mainland, one of the earliest examples may be the fresco fragments depicting patterned dresses found under the Ramp House on the Acropolis of Mycenae (Lamb 1919-1921, pl. VIII, 8-9). In a form that closely resembles the Knossian example, it is found on the painted floor of the Megaron of the Palace at Pylos (Blegen and Rawson 1966, fig. 73).

Pattern C (fig. 1 C; col. pl. 2 C)

(PM III 2, suppl. pl. XXVII, no. 21, and p. 729, fig. 456 c, where it is incorrectly reproduced with ivies upside down; Sapouna-Sakellarak pl. B, a). It appears on the kilt of a man just ahead of the one noted under Pattern B.

Pattern and grid. This is a diagonal or rapport pattern, each of its lozenges containing a pendant ivy, the spiral ends of which are linked by two curving bands, bordered below by dots. A vertical blade-like element, perhaps a bud, marks the centre of each ivy, the upper tip of which is marked by a dot. All dots in this pattern, including those at the junctions of the lines of the diagonal grid, were painted in white impasto against a blue background. The cores of the spirals of the ivies are ochre, and traces of yellow ochre appear here and there on other parts of the motif, raising the possibility that it was originally painted entirely in ochre. If so, one wonders if a golden ornament, a pendant, is implied.

The whole design was executed with the help of a squared grid. The units were nearly square (just ca. 1 mm larger height-wise in each case), and they varied in size, depending on their location on the kilt, from 2.1 to 2.7. Their more standard size, h. 2.4 and w. 2.3, is adopted in fig. 1 C. As can be seen in that illustration, the diagonal pattern was obtained by drawing the diagonals of each of the grid’s square units. Ivies and dots were added next. Interestingly, the diagonals of the pattern were also impressed like those of the grid. Whether a string dipped in black paint was used for the diagonal lines, or the impressions of an undipped string were later overpainted, is not clear without microscopic inspection.

It is possible that the pattern represents an actual net. One thinks of beaded nets worn over dresses by women in Egypt (Riefstahl 1944, 11 to 12). If it is a net, we could also raise the related question of whether the ivies represent gold ornaments attached to the fabric of the kilt. The possibility of using attachments as decoration in Aegean dress has been discussed by others (Σαπούνα-Σακελλάρικη 1971, 193, and more recently by Κωνσταντίνη 1995).

Comparanda. I am unaware of parallels for the particular rapport arrangement of the ivies in other frescoes. In pottery they usually appear (but set sideways rather than pendant) in bands (Furumark 1972, motif 12, figs. 35-36), the beaded variety being rather prominent in LM I (Niemeyer 1985, fig. 22 [1] 16). The arrangement in bands is also encountered in textile depictions in other frescoes (Fyfe 1902, 117 no. 40. Sapouna-Sakellarak 1971, pl. E, a).

The pattern of a diagonal grid finds a parallel in the Lady in Red (Cameron 1971, 37. PM II 2, 731, fig. 457, there wrongly attributed to the “Ladies in Blue”). In this, the red background was painted first, then the lines were impressed and painted black, their points of junction covered by a dot in white impasto. Horizontal parallel red lines fill half of each lozenge. A similar pattern occurs in what may be a predecessor of the Proces-
sion Fresco (PM II 2, 680, fig. d). The lines were again incised, as they are in some Mycenaean frescoes (Lang 1969, pl. Q, 14 D nws).

**PATTERN D** (fig. 1 D, col. pl. 2 D)

(PM II 2, suppl. pl. XXVII, no. 22, and p. 729, fig. 456, d: outer crosses incorrectly rendered as curvilinear). This figure is directly ahead of the one discussed under Pattern C. Only a tiny part of the kilt is preserved.

**Pattern and grid.** This is an elaborate interlocking pattern. The repeated motif is a curvilinear quatrefoil set within a cross, itself a rectilinear version of the quatrefoil. The units of the artist’s grid vary from 1.5 to 2.0, the more standard size, 1.6, being adopted in fig. 1 D. The crosses, painted in black, essentially follow the lines of the grid, each arm of the cross occupying one grid unit. They are arranged in a staggered or diagonal fashion and their points of junction (four in each case) are marked each by a solid black lozenge with incurved sides. The curvilinear quatrefoils within the crosses are also outlined in black, their centres occupied by a lozenge with incurved sides, which is also outlined rather than solid.

**Comparanda.** I am unaware of the particular combination of curvilinear and rectilinear quatrofoils in a rapport arrangement in pottery. To avoid repetition, I shall here limit myself to comparanda for the cruciform motif, the curvilinear one to be considered under Pattern E, for I do not know of another example of the combination of the two in frescoes. Examples of inter-


4. Patterns from the painted ceiling of the tomb of Hetpefa (M.C. Shaw).

locked crosses occur in loose plaster fragments from a variety of locations in the Palace of Knossos, though from undatable contexts. Sometimes alternating rows are painted in different colours, blue and ochre being one such combination. Filling ornaments also vary (Sapouna-Sakellaraki 1971, 167, fig. 70 a and d, 179, fig. 76, g; col. pls. E, a and F, b. Cameron 1975, vols. II, pl. 182, B and III, 146). On a fragment of a Mycenaean fresco depicting a woman’s dress, there is a pattern of crosses enclosed in crosses (Rodenwaldt 1919, pl. 9).

**Pattern E** (fig. 1 E, col. pl. 2 E)

(PM II 2, pl. XII, and p. 729, e). This pattern appears on the kilt of the famous Cupbearer, the only procession figure of which the head and most of the body are preserved. Fragments of this figure were found in the South Propylon of the Palace, but the similarity in scale and in other respects with the figures from the Procession Corridor makes Evans’ suggestion that it belonged to a continuation of the same fresco quite convincing (PM II 2, 704-712, figs. 443-44).

**Pattern and Grid.** The pattern uses interlocked curvilinear quatrefoils, the spaces between them painted solid black, creating a meandering band that surrounds them. The grid units vary in size from 1.7 to 2.0, depending on their location on the kilt. The more average size of 1.8 is adopted in fig. 1 E. Once the grid was impressed, the quatrefoils were outlined, each arm being the size of a grid unit. The spaces between them were then painted black. A circle surrounded by dots in red was placed at the centre, the motif repeated within the ends of the quatrefoil arms in blue. The background was painted ochre over which one can see diagonal brushstrokes in red.

**Comparanda.** The use of a curvilinear quatrefoil in an interlocking pattern is not, to my knowledge, encountered in pottery; but it occurs in Minoan frescoes (Fyle 1902, 117, fig. 40 A. Cameron 1975, vol. II, pl. 186 C and III, 150), and again in a very similar version on the painted floor of the Megaron of the Palace of Pylus (Blegen and Rawson 1966, fig. 73). An interesting and rich variation of Pattern E is the interlocking pattern on the dress of the so-called goddess in the fresco from the Villa at Hagia Triada. As shown here in a new drawing (fig. 3), it too was executed with the help of an artist’s grid, but by placing the quatrefoils in diagonal rows alternatingly painted blue and white. Four-pronged motifs are used as fillers: red ones within the white quatrefoils, blue ones within the black ones. The lozenge-shaped spaces between the quatrefoils are painted red. Some of the details described are missing in the restoration prepared by the Italian excavators (reproduced in Barber 1991, col. pl. 2), but they can be seen in that by Gilliérin in the Fogg Museum.

**DISCUSSION**

Before turning to a comparative analysis of the use of grids for the execution of complex patterns some comments are warranted about the comparanda related to pottery decoration noted in the Catalogue.

Perhaps the one clear conclusion is that, generally, there is not much matching in the use of such patterns in pottery and in frescoes, though rapport patterns with possible textile associations are not absent in the former. They occur, for instance, on Kamares pottery (Walberg 1976, 189, fig. 44, motif 16 i nos. 1-8 and 16 ii nos. 3-7), and in this case they are likely derived directly from the textiles themselves, rather than from painted renditions in frescoes. With the advent of major wall painting at the start of the New Palace period, the source of such patterns in other media, including vase painting, necessarily becomes ambiguous, for a special relationship is formed between the two related media. For instance, MM III and LM IA pottery does not show the interest of Old Palace pottery in rapport patterns. Instead it tries themes from nature, plants, trees and floral ornaments in the early Neopalatial period. Similar also are certain abstract patterns, like spirals, that are arranged in bands in vase painting, rather than in rapport compositions (Betancourt 1985, 97, figs. 98-100, pl. 17, A-G).

Rapport patterns seem to reappear in vase painting in the later LM IB period (Betancourt 1985, 121, fig. 90, pls. 18 B, and 22 D and H). This kind of decoration is seen by Furumark to be inspired by major art (1972, 164). Rapport decoration continues into LM II (Popham et al. 1984, pl. 166, 69-77, and pl. 167, 78-84), also in vases of Palace Style (Niemeyer 1985, pls. 6, XI A1, 7, XIII A3, pl. 24, top row right), and into LM III, but now with a more limited vocabulary of decorative elements, mostly scales and tricurved arches, more often in zonal arrangements (Popham et al. 1984, pls. 171-172. Betancourt 1985, 167, fig. 119). A survey suggests that LM IB to LM II/early LM III is the heyday of rapport or textile-related patterns in vase painting.

Vase painting patterns of a simpler character have also been used in the past in attempts to date the Procession Fresco. Hood, for instance, has pointed to the occurrence of the pattern of stacked arches both on the vertical band of the robe of a figure of the Procession (PM II 2, pl. XXV, 1) and in pottery in the earlier phase of LM III A (Hood 1978, 66), but here one must ask the question of whether textile patterns might have
been copied on frescoes well before they entered the decorative repertoire of pottery.

With these inconclusive remarks about the dating of the Procession Fresco based on pottery, I turn to a comparative analysis of the use of the grid, which remains the focus of this paper.

THE USE OF THE GRID IN CRETE

My knowledge of grids from Crete is based on direct examination of frescoes exhibited in the Herakleion Archaeological Museum. Other examples appear in Cameron’s dissertation, and selectively in Σπηλειών&eacute;ς Σικελίων (1971). Unfortunately, drawings of these patterns in various publications often omit the grid. I would estimate that there are more than 15 examples of grids known from Crete, including those on frescoes I quoted as comparanda in the Catalogue above for Patterns A-E of the Procession Fresco. Two cases I did not mention there, since comparisons in the Catalogue were made with regard to the pattern design itself, are the Ladies in Blue (PM I 545, fig. 397), and the Pseira Reliefs, both depicting women in fancy dress (Shaw 1998, col. pls. A-B, D-F).

Omitting miniature frescoes of which the scale does not allow for the indication of detailed dress patterns, as well as the later LM III frescoes from Hagia Triada, also with smallish figures (Immerwahr 1990, 100-103), all major figurative frescoes from Crete with large scale figures in highly patterned dress use an artist’s grid. Most of these frescoes depict women, but the Procession Fresco makes it clear that during official ceremonial occasions men did not shy away from flashier clothing. Pattern A shows that women also dressed up for such occasions. It is interesting in this context that, in the Theran frescoes, patterns appear basically on women’s clothing while men’s clothing is plain. A partial exception is the processional male figures from Xeste 4, whose kilts are decorated with bands of spirals and other simple patterns in which, however, there is no apparent use of a grid (Doumas 1992, 177, fig. 138).

On the basis of this relatively sizeable sample of Minoan artists’ grids, it is worth summarizing at this point the character and use of the device. Almost always the grid consists of essentially square rather than rectangular units. Though basically of the same size within each composition, the units tend to become slightly smaller near the edges of the clothing but still accommodating the entire pattern, which is rarely cut out. The size of grid units varies according to pattern. In the Procession Fresco the size ranges from 1.5 to 2.4. In the one pattern in the Ladies in Blue the unit is 1.2 to 1.3. In the dress of the goddess in the Hagia Triada “goddess” it ranges from 1.7 to 2.1. The grid on the dress of the kneeling woman from the same fresco is unclear because of poor preservation. In places I detected a size that varies from 1.4 to 2.0. The grid on the bodice of one of the two Pseira ladies decorated with rosettes is tiny (7 mm), and is impressed over the curving surface of the relief again with string lines. Grids are normally set vertically, but there are cases where such a grid was slightly slanted in parts of the fresco, as, for instance, on the sleeves of the Ladies in Blue where their arms are raised as they gesture. Pattern C in the Procession Fresco contains a diagonal grid pattern that was created with the use of a vertically set grid. In other cases, as in the Lady in Red, the artist skipped the stage of using such a grid to create a diagonal design, but the reason must have been the simplicity of the filling ornament, which is simple hatching. The pattern on the dress of the “goddess” in the Hagia Triada fresco is also constructed on a vertical grid which helped set the quatrefoils in diagonal rows. It should be noted here that an incorrectly oriented photograph of a detail of the dress published by Rodenwaldt (1919, 104, fig. 11) creates the wrong impression that the quatrefoils were in vertical rows. It is of interest that, as in the interlocking quatrefoil compositions of Patterns D and E, again lozenges cover the junctions of adjacent quatrefoils. The actual textile pattern in this case may have been inspired by inlay work (PM II 2, 731), where separate crosses or rounded quatrefoils in ivory, faience, or other materials would have interlocked in a similar manner once attached to a surface (cf. Foster 1979, 92 ff.). The perfect fit between quatrefoils reminds one of the pieces of a modern puzzle.

Occasionally a grid is omitted where one would expect one. Specifically, I refer to the skirt of one of the two Pseira Ladies, decorated by rows of lozenge-shaped spaces formed by undulating bands, each lozenge alternately enclosing a set of quadruple spirals and concentric rows of zigzags (Shaw 1998, col. pl. F, top). The omission is the more surprising, given the fact that an impressed grid was used in the other relief figure from this site. The explanation may be that the impressed lines coinciding with the bands would have been too conspicuous and would have cluttered the final design. It is possible that the artist resorted to the less favoured device of actually drawing the lines of the grid instead. An impressed grid would have been the more ideal, being faster and because it did not mark the surface with paint that had to be covered later by the painting.

Simple textile patterns naturally did not require the use of an artist’s grid. Dotted zigzags and dotted running spirals on the bodice of one of the Pseira La-
dies were rendered without the use of a grid, while patterns on another bodice did use a grid. Among the simple patterns that are apparently drawn freehand are those on the kilt of a man (PM II 2, 751, fig. 485) attributed by Cameron to a procession fresco he restores in the area of the Grand Staircase of the Palace of Knossos and dates to LM IA (Cameron 1978, 587-88).

THE USE OF THE GRID IN THE REST OF THE AEGEAN

Two areas are the most pertinent for the discussion of the rendering of textile patterns in frescoes: Thera, in the LC IA settlement at Akrotiri, and on Mycenaean sites. To my knowledge, no impressed grid of the kind described above for Crete has been attested on Thera. One explanation must be the relatively simple character of these patterns: florals, polka dots, simple diagonal grids filled with little crosses, dots, and lozenges, as well as a few somewhat more elaborate designs, like those on the dress of a lady in a fresco from Xeste 3, composed of linked rows of four-petalled motifs (Doumas 1992, 138. Televantou 1982, 131, fig. 7; 134, fig. 8, η-π). Such apparent lack of a grid is all the more surprising given the variety of other drafting devices (including the use of a compass) of impressed and incised guidelines otherwise attested in the Theran frescoes (Asiminos 1978, 573-77).

The rare complex rapport pattern is not seen on dress at Thera. Of the two cases known there so far, one occurs in a figurative scene in the House of the Ladies, in a fresco. The pattern may represent a canopy or a wall hanging (Doumas 1992, 38, figs. 6-7). Threaded red beads form a diagonal net in which large blue lozenges cover the points of junction of the beaded lines. Rather than being an actual woven textile, the decoration may have been made of threaded beads forming a net and the blue diamond motifs were metal attachments (Blakolmer 1996, 28). The artist's device we discern in the Theran fresco is an impressed or incised line that runs erratically through the middle of the diagonal beaded strands (see detail in Doumas 1992, pl. 8).

The second Theran example of a complex rapport composition is a wall hanging or curtain in a fresco in Xeste 3 (Doumas 1992, 175, pl. 137). It consists of a net the lozenges of which are marked by multiple undulating bands - a design that closely resembles that on the skirt of one of the Pseira ladies noted earlier. No impressed grid is used here, unless it lies under the bands which are in relief and separate from each other by an incised outline. A form of quilting was obviously in use, where padded bands in cloth were threaded through and held together by golden rings at regular intervals.

Mycenaean frescoes also generally feature simple textile patterns on dresses made without the use of an impressed grid (Immerwahr 1990, pls. XX-XXI). The Mycenaeans, however, did know of an impressed grid, as we learn from a unique case: a plaster fragment from the Palace of Pylos that depicts a tricurved scale pattern with a papyrus flower as a filler. It shows the use of an impressed grid with rectangular units (Lang 1969, 186, pls. 113 and R). Because of the nautical theme depicted on the other fragments with which this was dumped northeast of the Palace, the pattern is more likely to belong to a boat's sail or cabin, rather than a dress. Impressed lines were also used to create a grid-like pattern in the case of painted Mycenaean floors, each grid unit forming a panel that was variously filled with generally abstract surface patterns. What makes the difference here in comparing the use of a grid in its various applications is that the patterns within each panel appear to have been rendered freehand, rather using a grid as did patterns on cloth.

THE USE OF THE GRID IN EGYPT

The depiction of Minoan textile patterns in Egyptian paintings and other media has long been used as possible evidence for interconnections between Crete and Egypt via exported Minoan textiles. This approach to interconnections was given special impetus in the seminal study by H. Kantor, The Aegean and the Orient in the Second Millennium B.C., published over 50 years ago (see also Barber 1991, 330-357), but the issue of interconnections is ongoing, with reviews (cf. Warren 1995) incorporating new evidence. As noted above, the emphasis in this study is method of execution rather than iconography of the patterns. Since, however, Egyptian examples have not been noted in the Catalogue above, there is need for some introduction to the Egyptian use of complex patterns.

It is a known fact that complex patterns in Egypt are shown only on the clothing of foreigners, for the Egyptians themselves wore linen - a fabric that did not lend itself to easy colouring. There is instead a tradition for the use of surface patterns as architectural decoration going back to the Old and Middle Kingdom. Tombs, usually the best preserved monuments, display simple geometric surface patterns that cover wall recesses and ceilings - chequerboard, chevrons, and zigzags rows (Shedid 1994, 44, fig. 72) thought to simulate matwork. Mats were used for utilitarian purposes in
dwellings and other buildings (Smith 1981, 210). Mat patterns were gradually in part replaced. Thus, whether a matter of preservation or not, the early 12th Dynasty tomb of Hepzefa, Nomarch of Assiut in Upper Egypt, provides the earliest case of the dramatic introduction of spiraliform patterns in major painting. Other examples occur in varying forms in several other and mostly somewhat later Middle Kingdom tombs (Shaw 1970). Fig. 4 here illustrates two among the many adjacent panels on the painted ceiling of Hepzefa’s tomb. Involved are two closely related patterns, one using rectilinear motifs in the old Egyptian tradition relating to mats, the other curvilinear and spiraliform ones—a likely influence from the Aegean. The curvilinear version consists of rows of ivies, reversed in alternate rows so that their points touch. Lozenges of which the outlines are marked by dots appear on alternate rows. The overall effect just described is, to my knowledge, our best parallel for Pattern C of the Knossian Procession Fresco, since both paintings incorporate pendant ivies in a rapport pattern. Naturally, the Egyptian painting antedates the Knossian one by far, though ivies, a derivative of spiraliform designs, were themselves a novelty for Egypt at the time. The rectilinear pattern in the Hepzefa ceiling uses lozenges filled with four-petalled motives and what I have interpreted as rectilinear versions of the ivies (Shaw 1970, 28-30). It is quite possible that the construction of the rapport pattern itself, notwithstanding the borrowed Aegean motifs, owes much to Egyptian invention, unless one sees it as a direct copy of a type of Minoan textile already in use at that early time. The issue of transmissions and exchanges is obviously far from simple. Indeed, the wild variations of surface patterns on ceilings of later 18th and 19th Dynasty tombs suggest a great degree of invention on the part of the Egyptian artists. On the other hand, the closeness between the Hagia Triada textile pattern (fig. 3) and one on the ceiling of the 18th Dynasty tomb of Amenemhet (first noted by Rodenwaldt 1919, 104) is such that one has to hypothesize direct observation of a Minoan textile or a “book” of Minoan patterns. Whether the fabrics were traded directly between Minoans and Egyptians remains uncertain, but it is important in this respect to note that Hepzefa’s tomb (completed in the reign of Sesostris I) predates the earliest known MM pottery found in Egypt, which appears at the earliest in the time of Sesostris II (Shaw 1970, 25-26. Immerwahr 1990, 6. Warren 1995, 2-5).

Turning now to the question of technique, a recent publication by G. Robins (1994) provides most interesting information. The book is the product of first-hand inspection of paintings and painted reliefs in tombs, mostly of the New Kingdom, a few of the Middle Kingdom, and the Old Kingdom. The Egyptian squared grid (one used mostly to maintain the correct proportions of figures and other representations) was never impressed like the Minoan one, but in both cases a string was used. In Egypt, the string was dipped in red paint and allowed to leave its mark on the wall surface, one coated with plaster made of gypsum. As pigments were added on an already dry surface, the preliminary drafting must have also used a dry surface. One noteworthy fact that emerged from Robins’ research is that the use of a squared grid as a gauge for proportions of the human figure was apparently introduced no earlier than the Middle Kingdom—on present evidence in the reign of Sesostris I (Robins 1994, 73). On the other hand, during the Old Kingdom simple guidelines were used for rendering people along with a simple grid, used sporadically for patterns, such as for instance in the conventional rendition of water where the lines of zigzags were rendered by joining the diagonals of each grid square (Robins 1994, 70). This approach is eerily similar to the derivation of a diagonal net from a vertical grid in Pattern C in the Procession Fresco, but this may be coincidental.

Egyptian tomb ceilings are notoriously difficult to examine, both because of their great height that requires the use of a scaffolding, but often also because of their poor preservation. In the case of some Middle Kingdom tombs, the interiors were blackened by the fires lit by shepherds in modern times. Still, it is clear that patterns like checkers on many Old Kingdom ceilings inherently involve a grid structure. However, the more elaborate rapport designs introduced later, starting with the early Middle Kingdom, clearly required an artist’s grid. As noted earlier, such grids are now difficult to discern and, moreover, in most cases they would have been overpainted. Some cases have been detected in New Kingdom tombs (Robins 1994, 58). All in all, there should be little doubt that grids were used to render complex rapport patterns in Egypt. Copying, presumably from actual imported textiles, the Egyptians would have simply put the artist’s grid to new use. As for the Minoans, it is hard to tell whether the use of a grid was an independent local invention or one borrowed from Egypt and modified to make it suitable for fresco painting. What is clear is that the grid appeared first in Egyptian wall painting.

A final note should be added here on the bull-leaping fresco discovered recently by M. Bietak at the site of ancient Avaris, the capital of the Hyksos in the eastern Delta, and attributed by him to the decoration of the palace of Ahmose at the start of the 18th Dynasty (Bietak 1996, 67-83). This fresco incorporates a com-
plex pattern as a backdrop for one of the scenes and its theme obviously is inspired by the many frescoes depicting bull-leaping at Knossos. Here, however, I shall concentrate on the background pattern, which at one level of interpretation can be seen as inspired by textiles, whether woven, or embroidered, or painted (Shaw 1995, 105-111; 1997, 499-500).

A fine photograph published by the excavator (Bietak et al. 1994, pl. 14, D) makes the manner of the rendition of the patterns fairly clear and has served as the basis for the drawing I produce here (fig. 5) to illustrate the guide-lines used by the artist to ensure the correct drawing of the pattern. In a short presentation at the recent First International Symposium on The Wall Paintings of Thera (held at Santorini, August 30-4 September 1997), Palyvos pointed out the impressed lines and their use in guiding the artist to map out the overall pattern. It seems that the red painted motif that can be compared to a letter “I” was painted first, then came the serpentine black lines surrounding it. The horizontal and vertical lines are impressed, since the technique is that of fresco, rather than tempera, but these lines do not seem to describe a grid of the kind I defined above in connection with Minoan wall painting. An explanation may be that the configuration of the surface pattern in the Tell el-Dab’ a painting did not make such a grid necessary.

CONCLUSIONS

In conclusion I would like to return to some questions raised at the start of this paper and gauge whether and to what extent this technical study can throw some light on them. One was the question of the date of the Procession Fresco, the other that of artistic status and affinities both within the Aegean context and abroad in Egypt.

To summarize: the artist’s impressed grid is attested only in Crete within the Aegean, except for the unique instance at Pylos mentioned earlier. Impressed and (therefore visible) grids used specifically for dress patterns are lacking both at Thera and on the Mycenaean Mainland – at least on present evidence. Important for the question of date is the fact that the Procession Fresco fits fully within the Minoan tradition, one that goes back, as far as fresco depictions, to at least LM IA or early LM IB – the likely dates of the frescoes from the Hagia Triada Villa and Pseira. The quality of the execution and the complexity of patterns in the Procession Fresco equal such characteristics in other early Minoan frescoes, like the Ladies in Blue and the Lady in Red from the Palace of Knossos. Given such affinities, the temptation is to date the Procession Fresco early, name-

ly in the prime period of Minoan painting and no later than LM II, but then the possibility exists that the tradition for excellent craftsmanship lasted longer than we tend to assume. One problem with a LM III date is that, if the Mycenaeans were already in charge of Knos-

sos, it is strange that male clothing was shown in the fresco so elaborately patterned when male costume on the Mainland was apparently so plain. If Mycenaeans were depicted, then we must assume that they had adopted Minoan elite styles of dressing.

Another aspect that distinguishes Minoan renderings of complex patterns from the rest of the Aegean, and Egypt as well, is the difference in the use of the patterns. In Crete they decorate kilts and dresses. Abroad in the Aegean complex patterns seem to be limited to architectural decoration and interior decor. In Thera we noted the possible depictions of wall hangings or canopies, while on Mycenaean sites there are painted floors that may imitate carpet made up of joined panels. Complex patterns may once have decorated painted ceilings as well, to judge by the magnificent carved decoration on the stone ceiling of the Mycenaean tomb at Orchomenos (Marinatos and Hirmer 1960, pl. 161).

A situation similar to that described for the Aegean outside Crete seems to pertain in Egypt as well. Rockcut tombs preserve painted ceilings, the main areas of which are decorated with complex patterns. Elaborate patterns, often with spirals, appear on Egyptian sails and cabins as well (as has been suggested above for a fresco from Pylos). One wonders whether, if Crete was the main source of such patterned fabrics, these fabrics might have been of a heavier weave than those for kilts and dresses known to have been worn in Crete. Perhaps the Minoan textile industry accommodated these special needs of clients abroad. Heavy patterned fabrics would naturally be needed in Crete too, but the rare preservation of painted ceilings and floors there deprives us of the representational evidence for canopies and rugs.

My last note returns to one of the initial questions in this paper: whether the Procession Fresco had an Egyptianizing character. The most convincing reason would be the use of a double register suggested by Evans, but for this there is no compelling evidence. On the other hand, the use of the artist’s grid was almost surely imported from Egypt, already in earlier times, and there may have been other artistic exchanges between the two countries, as suggested above by Hepzefa’s painted ceiling. Indeed, ideas must have travelled back and forth over the centuries between the two countries, becoming eventually part of an international artistic koiné, itself a rich tapestry the exact character of which continues to elude us.
NOTES

1. I would like to thank the Ephor and Director of the Museum, Alexandra Karetsou, for inviting me to participate in this occasion, for facilitating my study in the Museum, and for financial assistance for the preparation of the illustrations. A small grant from the University of Toronto also helped. The study took place in the summer of 1997, and I thank Alexander C. Shaw for slides of details he took at the time, which helped double-check the accuracy of my tracings and drawings of the patterns. I thank Giuliana Bianco for initial help with the illustrations, which were digitally finalized by Michael Nelson. I am grateful to Professor Emily Vermeule for lending me a slide of the Gilliçon reconstruction of the Hagia Triada Fresco, necessary to check details on the dress of the “goddess” for the drawing in my fig. 3. My text benefited from comments by Professors J.W. Shaw, P.P. Betancourt, and J.B. Rutter, but I am solely responsible for any errors of judgment.

2. The other fragments depict a rigged mast crossed lower down by a horizontal band at which the rigging ends (Lang 1969, 186, pl. 113, 19 M ne). The fragment with the elaborate textile pattern could belong right under this band, decorating either a square sail or a cabin set amidships. The use of patterned cloth for at least the cabins is attested in other Mycenaean paintings (cf. Shaw 1980a).

3. There is a Minoan motif that resembles the shape of a rectilinear ivy, but in the two known examples it is used in a continuous frieze arrangement, rather than as part of a rapport pattern. The motif, forming an angle, appears in the painted Spiral Frieze from the west wing of the Palace of Zakros (no final published illustration), and, again, as a dress pattern in a Theran fresco (Doumas 1992, 140, pl. 103).

4. A pattern very similar to the net in fig. 1 C interestingly appears on the dress of a painted wooden figurine of a Nubian lady, also from the period of Sesostris I (Russmann and Finn 1989, 58, fig. 24). I thank the former author for bringing this to my attention.

5. The ceiling painted with quadruple spirals in relief from the Palace of Knossos could reflect such a textile (PM III, pl. XV).