MEASURE FOR MEASURE: WHAT THE PALAIKASTRO *KOUROS* CAN TELL US ABOUT MINOAN SOCIETY*

Every part of the whole
must be in proportion to the whole
(Leonardo Da Vinci, *Notebooks* 93 E.6v)

The chryselephantine statue of a young Minoan male (conventionally, a *kouros*) discovered at Palaikastro is, at nearly 50 cm. high, the largest Minoan sculpture ever found [1]. It had been broken apart in antiquity, presumably by looters avid to acquire its gold ornaments: the head, torso, arms and feet were found in an open square in a street outside Building 5, more than 10 meters from where the legs were later discovered within Room 2 of the same building. Both inside and outside areas were covered in the thick burnt debris and wall collapse of a Late Minoan IB fire destruction.

Despite having been badly burnt, the statue is virtually complete (only a small part at the waist is missing) [2] and is, except for the face [3] amazingly well preserved. Its very fine workmanship is evident, with highly realistic details such as sinews and blood vessels clearly indicated on both hands and feet [4]. The figure was carved from four separate pieces of hippopotamus ivory, using two lower canines for the torso and two

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* I warmly thank Prof. G. Robins for her great kindness in sending me a copy of page proofs of her book (below) in advance of publication. I am grateful too to the Archaeological Institute of the University of Heidelberg for the photographs made from their 1:1 casts, Pl. XLII and XLIII.
The following abbreviations are used:
IVERSEN - E. IVERSEN = *Canon and Proportions in Egyptian Art*^{2} (1976).
ROBINS - G. ROBINS = *Proportion and Style in Ancient Egyptian Art* (1994).
SCHÄFER - H. SCHÄFER = *Principles of Egyptian Art*, ed. E. Brunner-Traut; trans. J. Baines (1974).

1 We may be grateful to the excavators, L.H. Sackett and J.A. MacGillivray, for their prompt publication of this extraordinary find (*BSA* 83 [1988], 267, Pl. 45; *BSA* 84 [1989], 426-7, Figs. 7-8, Pls. 62-3; *BSA* 86 [1991], 141-44, Figs. 18-9, Pl. 9) as well as to those who dealt with its meticulous conservation and restoration: A. Nikakis, Agios Nikolaos Archaeological Museum; A. Moraitou, Acropolis Museum; P. Harrison; and M.S. Moak. I am further indebted to Prof. Moak for his very kindly supplying me with the essential 1:1 drawings and detailed measurements of the statue, and to the excavators and the Managing Committee of the BSA for their permission to discuss and illustrate it.

2 The maximum gap at the waist has been estimated at 0.9 cm., making its height 49.9 cm. from the top of the headdress to the soles of the feet; the pegs under the feet (which would have been hidden in the missing base) raise the overall height to 52.7 cm. The missing waist-piece could have measured as little as 0.0 cm. -- that is, no gap at all; the surviving pieces touched -- or as much as 0.9 cm.; anything over 0.9 cm. would result in a decidedly grotesque figure.

3 The face is a thin ivory front over a hollow head encased in its serpentine headdress; see J.A. MACGILLIVRAY *et al.*, "Excavations at Palaikastro, 1988", *BSA* 84 (1989), 426 & Pl. 62, 63.

4 The statue's essential anatomical accuracy -- that 'it was the product of minute observation ... cannot be denied' -- is confirmed by J. MUSGRAVE, "The Anatomy of a Minoan Masterpiece", *Ivory in Greece and the Eastern Mediterranean from the Bronze Age to the Hellenistic Period* (*British Museum Occasional Paper* 85, 1992) 17-23; he nonetheless considers it unwise to claim that the sculptor had examined dissected (or flayed) human bodies.

large lower incisors for the legs [5]. The craftsman's ability to unite flawlessly the carved ivory sections was intriguing. What technical procedure could he have used to ensure identical proportions on each of the pieces? For example, Egyptian artists worked within a framework of guidelines or grids in order to draw or sculpt human figures according to a fixed canon of proportions [6]. Such a grid would have also undoubtedly, if inadvertently, facilitated the fitting of separate parts into a seamless whole. Had the Minoan statue also been carved following some such proportional system? I did not (needless to say) expect to find the Egyptian canon underlying this most Minoan-looking figure, but rather sought to discover if there were any retrievable system or rules of proportions.

The Egyptian Model

Egyptian artists established the proportions of major male figures by means of a modular grid [7]. In the first Egyptian proportional canon (from the 5th until the 26th Dynasty) the height of a standing male figure, as measured from the soles of the feet to the hairline [8], was divided by horizontal lines into 18 equal parts (Pl. XXXIX, XLa-c) [9]. While the lines were inevitably slightly inaccurate, having been drawn with a straight edge or marked by a string dipped in red paint, they nonetheless consistently intersected the body at certain key points. During the periods with which we are concerned (Late Middle Kingdom and early 18th Dynasty) horizontal lines crossed a 'typical' major male figure at:

Line 18	the hairline
Line 17	bottom of the nose
Line 16	junction of neck and shoulders
Line 14	the nipples
Line 11	the navel (back: small of back)
Line 9	the hips (back: lower line of buttocks)
Line 6	the upper knee
Line 0	under the soles of the feet

Across these horizontal lines, vertical lines were drawn, equidistant on either side of a median line running (most commonly) in front of the ear, to form a squared grid. Just as the horizontals passed through certain key points, the verticals were also fixed,

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5 M.S. MOAK in J.A. MACGILLIVRAY *et al.*, "Excavations at Palaikastro, 1990", *BSA* 86 (1991), 141-44.

6 On the artistic canons and the use of grids, see IVERSEN, 20-26, and ROBINS, Chapter 2 (both citing previous literature); note especially the discussion on the development and variations in the first Egyptian canon in ROBINS, Chapter 10.

7 I would like to thank Prof. B.M. Bryan for sending me detailed measurements of some Egyptian 18th Dynasty statues and Prof. G. Robins for her generous help and lively criticism. The Egyptian system is discussed in detail in both IVERSEN and ROBINS (*supra* n. 6); for a more Aegean viewpoint, see also my "Proportions and the Palaikastro *Kouros*: A Minoan Adaptation of the First Egyptian Proportional Canon", in *Fest. Martha Bell* (forthcoming).

8 The hairline is the highest visible point of the figure when the head is covered by a wig or headdress; in a sense, it is also the highest 'true' point since head coverings were of variable height.

9 The rule of 18-units to the hairline was rarely breached except in the Amarna period when a 20-unit grid was established (ROBINS, Chapter 6). There had been some experimentation with a 20-unit grid in the time of Thutmose IV (G. ROBINS, "Amarna Grids: Standing figures of the king in the early style", *Göttinger Miszellen* 84 [1985], 62-4) and occasionally again in the post-Amarna period (G. ROBINS, "The canon of proportions in the tomb of Ramesses I", *Göttinger Miszellen* 68 [1983], 85-96).

marking the frontal torso at the armpits two squares from the median line and the widest point of the shoulders at three squares from the median line.

By following this grid and placing the key points on the correct horizontal and vertical lines, the artist could draw or sculpt perfectly-proportioned figures to any scale in accordance with the first Egyptian canon. It is not to be imagined, of course, that all artists slavishly followed every detail of this grid; freehand drawing and an artist's eye always played some role. Still, the use of the modular grid standardized the representation of major male figures to the extent that, in the absence of visible grid traces (of course, the vast majority of cases) a hypothetical 18-square grid can be reconstructed which almost invariably picks out these key crossing points [10].

Obviously, the Egyptians found these proportions satisfying and presumably exemplary. Erik Iversen, in an influential but controversial work, *Canon and Proportions in Egyptian Art*, claimed that the canon was built on a metrological model, that it was 'an anthropometric description of the human body, based on the standardization of its natural proportions expressed in the Egyptian measure of length' [11] . The force of such an elemental model might help explain the conservatism of proportional rules over some centuries. As elsewhere in the ancient world, the basic units of Egyptian linear measurement were standardized lengths of parts of the body, chiefly fingers, hands and arms: *i.e.* digits, palms (= four digits), small cubits (= 6 palms) and royal cubits (= 7 palms). Iversen argued that each square of the grid was a modular unit equivalent to one metrological fist (that is, the fist as a measure, equal to the width of palm + thumb = 1 1/3rd palms) [12] . Thus, in his view, the fact that the clenched fist very commonly fits *exactly in* a grid square was not a consequence of the grid but its cause.

This claim has been disputed, most recently and vigorously by Gay Robins [13] and it is certainly not my purpose -- nor within my competence -- to mediate between them. My intention is rather to investigate whether the Palaikastro *kouros* was also carved within a proportioning grid.

The Palaikastro *Kouros*

The height of the *kouros* from the soles of the feet to the top of his stone headpiece has been restored at 49.9 cm., with the hairline at 48.4 cm. above the soles of the feet. The gap at the waist could be as little as zero or as much as 9 mm. [14] which makes discussion of its original height problematical. However, we are not so much interested in restoring the total height of the statue as in retrieving its internal proportions; thus, I tested each possible grid *down* from the top of the head or hairline and *up* from the soles of the feet, to see which lines (if any) crossed meaningful points. Having tried a number of different units

10 A number of exceptions exist to 'prove the rule': some seem to be due to artists taking liberties or drawing freehand, but there were other modifications too (ROBINS, Ch.10); note especially the altered represention of private persons in the late 12th/13th Dynasty (ROBINS, 249-54). During the 18th Dynasty (beginning temp. Thutmose III or Amenhotep II) proportional rules underwent more general changes (ROBINS, 87-94); nonetheless, the 18-unit grid remained the basic convention (except in the Amarna period; *supra* n. 9) until the introduction of the Second Canon in the 25-26th Dynasties.

11 IVERSEN, 33.

12 On the proposed metrological structure of the canon, see IVERSEN, 27-38, and, more succinctly, his "Metrology and Canon", *MDAIK* 46 (1990), 114-115.

13 ROBINS, 40-56.

14 *Supra* n. 2.

and grids, I propose that a variation of Iversen's fist-based module best fits the Palaikastro *kouros* [15].

The statue's extant left hand is drawn with meticulous anatomical realism and can be accurately measured: the back of the fist at its widest point across the second knuckles, *i.e.*, equivalent to one palm in width, is a fraction under 1.8 cm (Pl. XLd). The width of the thumb is .49 cm. Added together, the resultant fist measures a little under 2.29 cm. Since it is hardly likely that ancient craftsmen worked to a tolerance of less than one millimetre, I tested a grid module of 2.3 cm.-squares [16].

When such a grid is placed over the statue, the figure's underlying structure immediately becomes clear (Pl. XLIa-b). The hairline is 21 modules high (with the estimated gap at the waist reduced to 5.5 mm.) [17]. Horizontal lines cross the following points:

Line 21	the hairline
Line 18	the widest point of the shoulders
Line 17	the nipples and armpits; note that the nipples are placed most unnaturally high, on the same line as the armpits
Line 11	two small holes; perhaps lower attachment points for a codpiece (in profile: top of buttocks)
Line 10	join of the legs (in profile: lower buttocks)
Line 6	the top of the knees
Line 0	under the frontal toes (in profile: under soles of the feet)

We may also tentatively locate the missing navel (and thus, in profile, the small of back) on Line 13, a suggestion discussed in some detail below [18]. For the verticals, on either side of a median line drawn through the join of the legs: the armpits are two squares and the widest point of the shoulders three squares from the median line, exactly as in the Egyptian canon.

Since *the modular measure of the fist was taken from the statue itself*, the coincidence of grid lines crossing so many important points is unlikely to be due to chance.

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15 Some of the many 'failed' grid modules are described in WEINGARTEN, *supra* n. 7. NB: a warning word on grids: the human body can be visually described in various ways, with each view turning up some points of interest. In ancient Mesopotamia, for example, perhaps in accordance with the sexagesimal system, the body was often divided into parts of one-sixth (G. AZARPAY, "A Canon of Proportions in the Art of the Ancient Near East", *Investigating Artistic Environments in the Ancient Near East* [1990], 93-103). Greek and Roman proportions passed down by Vitruvius were based on 10 perfect parts (possibly a Pythagorean concept). In Egypt, the ideal proportions of the first canon divided the body into 18 parts and of the second canon into 21 1/4 parts, a system also followed by some archaic Greek sculptors (E. GURALNICK, "The Proportions of Kouroi", *AJA* 82 [1978], 461-472). Each viewpoint yields perfectly viable proportions with lines crossing some significant points. However, in each artistic culture, if a grid has been used, there should be only one best-fitting grid, which should yield significant points on vertical as well as horizontal lines. Thus, I am not presenting the only possible grid for the *kouros* (cf.: *infra* n. 19) but what I take to be the best-fitting grid.

16 The minimum Egyptian unit of length (as far as I know) was 1/16th of a digit, or ±12 mm. NB: by modern standards, Bronze Age metrology is fairly imprecise and one must allow for a wide degree of error even if we knew (which we do not) whether sculptors tended to carve on the inside or outside of the gridlines. Hence, I take the electronic callipers reading of the palm width at ≥1.73 cm. as between 1.7-1.8 cm. and tested these width ranges + thumb. My computer-generated gridlines, too, are unduly accurate compared to any possible hand-drawn grid, whether ruled or marked by strings (on how the Egyptian grids were made, see ROBINS, 26-30; for an example of the irregularity of gridlines in practice, see some extant grids on wallpaintings from Meir: A.M. BLACKMAN, *The rock Tombs of Meir*, II, [1915], Pl. 3 & 10).

17 This gap is dictated by the statue itself: at 5.5 mm., the 9th line of the grid descending from the hairline overlaps the 12th line of the grid ascending from the soles of the feet.

18 *Infra* n. 21.

The Minoan craftsman had clearly used a geometric grid in carving the statue and that grid was, I suggest, based on the proportional fist. The *kouros* is thus 21 proportional fists in height [19], measured (as in the Egyptian canon) from the hairline to the soles of his feet.

It seems likely that this 21-module grid descends from, and is but a simple variation of the proportional grid of the first Egyptian canon. The vertical divisions are perfectly in accord with the Egyptian canon. On the horizontals, the Minoans seem to have added three grid modules to the Egyptian 18-units in order to create their ideal elongated male figure. The elongation is limited to body parts below the nipples and above the knees [20]. One square was added to the thighs, increasing the length of the upper legs from three to four squares. Assuming that the navel has been correctly restored at Line 13 [21], the second square was added between the nipples and the navel (increased from three to four squares) and the third square added between the navel and the join of legs (from two to three squares).

The simplest explanation is that this 21-square grid used for carving the *kouros* was a stretched Minoan version of the 18-square grid underlying the first Egyptian canon of proportions. Since the procedure could not be deduced from finished images, it seems reasonable to accept, firstly, that it was adopted by craftsmen who learnt its use from Egyptian (or Egyptian-trained) artists and, secondly, that this transfer could only have taken place in a sculptor's or wood or ivory carver's workshop, where artists were accustomed to work with three-dimensional grids [22]. Egyptian sculpture in the round

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19 That is, the fist as a proportional element deprived of numerical value (IVERSEN 30, n. 1). While the 21-fist grid is the best fitting grid, it is not the only possible one. One could divide the total height of the statue from *top of its headdress* to base (49.9 cm) into 18 squares of ±2.8 cm., which results in horizontal and vertical lines crossing significant points. On the horizontals: Line 15 - top of shoulders; Line 14 - nipples & armpits; Line 9 - two dots; Line 5 - top of knees. On the verticals (with no median line): armpit to armpit = 3 squares; shoulder to shoulder = 5 squares. I doubt that this grid would have been attractive to any craftsman because the serpentine headdress and the ivory face would have had to share the frontal 18th square: Line 17.5 would mark the top of the ivory (*supra* n. 3) while the separate headpiece would have had a frontal measure of 1/2 square. The relatively good fit of this 18-square grid reflects its mathematical relation to that of 21 1/2-fists (to the crown of the head); the 6:5 ratio of 21.5:18 is coincidentally the same 6:5 ratio obtaining between the second and first Egyptian canons, with somewhat similar consequences for grid lines (ROBINS 164-66; IVERSEN 75-78 & Pl. 30, 31).

20 On both grids, the top of the knees are at Line 6 and the nipples four lines below the hairline (Line 17 on the *kouros*; Line 14 in the Egyptian canon).

21 The navel on this line finds support on more complete LM I Minoan and Theran male figures set on hypothetical 21-unit grids (cf.: below, the Theran Fisherman fresco); it also fits the natural distance of the navel under the armpits.

This restoration of the navel on Line 13 has the (unintended) consequence of a nearly perfect Golden Section ratio of 13:21 (0.619 compared to an ideal 0.618) with both numbers 13 and 21 in the Fibonacci Series. This is closer to the ideal ratio than the Egyptian ratio of navel to hairline of 11:18 (0.611), with neither number in the Fibonacci Series; see B. KEMP & P. ROSE, "Proportionality in Mind and Space in Ancient Egypt", *CAJ* 1 (1991), 104, 107-109, with their cautious conclusions, 126-127. NB: since these ratio's exclude the crown of the head, the coordinates are not precisely comparable to those later used by Vitruvius for the spread-eagled 'man in a circle' (*De Architectura*, III, 3.1, 2-8); for the same reason, the navel is not quite the centre of an ideal Egyptian nor, if my grid is accepted, of the Minoan male. A restoration of the Vitruvian canonical grid (also with Leonardo Da Vinci's modifications) in B. MÜLLER-HUBER, *Der Entwurf des Künstlers: Bildhauerkanon in der Antike und Neuzeit* (1992), Ch. 7 and Fig. 39.

On a Fibonacci-like series in the Late Bronze Age, see K.M. PETRUSO, "Additive Progression in Prehistoric Mathematics", *Historia Mathematica* 12 (1985), 101-106.

22 While the Egyptian canon of proportions was the same for sculptors and painters, some technical consequences were different. Not least, when a painter drew a figure's outline on a two-dimensional grid, he kept his guidelines visible until he filled in the body colours and painted over these lines; a sculptor, on the other hand, blocked out a three-dimensional grid with an incised or painted outline of the figure on

obviously does not follow all conventions of two-dimensional painting and relief. For example, when a sculptor sketched the side of a figure on the side of his stone, he drew it with both shoulders shown in correct profile [23]. This may be why the *kouros* lacks the conventional guideline marking the juncture of neck and shoulders in Egyptian two-dimensional work (at two lines below the hairline, Egyptian Line 16). Is the absence of this horizontal guideline due to a shift from a two- to three-dimensional view? This leads to a testable hypothesis: the Egyptian canonical line, *i.e.* marking the juncture of neck and shoulders two lines below the hairline, should appear in Minoan two-dimensional paintings or reliefs. Though proof is indirect, this surmise turns out to be correct.

As most commonly happens, even in Egypt, overpainted gridlines have vanished [24]; Egyptologists can nevertheless reconstruct the underlying grid if (and only if) the artist followed the rules of the canon. Robins describes the procedure:

> "it is possible to take an accurate reproduction of any figure and analyze it on a hypothetical grid obtained by dividing the distance between the hairline and baseline by the appropriate number of [18] squares .... The position of the horizontals in relation to a given figure is governed by the baseline and the level of the hairline...When these coincide with the constructed grid, the horizontals can be taken as matching as nearly as possible the position of the originals, so long as it is remembered that there are likely to have been irregularities in the grid as it was originally drawn by the Egyptian draftsman. It is more difficult to place the verticals because there are no points to which they are exactly fixed. Where figures survive on original grids, one vertical, more or less central with respect to the upper part of the body, virtually always runs through some part of the ear... so that a vertical passed through each armpit and others ran down the outside of each upper arm" [25].

In practice, this means that 1/18th of the distance from hairline to the soles of the feet equals one hypothetical module (whether or not this corresponds to Iversen's proportional fist). This module then defines the distance between vertical lines drawn on either side of a median line running, for example, in front of the figure's ear. When the resultant grid intersects the body at the appropriate fixed points on both horizontals and verticals, it is probable that the figure is canonical and the reconstructed grid is correct.

If, therefore, the 21-unit grid proposed for the Palaikastro *kouros* is correct, it follows that we can similarly divide any major Minoan male figure into 21 equal horizontal parts from hairline to soles of feet and use the derived hypothetical module to restore the verticals. Since (alas) no wall painting on Crete is sufficiently intact for such a test, our proof must lie in Thera: we shall apply this hypothetical grid to the Fisherman fresco from LM IA Thera.

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each surface of the stone and, as his work progressed, the guidelines were cut away with the stone. It is rare to find extant guidelines on statues before the Late Period, perhaps because grids were removed by an initial chiselling of the entire surface of unfinished statues (I am grateful to Dr J. Phillips for this information); nonetheless, grids occasionally remain visible, *e.g.*, a colossal limestone statue (temp. Amenophis IV?) still with incised grid: C. SIMON, "Le *nbi* et le canon de proportions", *JEA* 79 (1993), 165, n. 24; cf.: a 3rd(?) Dynasty limestone relief (trial piece?) with complete grid on reverse: W. DAVIS, *The Canonical Tradition in Ancient Egyptian Art* (1989), Fig. 5.4 b,c.

23 C.C. EDGAR, "Remarks on Egyptian 'Sculptors' Models' ", *Recueil de travaux [relatifs à la philologie et à l'archéologie égyptiennes et assyriennes]*(1905), 137-50.

24 *Supra* n. 22.

25 ROBINS, 61-62.

The Theran Fisherman Fresco

Christina Televantou considers this fresco to have been painted by an artist 'very close to the tradition of Minoan painting' [26], and we can now add the evidence of his proportions to her aesthetic and technical judgments. The hypothetical 21-unit grid crosses the Fisherman (Pl. XLIc) as follows:

Line 21	the hairline
Line 20	the bottom of the nose (a feature lost on the Palaikastro figure but corresponding to the Egyptian canon)
Line 19	the junction of neck and shoulder; NB: *this is the canonical line in Egyptian two-dimensional painting; it not only marks the junction but falls two lines below the hairline, as in the first Egyptian canon*
Line 17	the armpits, as on the *kouros* (nipples are not indicated)
Line 13	back: the small of the back; anatomically, this line must mark -- or be very near -- the navel on the front; this supports the proposed restoration of the navel on Line13 of the *kouros* [27]
Line 11	back: across the buttocks at the point of maximum convexity [28]; this line marks the top of the buttocks on the *kouros*
Line 10	the join of the legs, back: lower line of buttocks, as on the *kouros*
Line 6	the top of the knees, as on the *kouros*
Line 0	under the soles of the feet.

Thus, on the horizontals, the only major difference between the Fisherman and the *kouros* (as preserved) is at Line 19, marking the Fisherman's junction of neck and shoulders; this line has no equivalent on the *kouros*, but agrees with the canonical Egyptian gridline in two-dimensional work.

On the verticals, the fit is less good in one respect: the Fisherman's shoulders are decidedly narrower than those of the *kouros*. When a median line is drawn in front of the ear and verticals spaced one module apart, lines pass (as they should) through the armpits, but the shoulders are slightly less than five squares across rather than the canonical six squares. Is this narrower body an indication of the Fisherman's youth, or of lesser status (an offering-bearer rather than a major figure in his own right) -- two options with good Egyptian parallels [29] -- or does it reflect local taste in proportions? Further research may clarify which explanation (if any) applies to the Fisherman.

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26 C. TELEVANTOU, "Η αποδοση της ανθρωπινης μορφης στις Θεραικες τοιχογραφιες", *AE* (1988), 135-166.

27 *Supra* n. 21.

28 *Infra* n. 29

29 Shoulder width possibly reflects status; *e.g.*, on a wall painting from early-12th Dynasty Meir, still with much of its original grid (Pl. XXXIX; BLACKMAN, *supra* n. 16), the major male figure -- who is, of course, the tomb owner -- measures 6 squares across the shoulders while most subsidiary figures (cf.: especially, the incense bearer) have narrower shoulders, five squares across or less. Age, too, can play a role: the slender playing boys have shoulders only 4 squares across.
Also, in the Late Middle Kingdom, there are more slender shoulders and especially slender waists (two squares or less in width at the level of the small of the back) on images of private persons and minor figures; for example, on some stelai from late 12th/13th Dynasty Abydos (Pl. XLb; cf.: Pl. XLII; ROBINS, 249-250, figs. 10.31, 10.34). NB, too, at this time, the line crossing the buttocks at the point of maximum convexity. Though evidence is very slight, there is a further hint that the Minoans might have adopted the proportional system during the Late MK: cf.: the unnatural location of the nipples of the *kouros*, on a level with his armpits, a feature of some late-12th/13th Dynasty sculpture; *e.g.*, L. HABACHI, *The Sanctuary of Heqaib* (1985), Pl. 82 and 103: no 28 and 37; C. ALDRED, *Middle Kingdom Art in Ancient Egypt* (1956), Pl. 79 & 81; and cf.: the (similar) Pl. XLa.

Although a question-mark hangs over the reason for his shoulder width, the evidence of the Fisherman's horizontal proportions (as well as vertical lines through the armpits, on either side of a median line drawn before the ear) shows that the Fisherman Painter proportioned his figure according to a 21-unit squared grid, which was otherwise in accord with the first Egyptian canon. This has two consequences:

First, it is more likely that this Theran 'school' adopted the proportional grid from Minoan painters rather than directly from Egypt or the Levant. This means, in turn, that Minoan artists themselves must have adopted the Egyptian grid no later than early LM IA, or possibly quite a bit earlier (presumably needing some time to experiment and cope with the effects of elongating a body from 18 to 21 units) [30].

Secondly, the Fisherman Painter did not use the fist as the grid-module --the Fisherman's fist is visibly smaller than a grid square-- but, rather, apparently divided the space between hairline and baseline into 21 equal parts, with the resultant module used for the vertical lines. This suggests a less strict interpretation of proportional rules than those followed by the *kouros* sculptor. It cannot now be determined if the fist-based module was lost in the transmission from Crete, or if this Theran 'school' had learnt its proportional grid from Minoan artists governed by less strict rules.

The Boxer Rhyton and Chieftain Cup

That there was more than one set of Minoan rules of proportion on LM I Crete is already evident: the carvers of the LM I Boxer Rhyton and Chieftain Cup, both found at Ayia Triada, also used squared proportional grids... but not the 21-unit grid of the *kouros* or Fisherman. Despite determined attempts to make them fit this grid, they resolutely refused to do so. More open-minded tests followed and, to my utter surprise, the best-fitting grid for both relief figures turned out to be an 18-unit grid corresponding in almost every particular to the original Egyptian model (Pl. XLII, XLIII) [31]. While there are some differences where lines cross their figures (due to, not least the dramatic pose of the Boxer), both males are drawn according to the same basic grid structure [32]. In order to demonstrate this clearly, I have superimposed complete 18-unit grids on the illustrations though I believe it highly unlikely that such small scale sculpture would have required every line drawn (and, as remarked, I doubt that Bronze Age artists could have managed tolerances of <1 mm.) [33]; it would have sufficed for the sculptor to mark every second line between the knee tops and the hairline since any competent artist could visualize and mentally insert such small half-stops.

If the Minoans had indeed taken over the Egyptian proportional system at some time during the Late Middle Kingdom, it had already passed through the hands of several generations of Minoan artists before it was carried to Thera and eventually reached the Fisherman Painter.

30 *Supra* n. 29.

31 *Supra* p. 248. NB: the photographs of the Chieftain and the Boxer illustrated in Pl. XLII and XLIII are taken at a right angle to the carving (*i.e.* the vases are tilted to present a right angle to the camera) in order to reproduce the way the figures were seen by the sculptor and not the way they look on display! The sculptor would have held the vase, in a clamp or between his legs, so that he actually carved on a straight surface, his drill or gouge held at an essentially right angle to the stone.

32 Independent evidence now for the use of a grid, though not necessarily to establish proportions, on the Zakro Sanctuary rhyton, in P. REHAK & J.G. YOUNGER, "Technical Consideration on the Planning of Minoan Stone Relief Vessels", AIA paper reported in *AJA* 98 (1994), 306-7: 'the top and bottom reveal incised setting lines used to lay out the composition in broad outline.... [The] sketched initial outline probably indicate[s] that the peak sanctuary shown is a generic rendering, based on considerations of symmetry and grid patterns...'; for a further suggestion of how the pattern was made, see *infra* n. 41.

33 *Supra* n. 16.

Let us first examine the Boxer (Pl.XLII), the major (and most complete) figure on the Boxer Rhyton.

Line 18	the hairline
Line 17	the bottom of the nose
Line 16	junction of neck & right shoulder
Line 14	the nipples
Line 11	small of back (front = navel?)
Line 9	bottom of codpiece (= join of legs)
Line 8	bottom of kilt
Line 6	the top of the knees
Line -0.5	under sole of right foot

Vertical lines, equidistant on either side of a line drawn in front of the ear, pass through the armpits at two squares and mark the widest point of the right shoulder at three squares. The body is extremely narrow at the level of the small of the back (Line 11), less than two squares in width [34]. This slenderness contrasts radically with the powerful image of his upper arms, doubled at the biceps from (the Egyptian standard) one to two squares in width. Note, too
--and this is difficult to explain on such a small scale-- that the width of the Boxer's gloved right fist is identical with the width of a grid square.

Although the grid establishing the proportions of the Boxer corresponds very closely with the canonical Egyptian grid, there is a puzzling irregularity: assuming that his foot has been correctly reconstructed, which is likely [35], the sole of his foot falls not on Line 0 but at Line -0.5, with the (intended?) consequence that the lower leg is slightly elongated.

It has been remarked that the Chieftain on his eponymous Cup looks oddly proportioned [36], and the reason for this becomes apparent when he is placed on an 18-unit grid.

Line 18	the hairline
Line 16	the chinline (not canonical)
Line 15	junction of neck & left shoulder
Line 14	the nipples
Line 11	small of back (= navel?)
Line 10	top of the buttocks
Line 9	lower line of buttocks (= join of legs?), bottom of codpiece
Line 8	bottom of kilt
Line 6	the top of knees
Line 0	under soles of feet

The Chieftain's head is two squares in length (rather than the canonical Egyptian ca. 1.5 squares, for which also cf.: the Theran Fisherman and the Boxer). This expansion pushes the junction of neck and shoulder down to Line 15 (rather than Line 16) which, in turn, compresses his breast from a healthy two squares to just one square high [37]. I know

34 *Supra* n. 29.

35 Although not visible on Pl. XLII, photographed from a cast, the lower leg and foot below the break on Line 3.5 is a reconstruction (as is also the left forearm beyond vertical Line F). One could also imagine, however, that his foot did not stand flat on the groundline but was raised on the toes, so that Line 0 was calculated from the lifted heel.

36 B. KAISER, *Untersuchungen zum minoischen Relief* (1976), 140-142.

37 The same grid with the same peculiarities also applies to the facing figure of the "Soldier" on this vase; although visibly more coarsely carved, and hierarchically shorter than the Chieftain, he is nonetheless

of no earlier parallels for such an overlarge head but there may be some reason to think of it as a local development [38].

With vertical lines drawn equidistant in front of the ear, lines pass through his armpits two squares in front and one behind, and at the widest point of his left shoulder at one square more (the same breadth and proportions as the Theran Fisherman). His body is otherwise extremely slender -- just one square wide at the waist. Again, surprisingly, each clenched fist fits the grid module.

The fact that many of the horizontal and vertical lines pass through the same significant points on the Boxer and the Chieftain (hairline, armpits, nipples, small of back, bottom of codpiece, bottom of kilt, top of knees) indicates that both figures were carved on 18-unit proportional grids. Despite his vigorous activity and powerful arms, the Boxer fits a grid which is (except at the baseline) very close indeed to that of an Egyptian canonical male figure. The Chieftain, on the other hand, displays some peculiarities, such as his enlarged head, which cannot be explained as due to differences in pose or activity. Such mutations in proportional rules make it perhaps less likely that the vases issued from a single workshop [39]. Nonetheless, the Chieftain is still much beholden to the underlying Egyptian proportions... even his staff, with a lateral displacement of one square for a drop of five squares, has good Egyptian parallels: the obliquely held staff has its base immediately left of a grid intersection on Line 0, and passes through the same point at Lines 5, 10 and 15; at each point it has moved one square to the left [40].

Beyond the details lie some larger questions. Why were the figures on the Chieftain Cup and Boxer Rhyton fitted on a (presumably, more conservative) 18-unit grid while the proportions of the Palaikastro *kouros* and the Theran Fisherman were elongated to 21-units in height? Was there a traditional grid for small-scale artwork, or different rules for different media, or did the vase sculptors conceivably take into account the effects of the angle at which the vase would be seen?

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proportioned on an 18-unit grid with horizontal and vertical lines crossing at very much the same points as on the Chieftain.

38 Cf.: the LM IIIA:1 Ayia Triada sarcophagus: with a grid superimposed over the sole intact male figure in the presentation scene, his proportions turn out to be very close to those of the Chieftain; cf.: *infra* n. 39. A proportional study of the sarcophagus (now in progress) shows that the same grid applied to women as to men. One can also see -- as is hinted on the Fisherman fresco from Thera and as remarked by REHAK and YOUNGER (*supra* n. 32) -- that the whole composition, not just the human body, may be built around the grid, using gridlines as guidelines for the offerings and built structures. Cf. the use of the grid in Egypt also to 'aid in the composition of whole scenes...': G. ROBINS, "Composition and the Artist's Squared Grid", *JARCE* 28 (1991) 41-54.

39 Contra P. WARREN (*Minoan Stone Vases* [1969], 174) who held that all relief vases were products of a single Knossos workshop; cf.: *supra*, n. 38. Their style of modelling, too, is not particularly close: J.G. YOUNGER (*Bronze Age Aegean Seals in their Middle Phase* [1993], 174-175) contrasts the "smooth modelling" of the Chieftain Cup with the "rich modelling" of the Boxer Rhyton (and Zakro peak sanctuary rhyton) but does not discuss whether this implies different workshops. Kaiser (*supra* n. 36), on the other hand, distinguishes 4 phases in relief vase manufacture: the Chieftain Vase (late-MM IIIA-MM IIIB), the Group of the Harvester Vase (MM IIIB-LM IA), the Boxer Rhyton Group (LM IB), and the Peak Sanctuary Group (late-LM IB-LM II).

40 For the 'notion of obliquity having been measured on a grid' as demonstrated by staffs and spears, see ROBINS, 224-225; cf.: the staff held by Amenemhat Nebuy (Pl. XLb) with the same displacement of 1 square for a drop of 5 (passing the same points as the Chieftain's staff on Lines 1, 6, 11 and 16).

Hypothetical Grids and other Hypotheses

There is a great deal still to learn about the proportional grid, and its use, if widely confirmed, will have important art historical ramifications. Not least, the use of proportional grids raise a number of technical questions [41]. But I would like to finish with some consideration of what the grid tells us about Minoan society.

On one level, of course, the proportional grid is an artist's tool but, on another, it functions as a geometric model for the conceptualization of space. In Egyptian royal workshops, that took the shape of an ideal male figure, a social and cultural construct. Of course, we do not know to what extent even Egyptian working artists understood the ideology underlying ideal proportions [42]. Still less can we judge if the Minoans adopted any beliefs along with the proportional grid, though it is difficult to imagine that the original travellers would not have been exposed to some ideology and notions of decorum when they came to learn and understand the technique.

Psychologically, the use of a planning grid suggests a rigorous view of the human form, akin in conception to a modular system of building [43]. It is difficult to conceive of this as an artist's individual inspiration but rather a development issuing from central workshops in which formal rules were preserved and passed on. The evidence of the Boxer Rhyton and Chieftain Cup suggests, however, that the writ of a central workshop did not run very far; in that sense, we must not even think of a *Minoan* canon of proportions. Nonetheless, the Boxer owes his basic structure to a grid; even the engraver of the Chieftain, though incorporating some unorthodox variations, was trained to copy what he thought were perfect proportions. The Palaikastro *kouros*, on the other hand, speaks of a central tradition, developed in a workshop where three-dimensional grids were in common use [44]. The precision of its carving, too, the sharpness of line, and the

41 Because Aegean frescoes are painted in true fresco technique, gridlines made by strings dipped in paint would have remained visible (as do impressions of unpainted string lines marking register lines on some Theran frescoes). If Aegean artists actually painted over grids (and not just learnt their drawing skills on grids) their method must have differed from those of the Egyptians. One possibility is that they drew grids in chalk which was afterwards brushed away.
While it is possible for engravers of steatite relief vases to have followed a grid incised directly onto a vase, it seems more plausible to picture an artist first drawing a separate pattern (*i.e.*, a gridded drawing on a soft material such as leather) and transfering this to the soft-stone vase, perhaps by dotting through the main lines with a pointed tool.

42 'Ideology' in its weak sense, as half-formulated beliefs and assumptions, in this case relating to prestige and prerogatives. I do not think it anachronistic to claim that master artists (*i.e.*, those who were chiefs of royal workshops or of crews of artisans) were aware that canonical portrayal was among the dignities due to deities, royals and the nobility. For the canon as an expression of elite power in a stronger sense, see DAVIS (*supra* n. 22), Ch. 7.

43 D. PREZIOSI (*Minoan Architectural Design* [1983], 320-21), finds clear evidence for modular grid planning and layout in sufficiently preserved Minoan ground plans. Cf.: C. PALYVOU's discussion of architectural design with evidence of latent grids in Room 5 of the West House and in the eastern part of Xeste 3 at Thera ("Architectural Design at Late Cycladic Akrotiri", *Thera and the Aegean World III. Proceedings of the Third International Congress, Santorini, Greece, 3-9 September 1989*, 1 *Archaeology* [1990], 44-56).

44 The use of his fist as grid module also argues against an independent Minoan metrological system based on a 'Minoan foot' and for the reintegration of Crete into the Egyptian-Near Eastern community of cubit-based metrology. A Minoan foot of ±30.36 cm. was advanced by J.W. GRAHAM, *The Palaces of Crete* (1969), 222-29; more recent statistical analysis of Graham's data suggests a unit of ±46 cm.: J. CHERRY, "Putting the best foot forward", *Antiquity* 57 (1983), 52-56. Support for a ±46 cm. measure now comes in the width of the central section of the Royal Road at Knossos, at 1.40 m. (2 slabs of .70 cm. each) = 3 units: P.M. WARREN, "The Minoan Roads of Knossos", *Knossos: A Labyrinth of History. Papers in Honour of Sinclair Hood* (1994), 206.

accurate, close observation of anatomical detail, all argue for a dedicated workshop that had spent generations mastering the carving of soft materials. We may at least hope to find some archaeological trace of the stands on which their ivory and wooden statues must once have been placed [45].

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45 Perhaps this was the function of the inscribed stone block from Kophinas (± 117 x 81 mm: L. GODART and J.-P. OLIVIER, *Recueil des inscriptions en linéaire A* 4 [*EtCrét* XXI.4, 1982]); with two small holes drilled in its surface, it might have served as a base for a small statue (I am indebted to I. Schoep for this suggestion).

LIST OF ILLUSTRATIONS

Pl. XXXIX Figure of Ukhhotep I and Wife (Meir B2, temp. Sesostris I) with grid completed from surviving traces (after IVERSEN, Pl. 8; added dots marking key points).

Pl. XLa Figure of Sarenput II (Elephantine, temp. Sesostris II-III) with grid completed from surviving traces (after MÜLLER, *Felsengräber der Fürsten von Elephantine* [1940], 84b).

Pl. XLb Stela of Amenemhat Nebuy (Abydos, late 12th Dynasty) on hypothetical 18-square grid (after ROBINS, Fig. 10.29).

Pl. XLc Figure on astronomical ceiling, TT 353 (Thebes, 18th Dynasty) with grid completed from surviving traces (after ROBINS, Fig. 5.2).

Pl. XLd Palaikastro *kouros*: plaster cast of left palm (from mould made by M.S. Moak).

Pl. XLIa The Palaikastro *kouros* in frontal view (drawing by M.S. Moak), with superimposed 21-unit hypothetical grid of 2.3 cm. squares.

Pl. XLIb The Palaikastro *kouros* in profile view (drawing by M.S. Moak; torso angle slightly changed by the author), with superimposed 21-unit hypothetical grid of 2.3 cm. squares.

Pl. XLIc The Fisherman fresco from Thera, on hypothetical 21-square grid (superimposed over Pl. 19 in C. DOUMAS, *The Wall-Paintings of Thera* [1992]).

Pl. XLIIa A boxer on the Boxer Rhyton from Ayia Triada, photographed at right angle to surface (photograph from 1:1 cast, courtesy of Archäologisches Institut der Universität Heidelberg).

Pl. XLIIb The boxer with superimposed 18-unit hypothetical grid.

Pl. XLIIIa The 'Chieftain' on the Chieftain Cup from Ayia Triada, photographed at right angle to surface (photograph from 1:1 cast, courtesy of Archäologisches Institut der Universität Heidelberg).

Pl. XLIIIb The Chieftain with superimposed 18-unit hypothetical grid.

DISCUSSION

R. Laffineur: I would like to stress two points: First I must confess that I do not understand your arithmetics. You begin from the 18 line grid of the first Egyptian canon, then you make it equal to 21 lines and this is quite strange to me.

J. Weingarten: The 18-square grid applies to the Egyptian canon only. The Minoans added (whether immediately or after some time) three additional squares. What I tried to show is that some of the same points – up to the top of the knees; the hairline to the nipples – are used as in the Egyptian canon: the Minoan elongation comes in three steps between the nipples and the knees.

R. Laffineur: The second point is a methodological one. I do not think that you can make such measurements for the chieftain's cup when you use an image of the cup which is not in a strict profile. The picture you use is a picture which has been taken from below. You see the rim is not a straight one. So I think it is dangerous to use it because there is some deformation. On a more general level, I think it is relatively easy to apply a grid of incised lines on a regular geometric bloc like the one used in the initial phase of carving a stone statue or on the even surface of a wall used for a painting. I find it much more difficult, if not really impossible, to apply such a grid on an irregular volume like the tusk used for carving an ivory statuette -not to mention that the Palaikastro *kouros* is not made from one single piece and that the grid would have been divided accordingly. Furthermore, to be able to conclude that a grid system was used for proportioning Minoan human figures would imply a systematic examination of the whole *corpus* of Minoan human figures. Such a systematic inventory, however, has to be strictly limited to images satisfying the following conditions: 1. overall dimensions that are beyond certain limits (sealstones and finger rings are obviously below such values); 2. a strictly upright position of the figure; 3. images appearing on an even surface; 4. measurements taken on the original and not on a photograph.

J. Weingarten: I made the original measurements on my own photographs. But unfortunately, as these were taken through glass, they were not absolutely in focus, so I used this one instead. In the final publication I hope to provide a strict profile photograph. I am very well aware of the problem.

J.L. Crowley: I have always found that the Minoans' art is much more experimental and would not want to see them put into a wooden pattern. Let me just take up one point that I do not think is covered. One of the most unusual things about the way the Egyptians handled the human figure in two-dimensional art is that they put the swivel of the body at the armpits. Nobody else does it. Everybody else does a waist-swivel of some sort; they turn the body through the waist, i.e. from the frontal shoulders and frontal chest to the profile hips and profile legs and feet. The Egyptians put the waist-swivel at the armpits and they show one nipple. Now this is, I think, fairly crucial to your discussion. Minoan art does not do this. Like everybody else, the Minoans show the chest also and you get two nipples. As far as I know they do this every time except when you have a full profile.

J. Weingarten: I am certainly not suggesting that the Minoans are blindly copying the Egyptian image. They are adopting a methodology and then adapting it. And I think they made the change quickly, several generations perhaps before we see the results. Secondly, one has to be careful when talking of grids of sculpture and grids of drawing. Unfortunately, almost all of the existing grids, from Egypt too, are on wall paintings or reliefs. There are very few – and really almost none in the period we are speaking of – on sculpture. Nonetheless, on Egyptian sculpture of this period, you can place a grid and can see that it fits as well. Now the real point is: am I denigrating Minoan artists by saying they used a grid? I do not believe so! I think artists in the past were always trained with more rigorous methods than we can even imagine today. Shall we denigrate the sculptors of archaic Kore for using the Egyptian grid nearly a thousand years later? I do not think so! I think that artistic expression and freedom of lines remain. It is a question of perfect proportions and not a question of good or bad style! Some of the finest Egyptian work is in small-scale wooden sculpture where there is as much artistic freedom as there is here, yet they were made on grids.

P. Rehak: I enjoyed J. Weingarten's paper, although I have some reservations. As she herself said, one has to figure the scale from what is preserved. I was surprised that she did not bring up the advanced left foot which you see in the Egyptian canon. This recurs in later Greek *kouroi* and surely derives from Egyptian art.

J. Weingarten: I was certainly aware that it is the left foot that is advanced. But we have only one statue so it is a fifty-fifty chance that if he has a foot advanced, it will be the left. There are many other things that

however have parallels in Egypt at this time: for example the span from the elbow to the wrist is always three fist lengths on Egyptian statues. So also on our statue (and it makes the arms look awfully stunted); the fisherman's feet have the exact, canonical three-square length, and so forth.

G. Kopcke: What J. Weingarten has presented is only a thinking experiment. I do not think that such a grid was used on Crete or that there was a need for it. Take monumental art: Monumental art really requires complicated measures. But in Crete it is not clear that any such need existed. A figure like this could have been created in line with a tradition which is indicated by many bronzes, which, as you know, are executed like sketches would be. I would think that there was a natural sense of aesthetic proportioning, sufficient to explain what we are seeing.

J. Weingarten: That is why I took the module from the statue itself; obviously, you can make grids that would fit anything. If some lines do not look very good, you might move them half a centimetre and then other lines would look good. I am very aware of this. I started out testing all sorts of things. I measured the fists and then checked how many fist-lengths separated one point from another. Of course, it could all be coincidence, but it would be a remarkable coincidence.

J.G. Younger: I basically have no doubt that there is some sort of grid pattern or some sort of technical lay-out system for these kinds of statues. P. Rehak's and my own work on stone vases has , for instance, discovered lay-out sketch lines on the Kato Zakros Sanctuary Rhyton. There are positioning lines; there are also errors or changes in the design that are very easy to see. We also discovered starting and ending lines on the Harvester Vase as well as dittographed figures, erased figures and a certain lay-out of the figures. There is an increasing proportion toward the end which has been noticed before but we have managed to put it on a solid, technical basis. So I have absolutely no doubt that these kinds of technical things – preliminary thinking or sketching – certainly went on. It is perfectly reasonable that some sort of grid pattern or module system would have to have been used for the proportions of the Palaikastro Kouros. One thing that you might wish to consider with regard to the fisher-boy which you mentioned: he has a stooping or slumped posture. This might account for some problems which you have already noticed in the grid pattern. The slumped posture itself may be indicative of its own status, as we see it in the Near East.

J. Weingarten: He is not really slumped; his shoulders are straight.

J.G. Younger: His head is bent forward not held straight upright. The latter is the sort of posture which you would expect in other situations, such as that of the chieftain, as you have already pointed out.

J. Weingarten: There are also string-lines, *i.e.* lines marked by strings, which you should consider as well.

T.G. Palaima: The trouble seems to me that J. Weingarten started out by looking at the Egyptians in the 25th and 26th dynasty and their module grid of 18 units. The 26th dynasty is around 700 B.C. After that they used a 21 unit grid system. Then you started looking at the Minoan material and saw in the Palaikastro Kouros the adaptation of a 21 unit grid. This is a case of letting not the tail, but one hand wag the entire dog. I was wondering whether, if I may pick up G. Kopcke's point, these things could have evolved internally? In regard to some of the odd features of the fisher-boy, if you apply an 18 unit grid and follow your line – for example, you say that the small of the back comes at 13 –, then the small of the back would be at 11, since it is a seven-to-six proportion. Then everything would be in line. It may not be as easy as starting with the Palaikastro figure and applying the 21 unit grid everywhere.

J. Weingarten: There is obviously a relationship between the 21-unit grid and the 18-unit grid and it is precisely the same as between the second and first Egyptian canon, a ratio of 6:5 (if you measure from the top of the head). I did, of course, test an 18-unit grid which crossed some significant points on the horizontals but not – and this is crucial – on the verticals. So the 21-unit grid is the best of the two, crossing significant points on both horizontals and verticals. This is what I still publish but it is not the only possible grid – no grid is that. Let me again repeat: the grid is not just 21 units high, it is 21 *fists* high, 21 x the Palaikastro *Kouros's* own fist.

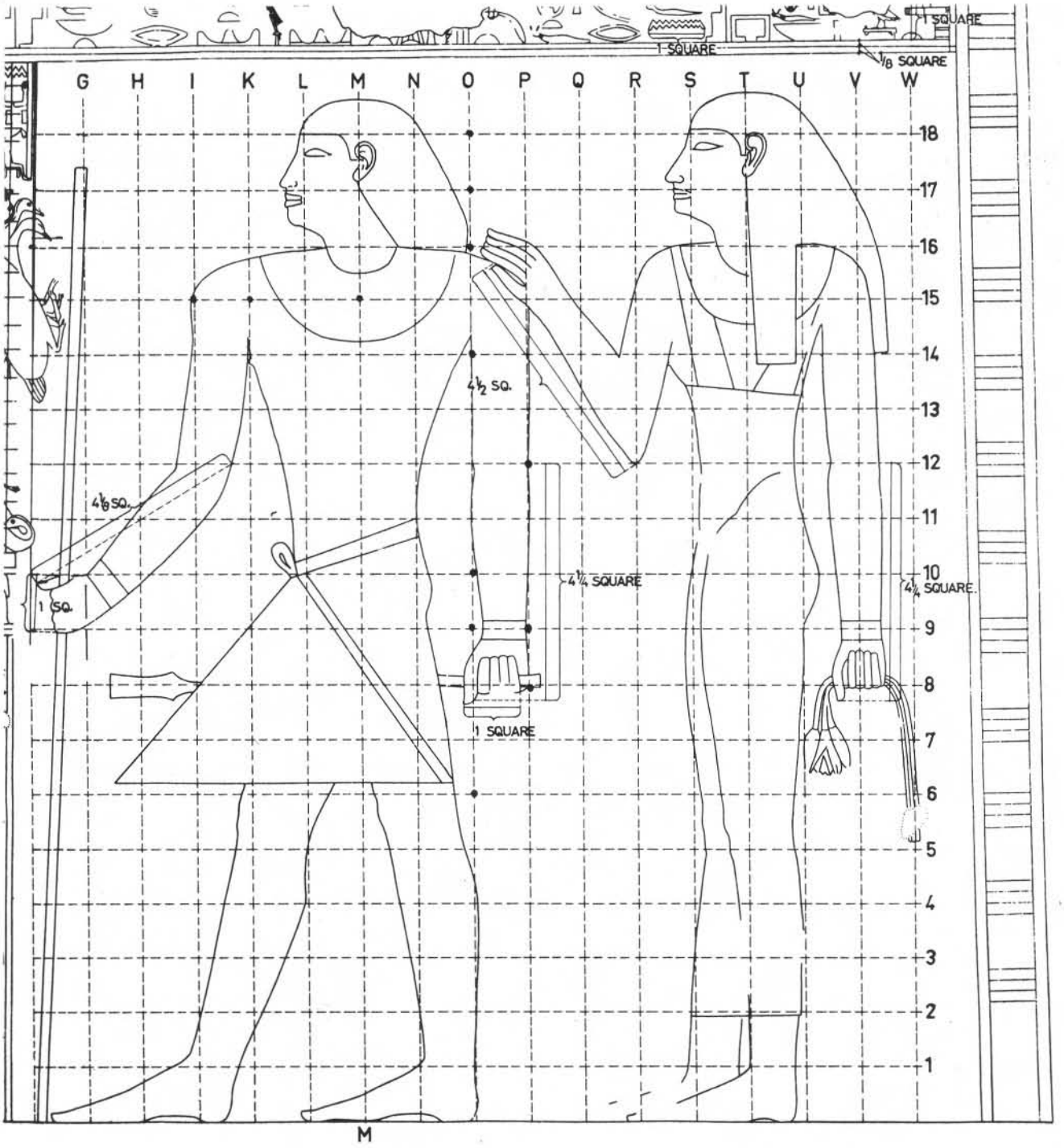
T.G. Palaima: But again, if the Egyptians do not adopt this for another seven or eight hundred years, how can it have any relevance to Minoan art ?

J. Weingarten: The Egyptians have an 18-square grid system at *this* time which has nothing to do with the later second canon of the XXVIth Dynasty. It describes the principle of how you proportion a figure, how you

divide it and follow guidelines or gridlines. This is the system adopted by the Minoans. It is certainly not prefiguring the Egyptian second canon — unless *you* want to say that it is.

T.G. Palaima: I do agree with your point, but the technical execution of an argument is that this has to be transmitted through some kind of influence preferably through close working together. I cannot imagine that you have here someone wandering around in an Egyptian tomb on a tour saying, "well, I notice these lines. When I go back to Crete, I shall have all my artists start using a grid"! So if they are going to adopt a grid-line, why should they not conform to the Egyptian pattern, which is the source of their grid?

J. Weingarten: If I may answer in one word, that word is: Ta-urt. She arrives on Crete in MM IIB as a very Egyptian-looking figure. We now also see her in MM III, well on her way to becoming the Minoan Genius, but the transformation is not yet complete. It is only in LM I that she has become the Minoan Genius. The transformation took time, from MM IIB to LM I. I do not know when the Minoans adopted the Egyptian grid, but I would guess not much less than a hundred years before we see the Palaikastro *kouros*. We may be seeing the results of several generations' adaptations here – and we do not know what happened in between.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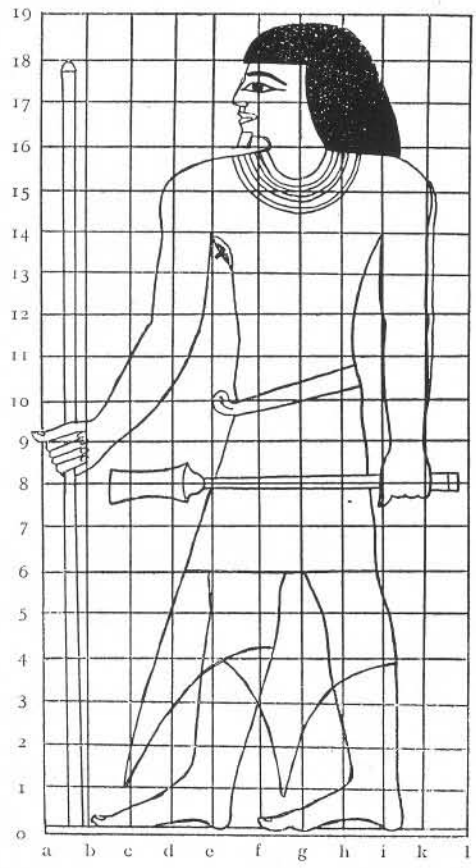

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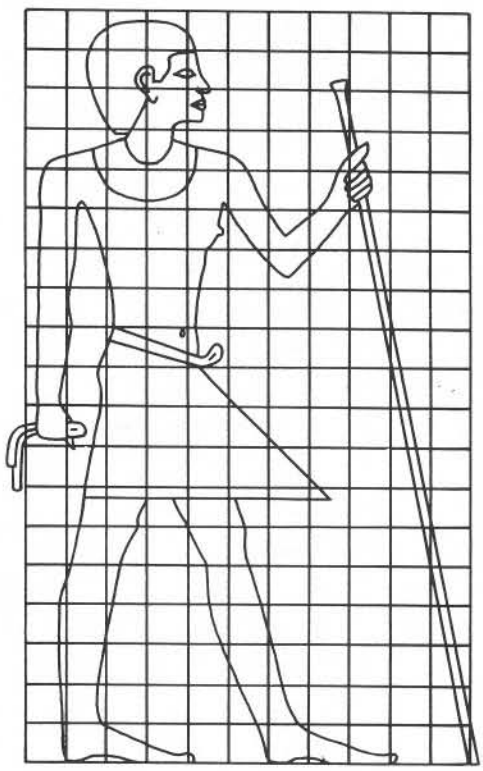

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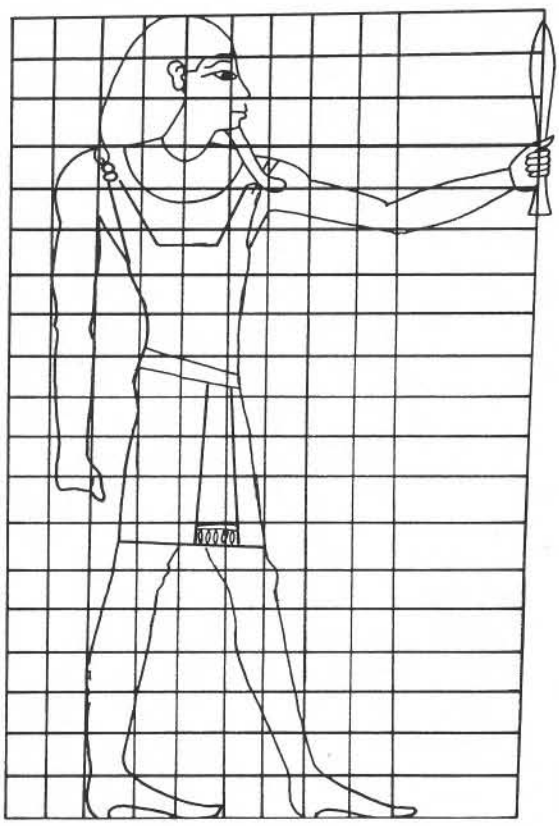

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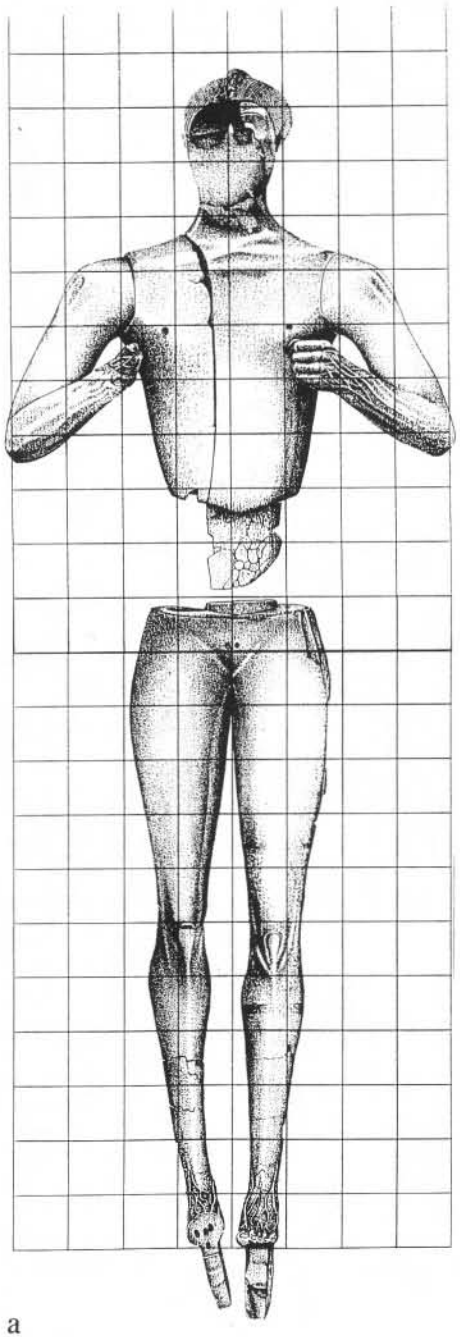

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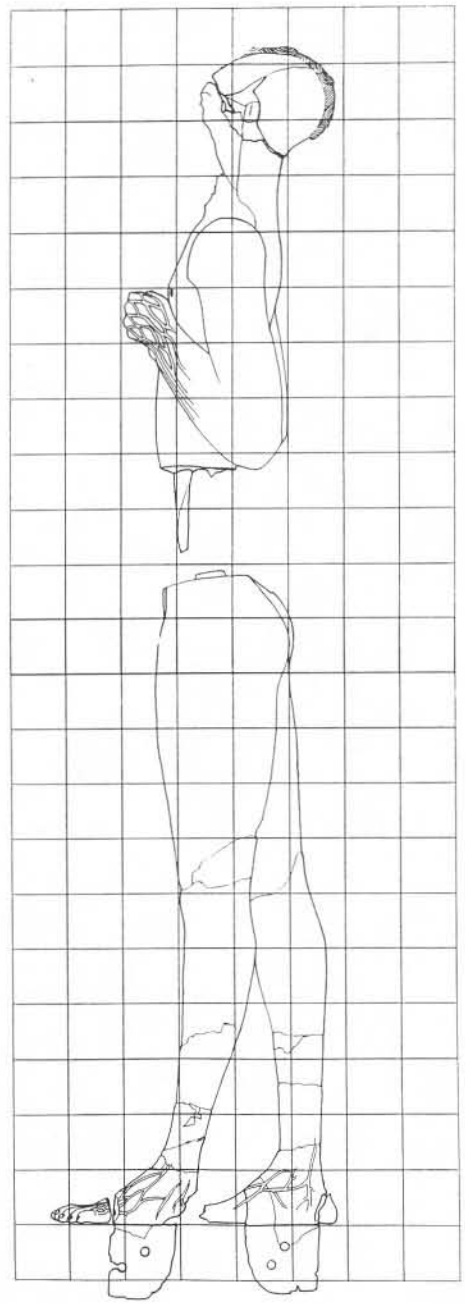

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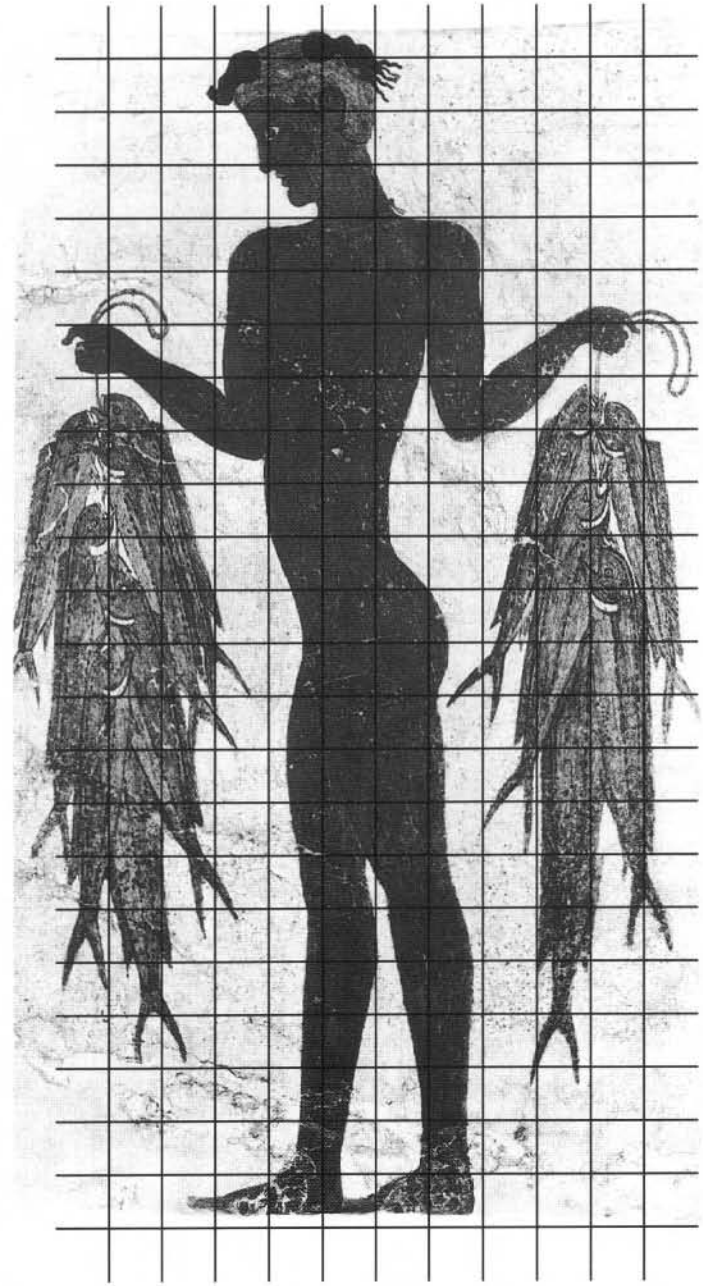

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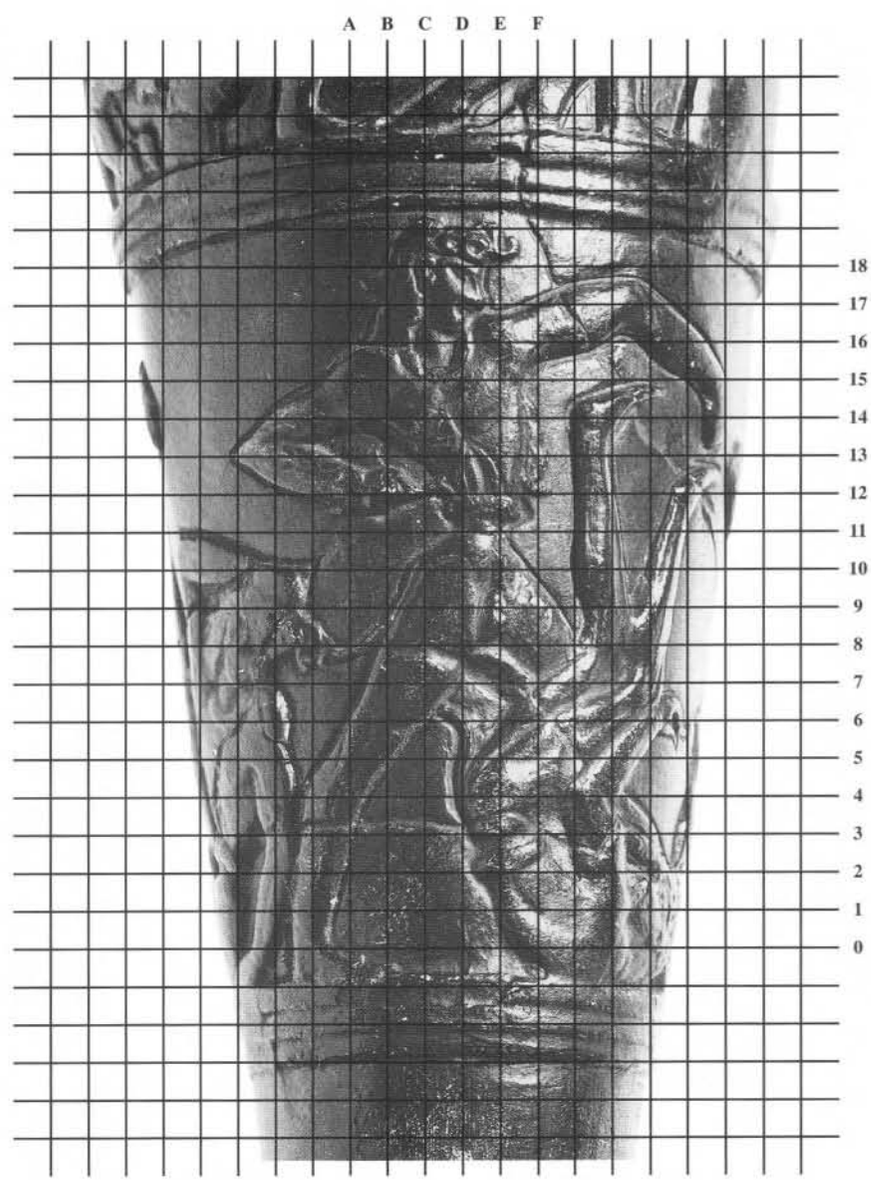

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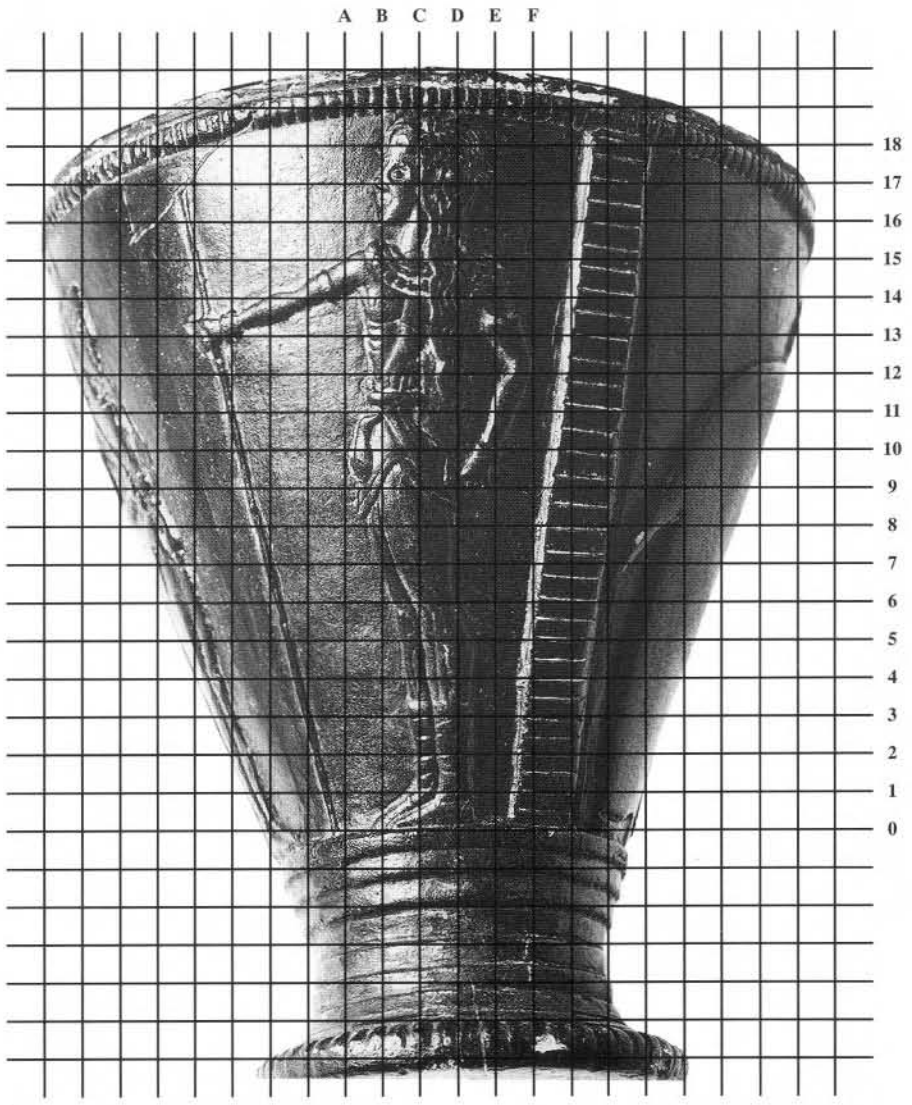

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