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Esotericism[1] at Persepolis – Really?[2]

In this paper, the proportions of the Persepolis terrace, Iran, are examined. The «Sectio Aurea» can be applied five times in one series on the ground-plan marking all important points of the built structures. The meaning of this is discussed in connection to Venus as a planet and as a goddess.

I. Introduction

According to his inscription (DPf, Lecoq 1997: 229, § 2) Dareios I. (522–486 BCE) could plan and erect the Persepolis terrace as he liked, because the terrain was not built over before. Constructions of the terrace began ca. 519/518 BCE (Jacobs 1997: 298), and it existed until Alexander the Great conquered the city. The purpose of the Persepolis terrace is still debated. Is it purely a secular residence? Or are there some hidden aspects, maybe of religious character? The answer is hampered as the religion of the Achaemenids is still debated. As already Krefter and Trümpelmann recognised, the Apadāna was built in precise proportions (Krefter 1971: 45–54; Trümpelmann 1988: 40–41). In this paper, the proportions of the whole terrace will be studied, with a special view to the «Sectio Aurea», the golden section.

II. The «Sectio Aurea»

If there are fixed proportions realized in the terrace, the ratios must have been inherent right from the very beginning of the terrace' planning by Dareios I. Therefore only structures of the first phase of construction are relevant (Tilia 1978: fig. 4; Jacobs 1997: 298–299). Any

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1 Here the term «esoteric» is used in its purest classical Greek sense: «for inner reasons».
2 For a critical reading of the manuscript my thanks go to R. C. Ackermann Basel/Bern.

building realized in nature has a certain deviation from the absolute accuracy – especially a huge terrace like that of Persepolis, dated so early (520 BCE; Jacobs 1997: 298).

Based on the plan of Tilia (original scale 1:2000; Tilia 1978: 15, fig. 4) the following lines are drawn (**fig. 1**). 1. Along the west front a line is drawn on the west front of the two bastions at the main gateway of Dareios I. 2. Along the south front a line is drawn on the south front of the wall carrying the inscription of Dareios I. (DPf; Lecoq 1997: 229), rectangular on the first line. The intersection point is called B. The point of the projection of the utmost corner of the north front on the line of the west front is called A. Using the plans of Tilia (1978: 15, fig. 4; scale 1:2000) and of Krefter (original scale 1:1000)[3], the angle of the two lines would deviate from rectangularity by 1.4 % (**fig. 1**), i.e. the maximum straight line AB differs from the minimum straight line by 2.3 m. The straight line AB measures 472 m or 473.3 m, respectively – the deviation is therefore 0.5 %; a very high precision. In the following, the straight line AB = 472 m is assumed and the line from B to C' is drawn rectangular.

Applying the «Sectio Aurea»[4] to this straight line AB results in the two straight lines of 291.7 m and 180.3 m, respectively. At 294 m from A lies the projection of the southern corner of the Apadāna called E – a deviation of 0.8 %. Applying the «Sectio Aurea» on the straight line AE gives the two straight lines of 181.3 m and 111.4 m resulting in point H. Point H is the projection of the northern corner of the Apadāna on the west front. AH measures in the terrace dimensions 181.5 m – a deviation of 0.1 %. Applying the «Sectio Aurea» on straight line AH resulting in point K gives two straight lines of 112.1 m and 68.2 m. The straight line AK measures in the terrace dimensions 112.0 m – a deviation of 0.1 %. The straight line AK is equal to the straight line HE. Trümpelmann gives 111.94 m for the total width of the Apadāna (Trümpelmann 1988: 41) – a deviation of 0.1 %. Applying the «Sectio Aurea» on straight line AK resulting in point L gives two straight lines of 69.3 m and 42.8 m. L marks the southern corner of the northern bastion. The straight line AL measures in the terrace dimensions 69.0 m – a deviation of 0.4 %.

Furthermore taking AB and the straight line from B to the eastern line of the eastern wall of the terrace at C' on the plan of Krefter gives in the dimensions of the terrace 472 m (AB) and 297 m (BC'). The proportion according to the «Sectio Aurea» results in 472 m and 291.7 m – a deviation of 2 % for the straight line BC'. The straight line AC measures in the dimension of the terrace 773 m and according to the «Sectio Aurea» 764 m (472 x 1.618) – a deviation of 1.2 %. On the plan (**fig. 2**) the straight line BB' measures 3 m – 0.4 % on 764 m. For a terrace built in reality, a deviation of 0.1 to 2 % is a convincing accuracy. So there is a fourfold application of the «Sectio Aurea» on the west front, and in addition the

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3   Krefter 1971: enclosure 36. Once measured on the actual plan, and once with the aid of the plan scanned using a CAD-program (Malz/Kassner 2009).
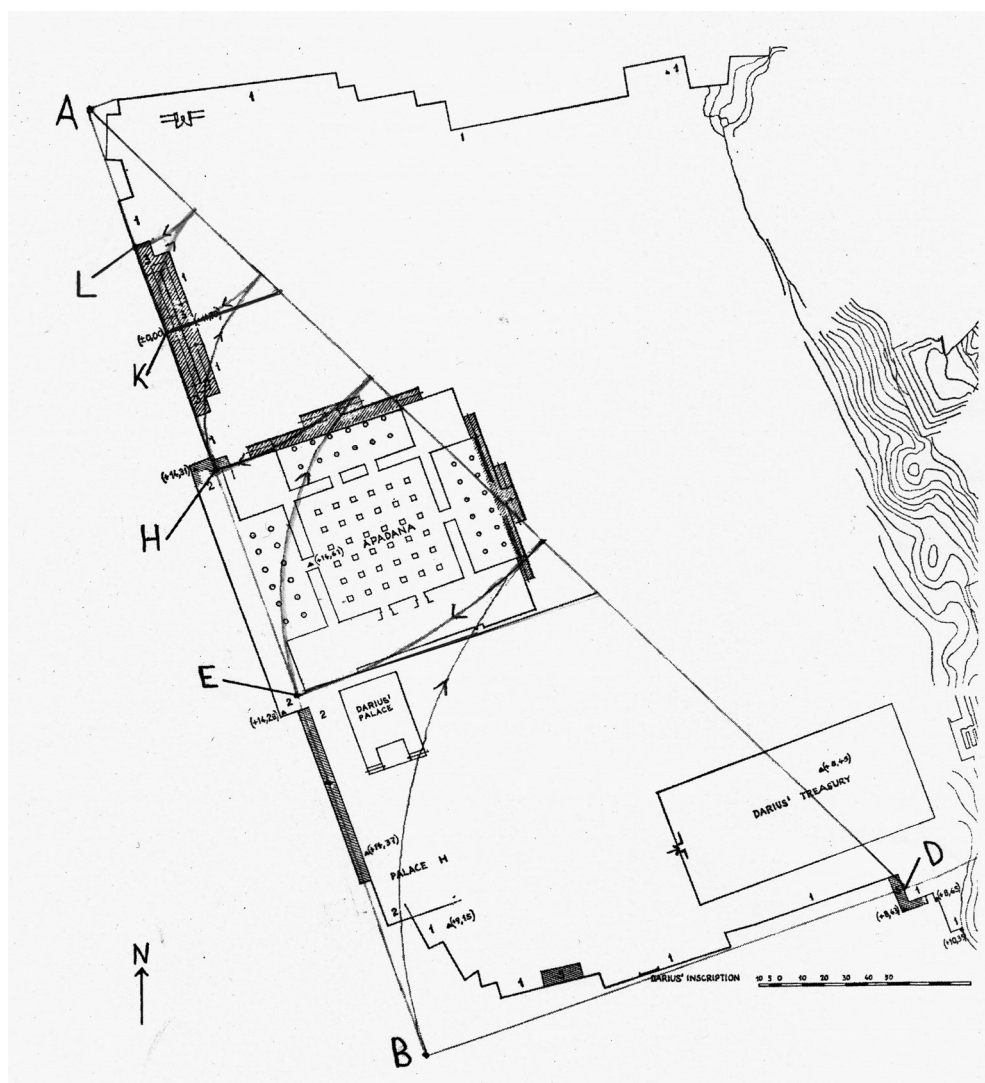4   The factor of the ratio is 1.618….

Fig. 1. Based on the plan of Tilia (Tilia 1978: 15, fig. 4) the fourfold «Sectio Aurea» is constructed geometrically in one series.

whole west front and the whole south front are also in the same proportion in the very same series. A deviation in the range of 0.1 to 2 % is beyond any pure coincidence. As the terrace at Persepolis was planned about 520 BCE (Jacobs 1997: 298), only a geometrical construction of the «Sectio Aurea» is to be expected at that early time. This procedure is applied in **figure 1 and 2** visualising the proportions of the «Sectio Aurea» series, the very same series
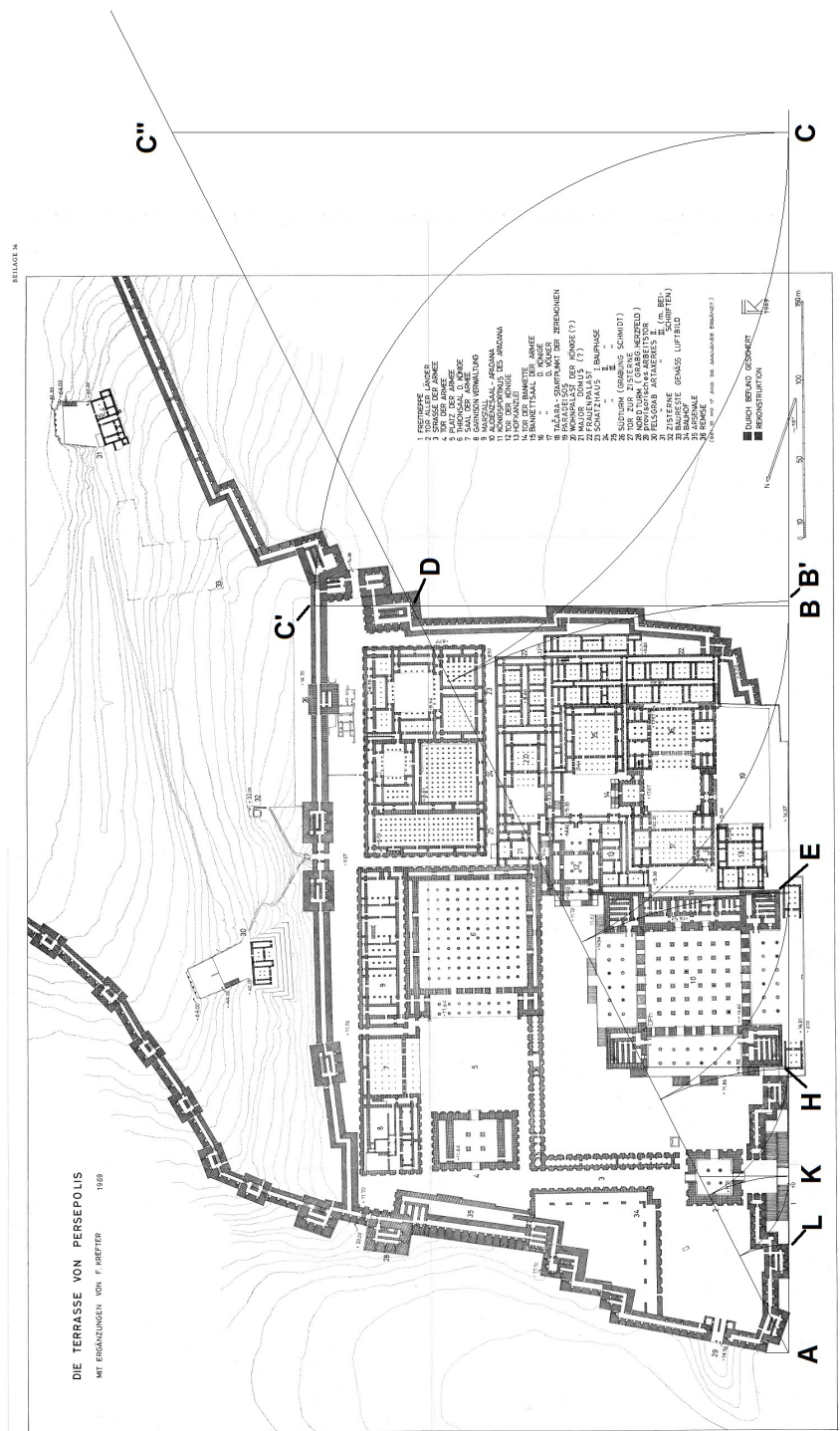
Fig. 2. Based on the plan of Krefter (Krefter 1971: enclosure 36) the fivefold «Sectio Aurea» is constructed geometrically in one series.

of «Sectio Aurea» calculated above, executed geometrically (**figs. 1–2**). **Fig. 3** shows how the «Sectio Aurea» is constructed geometrically.

As could be shown, the west front of the terrace at Persepolis is indeed structured in a fourfold «Sectio Aurea», in ratios marking precisely all important points in the west front: The corners A & B, the corners of Apadāna H & E, the centre of the main staircase[5] (and of the later «Gate of all countries») K, and the south corner of the most northern bastion L. Taking the plan of Krefter (1971: enclosure 36), in addition, the length AB and the width BC' of the whole terrace follows also the ratio of «Sectio Aurea» in the very same sequence as the west front.

The following equations hold valid:

$$AC = AB + BC', \; CC'' = AC/2, \; AB/2 = BD, \; AH = EB, \; AK = HE, \; AL = KH$$
$$AC : AB = AB : BC' = AB : AE = AE : AH = AH : AK = AK : KH = AK : AL = \phi = 1.618\ldots$$

The points E, H, K, and L are very well defined points of the constructions. Beyond any doubt the following equations hold valid: $KE : HE = HE : KH = \phi = 1.618\ldots$, and $LH : KH = KH : LK = \phi = 1.618\ldots$

III. The Apadāna

Because these proportions of the fivefold «Sectio Aurea» must have been settled right from the very beginning of planning of the terrace, the ground-plan of the «Prime-Apadāna»[6] («Ur-Apadāna»; Tilia 1972: 125–165; Jacobs 1997: 281ff, 291–293) in its north-south dimension is crucial for the above hypothesis. This earliest dimension must have been the very same as the visible dimension today for the validity of the above presented proportions of the series of «Sectio Aurea». The Prime-Apadāna, as Tilia states, was given up very soon after the construction work had begun (Tilia 1972: 136–138, 164). The western and eastern fronts were shifted to west and east respectively, but not the slightest hint exists that the north-south dimension was ever changed. Therefore the Prime-Apadāna must have been rectangular in its original layout, like the palaces P and S at Pasargadae. Already Schmitt and Stronach argued that the Apadāna is based on the two palaces P and S at Pasargadae (Schmitt/Stronach 1986: 146). Tilia describes the discovery of an inner wall at the eastern stairway (Tilia 1972: 127–172). Behind the north wing of the stairway, four blocks were found parallel to the parapet (Tilia 1972: 128) at a distance of 2.04 m to the stone parapet

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5   Erected under Dareios I: Jacobs 1997: 298.
6   I. e. the originally planned Apadāna.

Fig. 3. The geometrical construction of the «Sectio Aurea» applied once on straight line AB. In the same series the «Sectio Aurea» can be applied on straight line AC, and so on. The equations hold: AB : AC = AC :CB = 1.618…

Star of conjunction:
Venus-Earth
Star of opposition:
Venus-Earth

● Sun

● Venus

⊕ Earth

Days: 2922,00
Years: 8,00
Period of conjunction:
583,9214
Number of oppositions: 6

Fig. 4. The orbit of the planet Venus in geocentric view (using the program of H. Warm: Warm 2006) showing the outer and inner pentagram of the 8-year-cycle of five conjunctions lasting 583.92 days each (Mebert 2010: 42).

(Tilia 1972: 128, n. 3). Tilia states: «The borders of anathyroses worked along the outer edges on the northern side of the first block from the north, and on the southern side of the fourth block, show that other blocks were once joined to the four extant ones of this course, or at least that the intention had originally been to add more on both sides». And further: «Under the first block from the north of the upper course, there projects by 1.095 m[7] in a northern direction a block, which belongs to the lower and bottom course of the wall. No other block is joined to this one, but the anathyroses, worked along the outer edges on its northern side, shows that there had originally been or was meant to be a continuation in this direction». (Tilia 1972: 130 and fig. 7) In the southern part of the east front of the Apadāna an analogous inner wall with eight blocks was found (Tilia 1972: 154). Again the anathyroses on the southern edges of the most southern block shows that the wall had originally extended or was meant to extend in a southern direction – and in a northern direction as well (Tilia 1972: 155). These results show that the north-south dimension was established from the beginning of construction – it is only a pity that the blocks are missing in the north as well as in the south.

IV. Discussion

It becomes clear that the outstretching edge at A, where nothing was built, was necessary for the ratios of the «Sectio Aurea» as otherwise a rectangular terrace could have been built some meters north of the main staircase.

   Esotericism is taken here in its classical Greek sense: «for inner reasons».

   The ratios in the west front could not be recognized upon approaching the front – therefore they are really esoteric – for inner reasons – and not for an aesthetic reason. And for the invisible ratios it was not necessary to build the terrace wall to point A and B, respectively.

IV.1. Meaning of the «Sectio Aurea»

The «Sectio Aurea» is closely connected to the pentagram where it occurs many times. In Susa, tablets were found from the Old Babylonian time dealing with regular polygons (Harper et al. 1992: 276–278) proofing the awareness of the geometry of such polygons. The pentagram plotted in the pentagon – one of these polygons – is closely connected to the planet Venus which, with its orbit, marks a pentagram in its 8-years-cycle (**fig. 4**). This fact was already known at latest prior to 612 BCE as shown by cuneiform tablets. The facts in anti-chronological order:

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7   Three digits after the point overstress the possible measurement of a real construction.

1. From Babylon and Uruk, nine cuneiform texts, dating from 216 to 8 BCE, report positions of Venus in tables related to the fix stars, so called ephemerides (Neugebauer 1983, Vol. II: 300–302, 329–334; Vol. III, 170–172). After eight years, i.e. five constellations (5 x 583.92 days) of Venus, Venus stands almost exactly[8] at the same position in respect to the fix stars (**fig. 4**). This 8-year-cycle of Venus was known at latest in the 3rd century BCE (Neugebauer 1983, Vol. I: 300; van den Waerden 1957: 55–56).

2. From Baylon of the Achaemenid and Seleucid period, 52 cuneiform texts record positions of the known planets at that time (Mercury, Venus, Mars, Jupiter, and Saturn) (e.g. Hunger 2001: Nr. 57). The oldest text records ephemerides of Venus and Mercury from 587 BCE onwards (Hunger 2001: Nr. 53). Another text dated to the 7th year of Kambyses II. (i.e. 524 BCE) records ephemerides (Hunger 2001: Nr. 55).

3. A cuneiform text dated prior to 612 BCE explicitly mentions the 8-year-cycle of Venus and the correct cycles of the other four known planets (Brown 2000: 193–195).

4. Already in the Old Babylonian time, data of Venus were recorded. It was known that Venus is the morning star and the evening star as well, recorded in the so called Ammizaduqa tablet (Langdon/Fotheringham 1928; Reiner/Pingree 1975; Huber 1982: 148 [42]; Hunger/Pingree 1999: 32–41; Mebert 2010: 118–120).

5. The pentagram was known in Mesopotamia since the 4th millennium BCE. It is a sign of the pictographic script of ca. 3000 BCE, standing for the Sumerian word «UB» (Labat/Malbran-Labat 1995: Nr. 306). «UB» means «corner, angle, one of the four directions of the heavens» (Halloran 2006: 292 s.v. «ub»), or «parts of the universe» (Labat/Malbran-Labat 1995: Nr. 306).

The sequence of evidence is complete: 1. prior to 612 BCE the 8-year-cycle of Venus was known. 2. This cycle forms a pentagram. 3. The pentagram is full of ratios of «Sectio Aurea». 4. The pentagram is connected with Venus.

IV.2. Venus as a Goddess

The planet Venus – as the most luminous star in the sky – is the star of the goddess Ištar in ancient Mesopotamia[9], and her symbol is the 8-pointed star in a circle (Black/Green 2008: s.v. «Star») reflecting her 8-year-cycle. The religion of Ancient Iran is not yet well understood. The goddess Anāhitā assimilated to the west Iranian goddess Anāhiti in ancient Iran (Boyce 1989: i Ardwīsūr Anāhīd), and the resulting goddess was associated with the Babylonian Ištar. Boyce states: «Anaïtis is the Greek rendering of what appears to have been the name of the goddess of the planet Venus, who seems to have been worshiped by the Medes and Persians before they adopted Zoroastrianism. Her cult was apparently much influenced

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8   The largest deviation possible is 7.87 days: Warm 2011: 394, Tab. 6.3.
9   For the period of ca. 750–612 BCE see Brown 2000: 55.

by that of Mesopotamian Ishtar, an enormously powerful divinity in the 1st millennium B.C., whose worship had by then been adopted in a number of pantheons (including that of the Elamites) outside the Semitic world. Ishtar was venerated as goddess both of love and war, and this is thought to be because in earlier times the morning and evening appearances of the planet Venus (with whom she was linked) had been regarded as those of two different though related stars, with the divinity of the evening star being held to be female, that of the morning star male. By the 1st millennium the identity of the planet as seen at dawn and twilight had come to be accepted by Babylonian astronomers. It cannot be supposed that this identity had been perceived earlier by the Iranians; but it seems likely that they had long been accustomed to venerate the brilliant planet, either at its morning or its evening appearance, as the goddess Anāhiti, the «Pure One»… Presumably the ancient Persians, having settled in the land of the Elamites, learned there to worship their goddess Anāhiti in connection with both appearances of the planet Venus, and to associate her with the powerful Ishtar, called «the Lady». (Boyce 1989: ii Anaitis). In Pahlavi Anahid means a goddess and the planet Venus (MacKenzie 1971: s.v. «anāhīd»). Anāhitā, a popular Zoroastrian yazatā (deity) (Boyce 1989: i Ardwīsūr Anāhīd), got astral properties in Yašt (5, 128) and adopted features of the Babylonian Ištar probably already in pre-Achaemenid time (Hutter 1996: 206). Some scholars attribute Zoroastrism to the Achaemenid period. With certainty a religion connected with Auramazda is attested for Iran in Achaemenid time. Plutarchos (ca. 45–125 AD) states that Auramazda adorned the firmament with stars (*De Iside et Osiride*, Stephanus page 370, section A, line 5–8). Beside her female character, Ištar has also a male character as Boyce explained (s. above). Therefore she is not to be strongly separated from Auramazda. The fivefold application to the terrace plan reflects exactly the five points of the pentagram of Venus.

IV.3. The Inscription DPf

§ 2 of the inscription DPf in Elamite of Dareios I. reads: «Sur cette terrasse,[10] là où ce palais a été construit, là, aucun palais n'avait été construit; grâce à Ahuramazda, moi j'ai construit ce palais; et Ahuramazda a ainsi voulu, avec tous les dieux, que ce palais soit construit; et moi je l'ai construit; alors, il a été construit solide et excellent et exactement ainsi que je l'avais ordonné». (Lecoq 1997: 229). As the inscription is on the south wall of the terrace, it concerns the whole complex. The term «palais» is not necessarily used specifically for the palace of Dareios I., because this «palais» is called «Tačara» in DPa (Lecoq 1997: 101–102; Schmitt 2000: 53; Schmitt 2009: 114). In DPf, the word «hal-mar-raš» is written four times in Elamite, which means «Burg (citadel), Festung (fortress), Umwallung (circumvallation), Burgmauer (citadel wall)» and literally «Landbezwingerin (subduer of the country)» (Hinz/

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10   Lecoq mentions the Persian word «gatu» that was adopted in Elamite: Lecoq 1997: 229 §2.

Koch 1987: Teil I, 603, s.v. «h.hal-mar-raš»). The term occurs several times in inscriptions and has always the meaning of fortress (Hinz/Koch 1987: Teil I, 603, s.v. «h.hal-mar-raš»). With a high probability the term in DPf means the whole terrace. Dareios I. had explicitly written that the whole terrace was constructed on demand of Auramazda with the precise directions of himself. These directions may highly probably concern the proportions of the «Sectio Aurea» applied five times in one series on the Persepolis terrace.

The terrace at Persepolis may have had a religious dimension – a cosmic dimension.

The use of the «Sectio Aurea» at Persepolis demonstrates that it was known in the Ancient Near East before it was discovered in the Greek West by Hippasos of Metapont ca. 450 BCE (Van der Schoot 2005: 73; Stakhov 2009: 28–29) and described by Euclid ca. 300 BCE (Van der Schoot 2005: 73).

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