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INDEX

THE HEIGHT AND RECONSTRUCTIONS OF THE INTERIOR CORINTHIAN COLUMNS IN GREEK CLASSICAL BUILDINGS*

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The late fifth century temple of Apollo at Bassai with its single Corinthian column in the cella started a revolution in the interior design of

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* I wish to thank Richard Anderson, architect of the Athenian Agora, for reading a manuscript of this paper and a thorough discussion: his comments have greatly enhanced the legibility of this text. I am also grateful for Prof. Erik Østby, Dr. Petra Pakkanen, Prof. Olga Palagia, Dr. Blanche Menadier, Docent Leena Pietilä-Castrén, Mr. Kalle Korhonen, and Ms. Annie Hooton for their comments on my work. In addition to the abbreviations in the American Journal of Archaeology 95 (1991) 4–16, the following short titles are used in this article:

Amandry & Bousquet 1940–41 = P. Amandry & J. Bousquet, "La colonne dorique de la Tholos de Marmaria", BCH 64–65, 121–127.

Bauer 1973 = H. Bauer, Korintische Kapitelle des 4. und 3. Jahrhunderts v. Chr., AM-BH 3.

Büsing 1987 = H. Büsing, "Zur Bauplanung der Tholos von Epidauros", AM 102, 225–257.

Charbonneaux 1925 = J. Charbonneaux, La Tholos du sanctuaire d'Athèna Pronaia à Delphes, FdD II.

Cooper 1970 = F. A. Cooper, The Temple of Apollo at Bassai. A Preliminary Study, 1978; this is an unaltered publication of his 1970 dissertation.

Cooper 1992 = F. A. Cooper, The Temple of Apollo Bassitas IV.

Dugas 1924 = Ch. Dugas, J. Berchmans & M. Clemmensen, Le sanctuaire d'Aléa Athéna à Tégée au IV^{e} siècle.

Gottlob 1925 = K. Gottlob, Relevés et restaurations, FdD II.

Hill 1966 = B. H. Hill, The Temple of Zeus at Nemea. Rev. and suppl. by C. K. Williams, II.

Norman 1984 = N. J. Norman, "The Temple of Athena Alea at Tegea", AJA 88, 169–194.

Roux 1961 = G. Roux, L'architecture de l'Argolide aux IV^{e} et III^{e} siècles avant J.-C., BEFAR 199.

Seiler 1986 = F. Seiler, Die Griechische Tholos.

Schleif 1944 = H. Schleif, "Das Philippeion. Baubeschreibung", OlForsch I, 3–24.

Greek buildings.[1] During the fourth century Corinthian order became very widely used in the Peloponnesian and mainland buildings: it was certainly used in the tholoi at Delphi and Epidauros, the large peripteral temples of Athena Alea at Tegea and of Zeus at Nemea, and the Philippeion at Olympia.[2] In this paper I will study the interior Corinthian columns at Bassai, Delphi, Epidauros and Tegea, mainly concentrating on issues regarding their height and shaft reconstructions. The temple of Zeus at Nemea and the Philippeion are used as reference material.[3]

The temple of Apollo at Bassai (last quarter of 5th cent. BC)[4]

F. A. Cooper presents a new reconstruction of the interior Corinthian column with measurements in volume IV of the series The Temple of Apollo Bassitas.[5] The height of the column is certainly known: it is directly

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[1] For a reconstruction of the cella with Ionic half-columns and one Corinthian column, see Cooper 1992, pls. 9 and 34b. W. B. Dinsmoor argues for three Corinthian capitals at the back (see W. B. Dinsmoor, MMS 4 (1932–33) 209–212), but this is rejected by Cooper 1970, 151–153.

[2] On the interior Corinthian orders, see the following publications: Charbonneaux 1925, 20–22 (the Tholos at Delphi); Roux 1961, 153–158 (the Tholos at Epidauros); Dugas 1924, 47–51 (the temple of Athena Alea at Tegea); Hill 1966, 30–34 (the temple of Zeus at Nemea); Schleif 1944, 16–19 (the Philippeion at Olympia). At Nemea an Ionic upper colonnade was used above the Corinthian order (Hill 1966, 34–36); N. J. Norman suggests an Ionic upper storey for Tegea as well (Norman 1984, 179f.), but I do not find her reconstruction tenable (see pp. 154–157 below). It is possible that Corinthian became actually the dominant order in the interiors: Ionic order has been suggested for a number of fourth century buildings in the Peloponnese and mainland, but for none of them there exists any archaeological evidence to support it (Roux 1961, 356).

[3] These two buildings are not discussed in separate chapters, since there is very little I have to add to Hill's reconstruction of the temple of Zeus (Hill 1966, 34–36; see also Norman 1984, 180 n. 71) or to Schleif's reconstruction of the Philippeion (Schleif 1944, 16–19).

[4] For the date, see Cooper 1970, 165–167. The sculptural decoration is dated to the last decade of the 5th cent. BC; see B. C. Madigan and F. A. Cooper, The Sculpture. The Temple of Apollo Bassitas II, 1992, 99.

[5] Cooper 1992, pl. 40d. The figure 5.481 m given in the plate refers incorrectly to the total height of the column, not to offset from the 0.00 level (bottom of the shaft) as the other measurements do.

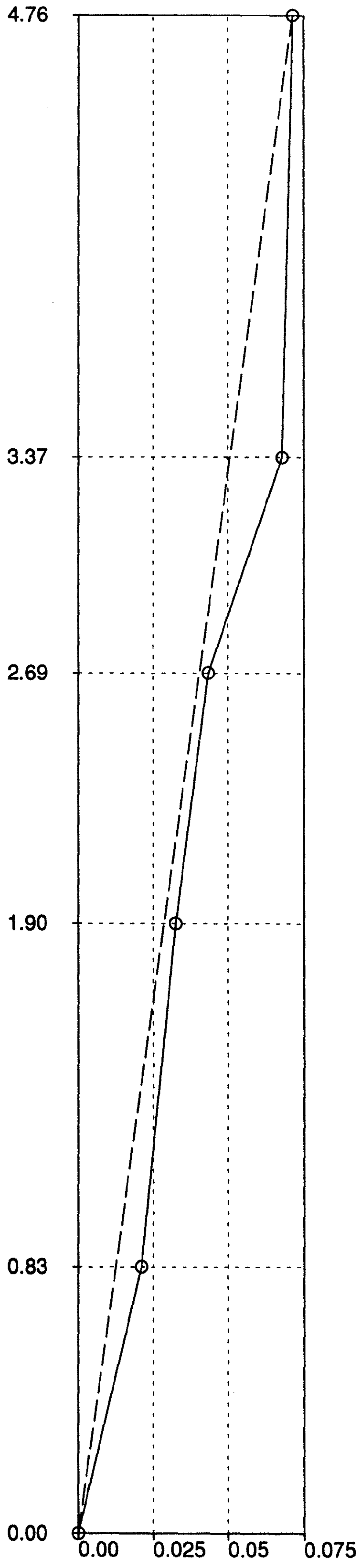
4.76
3.37
2.69
1.90
0.83
0.00
0.00
0.025
0.05
0.075

Fig. 1.

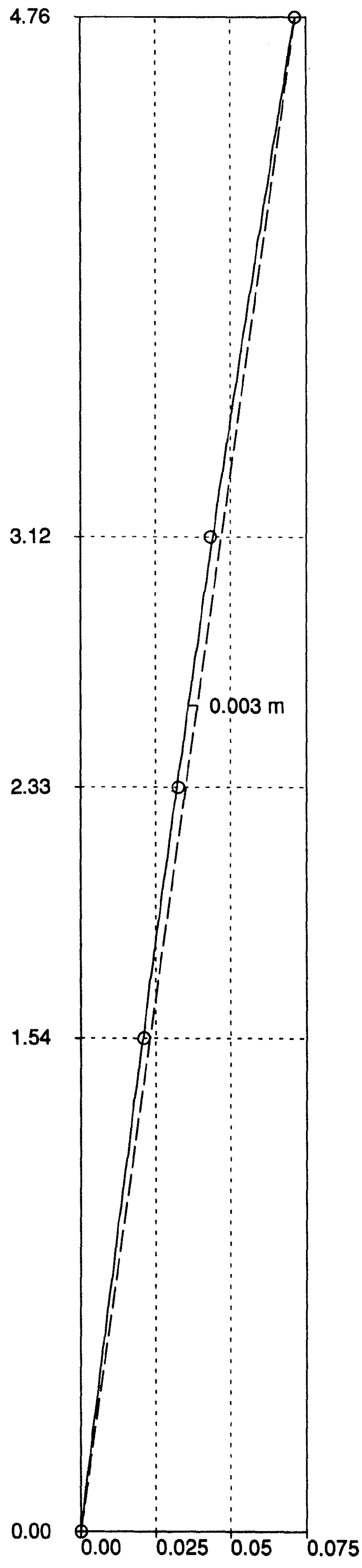
4.76
3.12
0.003 m
2.33
1.54
0.00
0.00
0.025
0.05
0.075

Fig. 2.

linked to the height of the adjacent Ionic half-columns by the epistyle.[6] Cooper places the single completely preserved drum and the four fragmentary drums in the lower part of the shaft. In figure 1 the shaft profile is based on Cooper's data.[7] The scale for *x* axis is ten times greater than for *y* axis in order to make it easier to distinguish features of the shaft profile. The straight dashed line connects the bottom and top of the shaft, and Cooper's actual data is given as small circles. All the intermediate data points fall to the right of the straight line producing an unthinkable zigzagging shaft profile. If the measurements given in the plate are correct, the basic error in Cooper's reconstruction is to connect the preserved top part of a drum (CL1b in fig. 3) to the bottom drum (CL1a):[8] the difference in the bottom and top diameters of 42 mm is not possible in a single drum when the total taper of the shaft is only 143 mm.[9]

Figure 2 presents the shaft profile with the drums lifted to a higher position in the shaft. I have omitted Cooper's second highest diameter measurement (broken drum, CL3 in fig. 3): its reliability is questionable because once more it introduces too large a taper for a single drum (49 mm). To the data I have fitted a parabola which is drawn as a solid line.[10] Figure 3 is a reconstruction of the column with the shaft fragments restored to position. The placement of the blocks in figures 2 and 3 is based on the presumption that the shaft consisted of six roughly equally high drums.[11] I have restored the fragment CL1b as the top of the second drum and pre-

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[6] Cooper 1992, pl. 34b.

[7] I have used the diameters measured at the bottoms of two opposite flutes, because these measurements are usually more accurate than the diameters measured at the possibly broken fillets. The height of the shaft, 4.762 m, is calculated by subtracting the capital height (0.677 m) and base height (0.402 m) from the total height (5.841 m); for the figures, see Cooper 1992, pls. 20.9 and 50c.

[8] The fragments cannot be directly joined to each other according to Cooper 1992, pl. 40d. I use the same names for the fragments as given in the plate.

[9] Subtracting the top diameter of the shaft (0.499 m) from the bottom diameter (0.642 m) we get 0.143 m.

[10] I have used least squares approximation as the curve fitting method: see J. Pakkanen, "The *Entasis* of Greek Doric Columns and Curve Fitting. A Case Study Based on the Peristyle Column of the Temple of Athena Alea at Tegea", forthcoming in Archeologia e Calcolatori 7.

[11] Dividing the shaft height of 4.76 m by six we get ca. 0.79 m as the average drum height – the two drums with their full height preserved are 0.79 and 0.68 m.

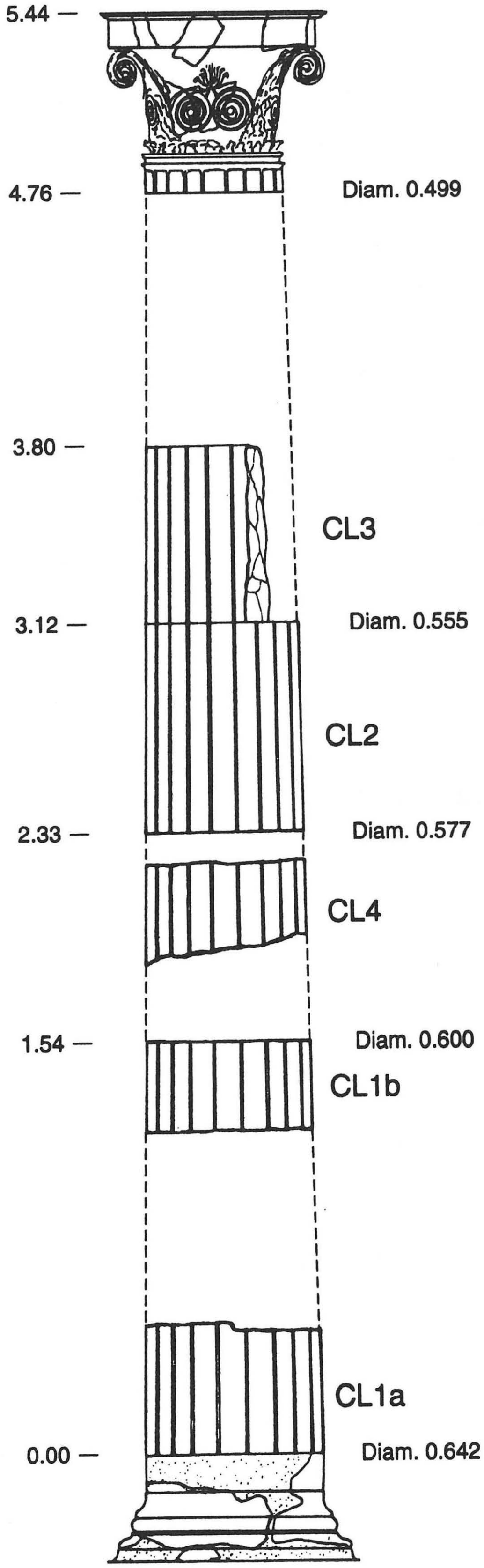
5.44 —
4.76 —
Diam. 0.499
3.80 —
CL3
3.12 —
Diam. 0.555
CL2
2.33 —
Diam. 0.577
CL4
1.54 —
Diam. 0.600
CL1b
CL1a
0.00 —
Diam. 0.642

Fig. 3.

sumed the combined height of the two lowest drums, 1.54 m, to be slightly lower than the height of two average drums, 1.58 m, because this brings also the position of maximum entasis lower. Restoring CL4 as part of a 0.79 m high drum we get 2.33 m as the bottom level of drum CL2. The next two height levels are given by the known drum heights.

The shaft profile in figure 2 presents a very slight entasis. The existence of entasis depends on the correctness of the argument above. If it were reasonable to restore the middle drums 0.14–0.22 m lower,[12] the entasis would disappear, and correspondingly, if the blocks were restored higher, the entasis would become more emphasized. The first alternative is conceivable: lowering the drums would create a gap of 1.18 m between CL3 and the capital, and this could be filled with one very tall or two short drums of 0.59 m. The latter alternative can definitely be ruled out, because lifting the blocks means also that the position of maximum entasis is moved higher: for such an entasis curve I know no parallels.

The entasis profile in figure 2 has a fairly close parallel in the fifth century Ionic columns discovered among the reused material of the Post Herulian fortification at the Athenian Agora: the proportional emphasis of the maximum entasis (the maximum projection between the shaft profile and the straight line connecting the bottom and the top divided by the shaft height) is at Bassai 0.06% and in the Ionic column 0.05%, but the placement of the maximum entasis is much lower in the Agora column.[13] Positioning the maximum entasis approximately at the center of the shaft as in figure 2 is on the other hand very common in fourth century Peloponnesian architecture.[14] It would seem that even though the existence of entasis in

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[12] Bringing CL1b 0.14 m and CL2 0.22 m lower would align their tops on the straight line between the bottom and top of the shaft.

[13] Proportional emphasis: temple of Apollo 0.003 m / 4.76 m, Agora column 0.003 m / 5.18 m; proportional position of the maximum entasis in the shaft (height of the maximum entasis divided by shaft height) is in the first one 0.544 (= 2.59 m / 4.76 m) and the latter 0.299 (= 1.55 m / 5.18 m). The figures given above are for the short column which currently stands re-assembled in the Stoa of Attalos. The columns are dated to the third quarter of the 5th century; see H. A. Thompson, Hesperia 29 (1960) 351–356.

[14] See J. Pakkanen, "Entasis in the Fourth Century BC Doric Buildings in the Peloponnese and Delphi", forthcoming.

the exterior Doric columns at Bassai is controversial,[15] the interior Corinthian column quite likely had a very delicate entasis.

The Tholos at Delphi (ca. 380–370 BC)[16]

The results of the co-operative study on the Tholos by J. Charbonneaux and K. Gottlob were published as two separate volumes in the series Fouilles de Delphes in 1925.[17] Their reconstruction of the interior Corinthian column is certain in many respects: The columns were standing on a podium, the column shaft penetrates very slightly – 2 mm – into the wall, and at the back of the shaft there is no fluting so that of the 20 flutes only 17 are actually carved. The base profile, lower diameter and height of the bottom drum as well as the main features of the capital are known from preserved fragments. The height of the column is uncertain: taking as the starting point the height of the preserved bottom drum (0.490 m) Charbonneaux and Gottlob reconstruct seven equally high drums on top of it. This brings the column height with the capital to 4.60 m, slightly over the joint of the frieze course and epikranitis course of the cella wall.[18]

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15 Most often the columns are reported to have no entasis; see Cooper 1970, 103f. Cooper himself found no entasis with an optical instrument. On the other hand, W. B. Dinsmoor was certain that the columns do have entasis: "the swelling outline of the shaft known as the entasis is certainly present, and is quite apparent as sighted from pavement or capital." (W. B. Dinsmoor (n. 1) 207).

16 The date is not certainly known, but the building and especially the carved metopes are usually dated to ca. 380–370 BC: see e.g. P. Amandry, Hesperia 21 (1952) 272 n. 94: ca. 380 BC; Roux 1961, 413, 415 and 418: ca. 370 BC; P. Bernard and J. Marcadé, BCH 85 (1961) 469–473: ca. 375 BC. F. Seiler suggests that the building was probably built in two phases: the main part of the building would have been finished at the beginning of the 4th cent., and only the roof elements would belong to the second phase (Seiler 1986, 65–67). The suggestion explains part of the contradictory dates given for the building, but I do not find Seiler's argumentation conclusive.

17 Charbonneaux 1925 and Gottlob 1925.

18 Charbonneaux 1925, 20–23; Gottlob 1925, pls. 21–26. In this paper I follow the convention used in architectural literature and use the term 'cella' also for the inner room of a tholos, even though the function of the circular buildings discussed in this paper is not necessarily religious; see G. Roux, "Trésors, temples, tholos", in G. Roux (ed.), Temples et Sanctuaires, 1984, 153–171.

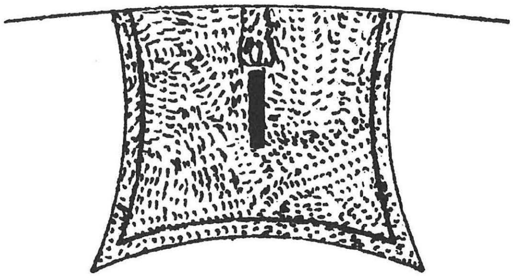

Fig. 4.

The three standing Doric columns of the Tholos were re-erected in 1938. Before this took place, P. Amandry and J. Bousquet conducted a thorough study on the existing column drums: they were able to show that the column shaft consisted of five and not four drums as had been previously thought.[19] H. Ducoux's section drawing presented in the publication omits the interior Corinthian order,[20] and therefore in studies and general works discussing the Tholos the old reconstruction drawing by K. Gottlob has usually been reproduced.[21]

Recently, F. Seiler has made a new drawing of the Tholos section: it takes as its starting point Gottlob's drawing, but he introduces into the drawing the higher Doric column, cella wall, and Corinthian column.[22] The only clear inaccuracy in the drawing is the ca. 0.85 m high bottom drum of the Corinthian column; on the basis of the preserved fragment its height is known to be 0.49 m.[23] Charbonneaux and Gottlob wished to reconstruct the shaft with eight equal drums and this aligns the top surface of the abacus 0.03 m above the top of the frieze course.[24] There is no reason to repeat this feature in a new reconstruction drawing with a different shaft height. Actually, the top of the abacus was more likely to have been level with the top of one of the blocks in the wall: The top surface of the abacus has a large 'dowel hole' in the center and also another cutting at the back edge (fig. 4).

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19 Amandry & Bousquet 1940–41, 121–127.

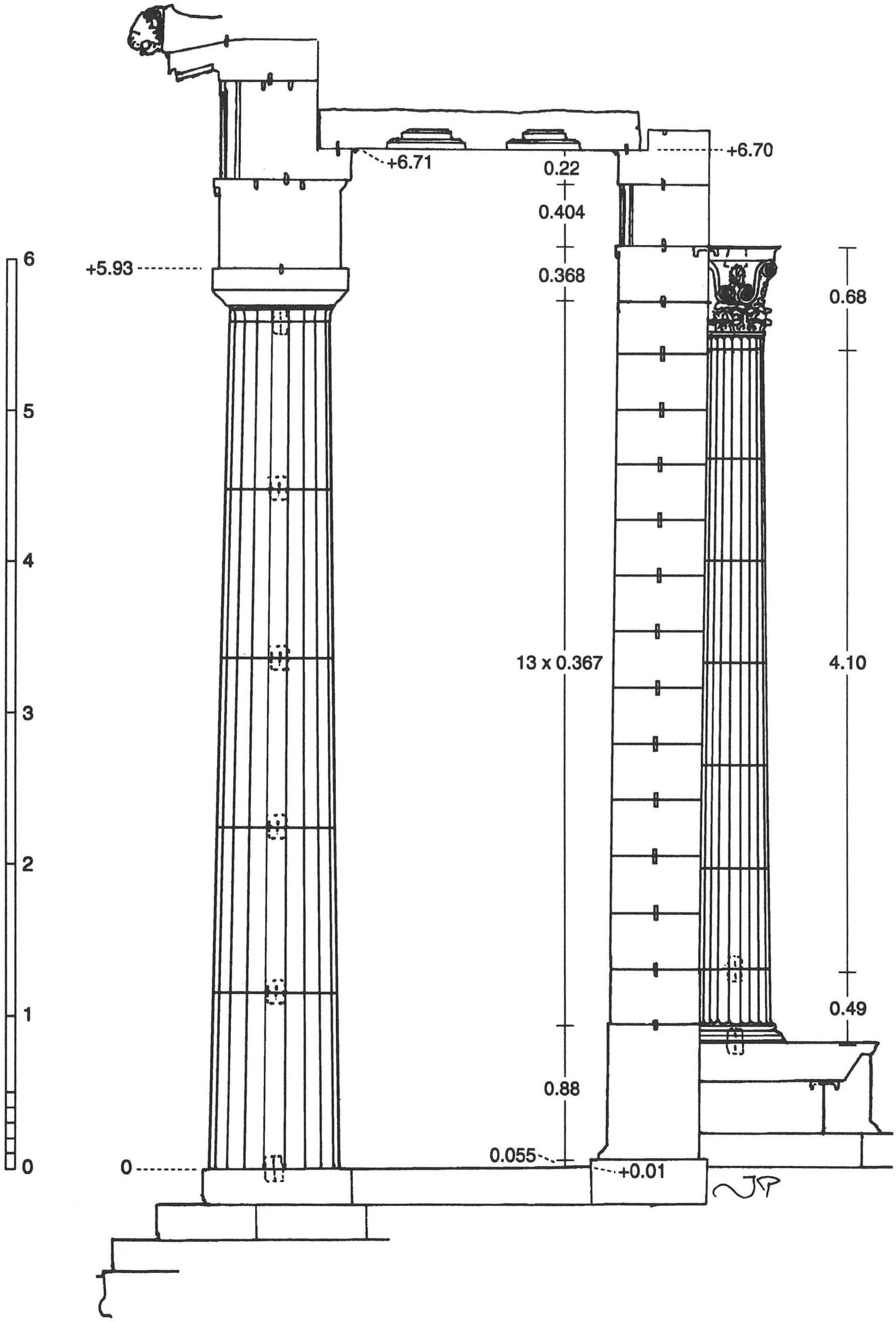
20 Amandry & Bousquet 1940–41, pl. 7.

21 Gottlob 1925, pl. 26. For reproductions, see e.g. H. H. Büsing, Die Griechische Halbsäule, 1970, fig. 47; A. W. Lawrence, Greek Architecture, The Pelican History of Art. (Revised with additions by R.A. Tomlinson), 1983[4], fig. 212; G. Gruben, Die Tempel der Griechen, 1986[4], fig. 94.

22 Seiler 1986, fig. 28.

23 Charbonneaux 1925, 22, fig. 28.

24 Charbonneaux 1925, 22; Gottlob 1925, pl. 26. H. H. Büsing (n. 21) 31 accepts this reconstruction as likely on the basis of comparative material.



6
5
4
3
2
1
0
+5.93
0
+6.71
0.22
0.404
0.368
13 x 0.367
0.88
0.055
+0.01
+6.70
0.68
4.10
0.49
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Fig. 5.

In the appendix on the Corinthian column Gottlob explains that these cuttings probably connected the epistyle to the top of the capital,[25] but I am quite sure that the second cutting was used to connect the capital to the cella wall with a Π-shaped clamp (fig. 5).[26] I can think of three possible ways to align the top of the capital with the cella wall: it could have been level with the top of the highest wall block, the architrave, or the frieze block. Unfortunately the backs of the existing wall-architrave and frieze blocks are missing, so no traces of possible clamp cuttings remain.[27] Charbonneaux and Gottlob report no clamp cuttings that could have connected any wall block to the abacus, although several fragments show traces of the hollow cutting for the column shaft.[28] The other fourth century tholoi have the top of the interior capital slightly higher than or level with the top of the exterior capital.[29] Therefore, I think it is reasonable to reconstruct the abacus of the Corinthian order level with the top of the cella wall architrave (fig. 5).[30] For the shaft between the surviving bottom drum and the capital I have hypothetically reconstructed six drums of ca. 0.68 m.

All the reconstruction alternatives produce a very slender column: the Corinthian column presented in figure 5 has a height of 11.7 lower diameters, and the lower and higher alternatives respectively 10.9 and 12.6 lower diameters.[31] The corresponding figure for the Corinthian column at Bassai

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25 Charbonneaux 1925, 35. Depths of the cuttings are not given, so their profile in fig. 5 is hypothetical. Richard Anderson has noted to me that the 'dowel hole' is more likely a lewis cutting used to lift the capital: this is indicated by the direction and position of the cutting.

26 See also Schleif 1944, fig. 3 for a similar cutting for a clamp on the abacus top surface.

27 Charbonneaux 1925, 12; Gottlob 1925, pl. 18.

28 Charbonneaux 1925, 11, 20; Gottlob 1925, pls. 16–17.

29 For Epidauros, see fig. 6; for Philippeion, Schleif 1944, atlas pl. 2. Also in the temple of Athena Alea at Tegea the interior capital is at a slightly higher level than the exterior capital (fig. 8).

30 The slight height discrepancy between the exterior order and the cella wall in fig. 5 is due to the curving krepidoma of the building: according to H. Ducoux's drawing the cella wall starts from a level ca. 0.01 m higher than the exterior column (Amandry & Bousquet 1940–41, pl. 7).

31 Since the bottom drum of the interior column has its top aligned with the bottom cella wall block (see Gottlob 1925, pl. 26), the height of the column can be calculated as following:

is considerably less, 8.65, which is almost the same as the proportional height of the Ionic column, 8.85 lower diameters.[32] Also the position of the Corinthian column – alone at the back of the cella – favors a robust one. In the Tholos the circumstances are very different: the columns stand relatively close together next to the wall. If the architect[33] wished to create more space between the columns and to emphasize the verticality of the inner space, very slender Corinthian columns were a perfect choice.[34] The Tholos is so early in the evolution of the Corinthian order that no canons could have existed. Breaking the proportional rules for the Ionic column is perhaps one of the first indications of regarding the Corinthian as an order in its own right, not just a variant of the Ionic order.[35] It should also be kept in mind that the architect of the building did not hesitate to break the proportional rules for the height of the exterior Doric columns when it was needed: the columns are much more slender than usual in order to compensate for the proportionally greater width of the tholos compared to rectangular buildings.[36] One possible explanation for the height of the Corinthian columns is that the architect wished to echo in the interior the exceptional proportions of the exterior.

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1) Top of the capital aligned with architrave course: 0.49 m (height of bottom drum) + 12 × 0.367 m (average wall block height) + 0.368 m (height of the architrave) = 5.262 m. 2) Capital aligned with the top of the highest regular wall block: 5.262 m – 0.368 m = 4.894 m. 3) Capital aligned with the frieze course: 5.262 m + 0.404 m (height of the frieze block) = 5.666 m. The proportional heights are calculated by dividing the column height by the lower diameter of 0.499 m (for the diameter, see Gottlob 1925, pls. 24, 26).

32 Corinthian column: 5.841 m / 0.675 m; Ionic: 5.841 m / 0.660 m (Cooper 1992, pls. 20.9 and 40d).

33 According to Vitruvius Theodorus of Phocaea wrote a book on the building, so he was likely the architect as well; Vitr. 7, praef. 12.

34 For an analysis of the inner room, see also Seiler 1986, 63–65.

35 Cf. J. J. Coulton, Greek Architects at Work, 1977, 128f.

36 Roux 1961, 321; R. A. Tomlinson, Epidauros, 1983, 64.

The Tholos at Epidauros (360–330 BC)[37]

In his very thorough work on the fourth and third century architecture in the Argolis, G. Roux discusses also the Tholos at Epidauros at length. His reconstruction of the Corinthian inner order is well argued. The base and the capital of the Corinthian order have been preserved in very good condition, but the drums of the shaft have been reduced to small pieces: G. Roux's measurements on the 150 fragments gave no positive results, and he was forced to calculate the column height on the basis of the exterior order. The tallest drum fragment has a preserved height of 0.90 m.[38]

G. Roux reconstructs the exterior Doric column with eleven drums,[39] but as I have elsewhere demonstrated, the column may as well be reconstructed with twelve drums. The latter reconstruction is possible because the top three (or four) drums are missing and the diameter of the capital is not accurately known.[40] Increasing the height of the exterior column will effect also the Corinthian column, because the height of the interior order is directly linked to that of the exterior order by the ceilings.

In Roux's reconstruction the ca. 6.10 m high shaft of the Corinthian column is hypothetically divided into six drums of ca. 1.02 m.[41] In figure 6 I present the alternative twelve drum reconstruction.[42] The ca. 6.69 m high Corinthian shaft has – also hypothetical – seven drums of ca. 0.96 m. I have reconstructed the height of the orthostate course as 1.31 m; the cella wall consists of eleven courses of 0.413 m and two courses of 0.46 m high blocks.[43] The Corinthian column of the first reconstruction alternative is

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[37] For the date, see A. Burford, The Greek Temple Builders at Epidauros, 1969, 63f.; R. A. Tomlinson (n. 36) 29. Seiler suggests a longer building period and the date as ca. 370–320 BC (Seiler 1986, 80–84).

[38] Roux 1961, 153–156.

[39] Roux 1961, 138–140, figs. 30–31.

[40] For reference, see n. 14.

[41] Roux 1961, 153.

[42] I wish to emphasize that Roux's reconstruction with eleven drums for the Doric column is equally likely as the twelve drum reconstruction.

[43] The height of the orthostate course is not preserved, but the height was at least 1.07 m. The height of the normal wall blocks varies between 0.405 and 0.42 m; the two top courses are known to be 0.46 m; see Roux 1961, 147–149.

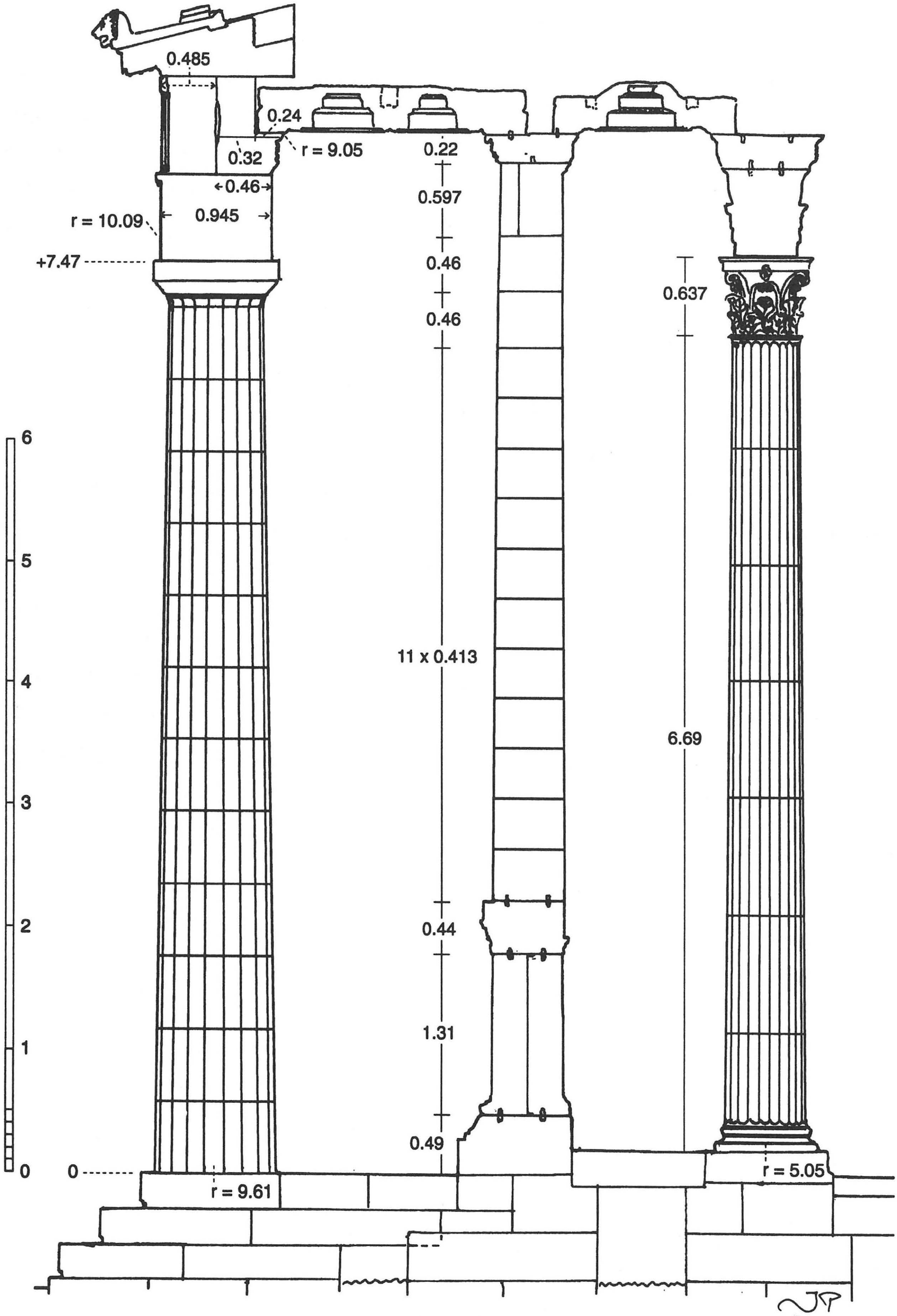
0.485
0.24
0.32
r = 9.05
0.22
0.46
r = 10.09
0.945
0.597
+7.47
0.46
0.637
0.46
6
5
11 x 0.413
4
6.69
3
0.44
2
1.31
1
0.49
0
0
r = 9.61
r = 5.05
JP

Fig. 6.

10.3 lower diameters high, and the second one 11.2 lower diameters.[44] The latter is close to the most likely column height proportion of the Tholos at Delphi, 11.7 lower diameters.

H. Büsing has recently studied the building: in figure 6 the krepidoma blocks and the position of the exterior colonnade have been revised according to his results[45] but I do not agree with his reasoning regarding the inclination of the exterior columns. Büsing has calculated the radius of the building at the exterior face of the architrave as ca. 10.03 m, and based on the other known radii of the building he suggests two alternative architrave and column inclination reconstructions. He concludes that the inclination of the columns toward the interior of the building can neither be ruled out nor verified on the basis of the preserved material.[46] The weakness of this argumentation is that the hypothetical radius calculation is not necessary: even though none of the architrave blocks survive, the radius of the architrave face can be derived from the frieze elements.[47] Büsing gives 9.046 m as the radius at the junction of the coffered ceiling and the frieze backer (fig. 6).[48] The width of the frieze backer from this point to the frieze block is 0.56 m and the width of the frieze block itself is 0.485 m.[49] Roux does not specify where width of the frieze is measured, but I suspect it is either done over the frieze taenia or the triglyph. Since they both are more or less flush with the architrave face and the width of the frieze backer directly above the architrave is 0.46 m,[50] the width of the architrave without taenia can be calculated as 0.945 m simply by adding the two widths together.

44 The first figure: 6.74 m / 0.657 m (Roux 1961, fig. 31); the height of the latter column is calculated by adding the height of one exterior drum, 0.59 m, to Roux's reconstruction: 7.33 m / 0.657 m.

45 Büsing 1987, 225–257.

46 Büsing 1987, 249f. and fig. 6; in 249 n. 73 he gives the radius as 546 dactyls of 18.37 mm. Roux 1961, 138 argues that the Tholos columns were vertical, but his argumentation is not conclusive: tilting the columns toward the interior can be done by only cutting the lowest drums so that their bottom and top surfaces are not parallel (see e.g. J. A. Bundgaard, Mnesicles. A Greek Architect at Work, 1957, 134–136, fig. 47), and since none of the bottom drums of the Tholos preserve any substantial amount of their bottom surface (Roux 1961, fig. 30), the verticality of the columns cannot be verified.

47 Roux 1961, 140 estimates the architrave width as 0.922 m from the abacus.

48 Büsing 1987, 257.

49 Roux 1961, 142.

50 Roux 1961, 142.

Thus, by this calculation, the building radius at the exterior face of the architrave is ca. 10.09 m[51] and the horizontal distance between the midpoint of the architrave and the center of the building is ca. 9.62 m.[52] Büsing has calculated the radius of the circle of exterior column centers as ca. 9.61 m[53] which, being virtually the same, gives proof that the columns were not inclined toward the interior.

The Temple of Athena Alea at Tegea (ca. 345–335 BC)[54]

During the years 1910–1913 the French archaeologist Ch. Dugas worked at the temple site in order to study and publish the material discovered in the earlier excavations and to continue with additional archaeological work. Dugas' chief collaborators were architect M. Clemmensen and sculptor J. Berchmans.[55] The result of their work was the lavishly illustrated publication of the Classical temple published in 1924. Dugas and Clemmensen proposed their reconstruction of the interior with engaged Corinthian columns based on their interpretation of the existing elements of the cella wall and column fragments.[56] B. H. Hill has revised the French re-

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51 9.046 m + 0.56 m (frieze backer) + 0.485 m (frieze) = 10.091 m.

52 10.091 m – 0.945 m / 2 = 9.619 m.

53 Büsing 1987, 249f. gives the radius as 523 dactyls. The small discrepancy of the two dimensions demonstrates how accurate Büsing's radii actually are.

54 For this date, see Norman 1984, 191–193; dating the building to the second half of the fourth century is supported also by the pottery discovered to the north of the temple in the Norwegian excavations carried out between the years 1990–1994. Since 1993 the study of the building blocks at Tegea has been carried out by the author of this paper as part of the excavations in the sanctuary; the excavation project has been conducted by the Norwegian Institute at Athens as an international cooperation under the direction of Prof. Erik Østby. During the 1995 and 1996 seasons I have been greatly assisted in the study by Dr. Petra Pakkanen, and in 1996 by architect Tuula Pöyhiä; her comments on the different reconstructions of the building have been of especial value. I also wish to thank Anne-Claire Chauveau, Øystein Ekroll, Christina M. Joslin, Marianne Knutsen, Tom Pfauth, and Heather Russell; without their help the building block study would not have been possible.

55 Ch. Dugas, CRAI 1911, 257–258; Dugas 1924, X–XII.

56 Dugas 1924, 37–42, 45–51. Large part of the material, such as most of the capital fragments and all the pieces of the engaged column shafts, has since been lost.

construction of the Corinthian capital, and H. Bauer subsequently has suggested a slightly higher capital.[57]

Recently, N. J. Norman has proposed a reconstruction of Ionic half-columns above the Corinthian order. She argues that the Corinthian column could be lower and therefore there is room for the Ionic order in the cella.[58] Her argumentation gives rise to many points on which I wish to comment on.

First of all, the figure for proportional height of the column, 11.20 lower diameters, which Norman uses to condemn the Dugas & Clemmensen reconstruction as "rather tall and slender even for a fourth century column"[59] is incorrect. She counts into the height of the column also the height of toichobate course below the column base and gives as the lower diameter the smaller dimension measured between the bottoms of the flutes. In the height comparanda she cites,[60] the column height never includes the height of any course below the base, and the diameter is in all except one case measured at the fillets.[61] By this unorthodox measurement Norman renders her proportional height comparisons meaningless. The correct figures derived from the Tegea publication are 7.438 m for the height, 0.770 m for the diameter and 9.65 for the proportion of height to lower diameter.[62] The corresponding figures for Nemea are 7.488 m, 0.84 m and 8.9 lower diame-

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57 Hill 1966, pl. 29B; on Hill's reconstruction, see also Norman 1984, 177f.; Bauer 1973, 65–71, 142.

58 Norman 1984, 176–180.

59 Norman 1984, 176.

60 Norman 1984, 176 n. 45.

61 This applies to the Philippeion at Olympia (10 l.d., Schleif 1944, 19) and all the proportion figures cited from Roux: temple of Artemis at Epidauros: appr. 10 lower diameters (Roux 1961, 214); Bassai: ca. 9.28 l.d. (Roux 1961, 36; for the correct figure on the Ionic column, 8.85 l.d., see pp. 148–149 above); and the Tholos at Delphi: ca. 10 l.d. (Roux 1961, 335, which actually reads "10 au moins"; see pp. 148–149 above). The only exception is the Choregic Monument of Lysikrates: Norman has calculated the proportion herself as 11.85 lower diameters (contrary to H. Bauer, who gives correctly the figure as 10.6; see H. Bauer, AM 92 (1977) 204).

62 Dugas 1924, 47, 50, pls. 21–26, 75. Bauer 1973, 69 suggests a lower diameter of 0.740 m, but the only reasoning he gives for this measure is that it is 2½ units of the foot-length 0.296 m. The other foot-units suggested for the building have been 0.294, 0.2985, and 0.326 m; see H. Bankel, AA 1984, 413–417.

ters,[63] which in fourth century context makes the height of the Corinthian column in the temple of Zeus the exception, not the French reconstruction of the Tegean Corinthian column.[64]

I find Norman's rearrangement of the cella wall blocks unsatisfactory as well. She is obliged to make this rearrangement in order to accommodate the Ionic half-columns of her cella interior,[65] but her solution is inconceivable because the link between the exterior order and the cella wall is ignored. The 0.402 high epikranitis course with a hawksbeak-moulding which carries the coffered ceiling has a corresponding course of equal height on the other side of the pteroma as the frieze backer.[66] In Norman's cella wall the top of the epikranitis course is at the height of 10.465 m,[67] while the top of the frieze backer of the exterior order is at 10.844 m.[68] Also, at the site there are two 0.368 m high preserved anta-blocks which correspond to wall blocks of equal height.[69] These wall blocks are placed in Norman's wall scheme as the second highest course, but the anta-blocks cannot be placed in this same course, *above* the anta capital.

The only additional evidence Norman provides for the Ionic columns is far from conclusive: the small fragment which Norman claims is from an upper half-column shaft does not necessarily have to be from the temple.[70] Norman's reconstruction also requires emending Pausanias' passage on the temple. Describing the orders all the manuscripts read ἐκτός in connection

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63 Hill 1966, 30, pl. 23.

64 I would suggest that the Corinthian columns at Nemea were made proportionally lower in order to accommodate the unique upper colonnade.

65 Norman 1984, 174, 178–180.

66 See fig. 8 for illustration.

67 0.077 (height of the toichobate course from the pteron floor) + 0.295 + 1.278 + 14 × 0.385 + 0.402 + 0.376 + 0.370 + 0.440 + 0.442 + 0.495 + 0.498 + 0.402 = 10.465 m.

68 Dugas 1924, pls. 21–26.

69 Dugas 1924, 38, fig. 14, pls. 21–26.

70 Norman 1984, 180, fig. 10. The temple site has a very long history of use: it was cleared of private houses only in 1900–02 and 1909; see G. Mendel, BCH 25 (1901) 241–256; K. A. Rhomaios, Prakt 1909, 303–316; Dugas 1924, X. A large number blocks retain traces of later use, and even though most physical remains other than from the Archaic or Classical temples have been removed from the site, there still remain some blocks which cannot be connected with these buildings, most noticeable a starting line block from the stadium and a few Byzantine double column and capital fragments.

with the Ionic columns,[71] and now for more than a century it has been debated whether the word should be emended to ἐντός or not.[72] In light of the previous argument perhaps the manuscript readings should be kept, and the passage in Pausanias applied to two possible dedicatory Ionic columns on the foundations in the north-east and south-east corners of the temple[73] or to some other undiscovered Ionic monument in the sanctuary.

Norman wishes to see Skopas, the architect of the Tegea temple,[74] as the inventor of the scheme which superimposes the Ionic order above the Corinthian. She contends that at Nemea this design was only repeated and that from these two temples the idea of two superimposed colonnades of different orders was then adapted to Hellenistic stoas.[75] This hypothesis should be considered in the light of what we know of the inner arrangement of the cella in the temple of Zeus at Nemea. The two storeys at Nemea break the tradition governing the proportion of the two superimposed orders. In Classical mainland temples the height of the upper columns is well over half of the lower one,[76] but at Nemea it is only ca. 37%.[77] The experiment is not a very successful one: the Ionic colonnade is too low compared to the Corinthian one and produces an unbalanced vertical division within the cella.[78] The effect is enhanced from the perspective viewpoint of a visitor at

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71 ὁ μὲν δὴ πρῶτός ἐστιν αὐτῷ κόσμος τῶν κιόνων Δώριος, ὁ δὲ ἐπὶ τούτῳ Κορίνθιος· ἑστήκασι δὲ καὶ ἐκτὸς τοῦ ναοῦ κίονες ἐργασίας τῆς Ἰώνων. Paus. 8,45,5.

72 For recent general discussion of the problem, see Norman 1984, 179.

73 This was first suggested by H. Thiersch, JdI 28 (1913) 266–272, and followed by Ch. Dugas 1924, 65. A. F. Stewart mentions that the so-called Hygieia head was discovered – apparently *in situ* – by the south-east corner of the temple (A. F. Stewart, Skopas of Paros, 1977, 83). From this Norman argues that the foundations supported statue bases (Norman 1984, 179 n. 66), but I find no reason why there could not have been statues standing on the dedicatory Ionic columns.

74 Paus. 8,45,5.

75 Norman 1984, 194.

76 The temple of Zeus at Olympia: ca. 63% (height of the upper order uncertain, Olympia II (1892) pl. 11); the Parthenon: 57.8% (A. K. Orlandos, Ἡ ἀρχιτεκτονικὴ τοῦ Παρθενῶνος I (1976) pl. 53); Hephaisteion at Athens: 57.0% (B. H. Hill, Hesperia Suppl. 8 (1949) fig. 10).

77 The height of the lower columns is 7.488 m, and the upper ones ca. 2.8 m; Hill 1966, 30, pl. 10.

78 For a section of the temple cella, see Hill 1966, pl. 8.

ground level, a phenomenon which can be missed by the modern scholar examining the building in elevation. If this arrangement had already been tested at Tegea, would it have been repeated as such at Nemea? The idea of having two superimposed storeys of different orders certainly became popular in Hellenistic stoas, but for functional reasons the second storey could not be as low as at Nemea:[79] already in the first known case of upper Ionic colonnade, the Stoa at Perachora, the heights of the two superimposed orders are in balance.[80]

Contrary to Norman's reconstruction, Dugas' and Clemmensen's wall scheme does seem very logical: every different block height has a reason for its position. Above the regular height wall blocks are two courses that correspond to the top anta block and capital, the next two to the porch architrave, and the two blocks corresponding to the frieze course carry the epikranitis block. But there are problems with this reconstruction as well. The "sub-toichobate block" showing the tooling for the semicircular course below the half-column base which it once carried has its front part apparently deliberately hacked away for about a height of 0.12 m: this has most likely been done during some later stage of reuse, and implies that it possibly originally had an extruding moulding.[81] Such a moulding would make it impossible to fit the block where it has been placed in the French reconstruction. There is also a slight height discrepancy between this block and two other sub-toichobate blocks: its height is 0.372 m, and the others are 0.375 and 0.377 m.[82]

The second problem is the 0.368 m high wall course placed below the anta capital. Five anta-blocks are preserved with the height of three of them being 0.385 m and two being 0.368 m. With only a single course of 0.368 m there would have been originally only four anta blocks of this height in the

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79 J. J. Coulton suggests that the idea to use Ionic order in the upper storey may be traced to the temple of Zeus at Nemea; see J. J. Coulton, The Architectural Development of the Greek Stoa, 1976, 106.

80 The reconstruction of the column heights is not certain, but it is well argued for: the height of the upper order was very likely ca. 71% of the lower one. The stoa was built toward the end of the 4th cent. BC; on the building, see J. J. Coulton, BSA 59 (1964) 100–131, esp. fig. 11 (elevation of the façade).

81 From most of the architrave blocks the taenia, regula and guttae have been cut almost totally away in order to make their reuse easier.

82 Dugas 1924, pls. 60A, 61A, 62B. Cf. Norman 1984, 174f.

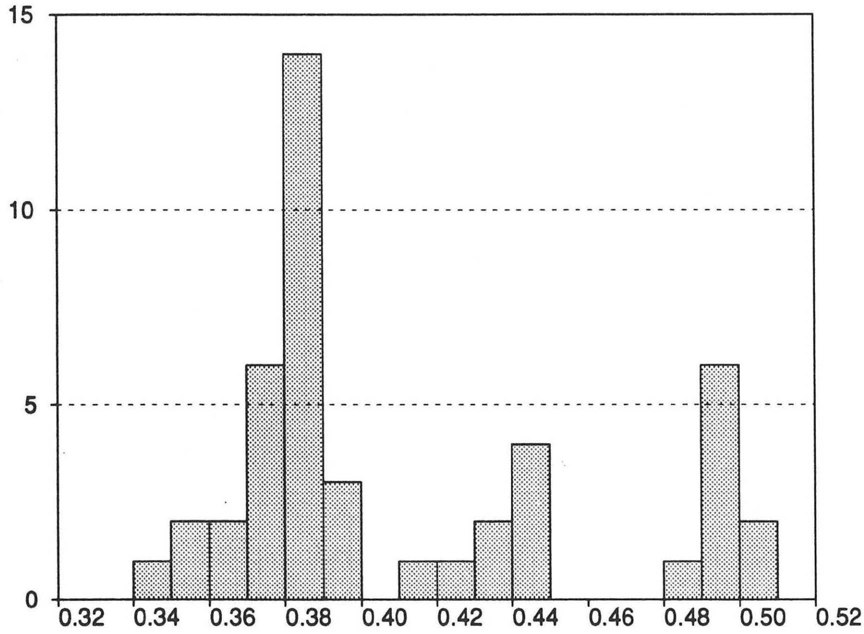

Fig. 7.

building and it would be quite a coincidence if two were preserved.[83] Probably, there should be more wall-courses composed of 0.368 m high blocks. A preliminary survey of the cella wall blocks at the site supports this conclusion: In figure 7 the results of the survey are presented as a histogram. There actually seems to be much less consistency in the height of the wall blocks than the French publication suggests.[84] There are eleven blocks in the range 0.331–0.380 m (mean 0.367 m) and seventeen in the range 0.381–0.400 m (mean 0.386 m). These shorter wall blocks are very frequent and it is unlikely that they could all be from the two courses corresponding to the top part of the anta or the hypothetical blocks from the top of the wall as is suggested in the French reconstruction.

The most serious problem with Dugas' and Clemmensen's reconstruction is that they do not have any suggestion for the design of the upper part of the cella wall. Since there is no room for an upper order, raising the half-columns on a podium is an obvious answer to the problem. This has been suggested by H. H. Büsing, but he has not presented a solution which

83 Dugas 1924, 38, pls. 21–26. The general level of preservation of the wall blocks is less than 10%.

84 The sample size in fig. 7 is 45 blocks. Dugas and Clemmensen were able to measure 78 blocks: the fewer number of blocks is partly explained by the disappearance of building material from the site and partly by the wall blocks Dugas and Clemmensen found in Episkopi, ca. one kilometer north from the temple (Dugas 1924, 38f., esp. 38 n. 2).

takes into consideration the material discovered at Tegea.[85] There is comparative material for the use of podium in the Tholos at Delphi (fig. 5), and also the half-columns of the Philippeion at Olympia are considerably raised from the floor level.[86]

Figure 8 presents a reconstruction of the section of the exterior and interior orders of the temple. For the toichobate course of the cella wall I have assigned a 0.41 m high block with a cyma reversa moulding at the bottom (α in fig. 8).[87] At the same level I have placed a block with a rectangular cutting at the top corner (β in fig. 8).[88] This reconstruction brings the cella floor level 0.45 m above the pteroma floor. The blocks Dugas and Clemmensen thought to be exterior toichobate blocks I have moved to the interior as the podium base course (γ in fig. 8).[89] For the 0.835 m high block forming the center part of the podium (δ in fig. 8) there is no position

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85 H. H. Büsing (n. 21) 31f., pls. 45–46. E.g. the cella wall epikranitis block cannot be placed as the podium cornice because of the treatment of the upper surface and the cuttings which connect it to the adjoining blocks (see Dugas 1924, pls. 79–80).

86 Schleif 1944, atlas pl. 2.

87 At the site there are three fragmentarily preserved blocks: all of the blocks have ca. 0.12 m wide and 2–5 mm high relief band below the profile, which fits very well a block that has to carry the whole weight of the cella wall. The greatest preserved thickness is 0.375 m. Dugas and Clemmensen assigned these blocks to the pronaos epikranitis course (Dugas 1924, 42f., fig. 15) and Norman to the eastern threshold (Norman 1984, 187f., figs. 11–14). A corresponding cyma reversa moulding is used at the bottom of the wall in the Tholos at Delphi (fig. 5).

88 The block was obviously thought to be *in situ* on the eastern ramp (Dugas 1924, pls. 3–5, 29A), but unless the ramp foundations have settled more than the east foundations of the temple, a reconstruction of the ramp with the block would require ca. 0.03 lower euthynteria blocks for the center part of the front of the temple: no such blocks exist at the site, and besides, these blocks would greatly cancel the carefully laid out curvature of the foundations (on the western short side of the temple the center is ca. 0.05 m higher than the corners). Therefore, I have tentatively assigned the block into the wall reconstruction: the dowel hole and pry marks on top of the block are actually very well suited for the position I am proposing.

89 The preserved height of the largest fragment is 0.293 m (Dugas 1924, fig. 13B), so the French reconstruction of the height as 0.295 m is quite unlikely: I have reconstructed them as 0.443 m (the height is calculated by subtracting the height of the podium dado, 0.835 m, from the orthostate height, 1.278 m). The corner fragment (Dugas 1924, fig. 13A) could be from the break in the podium by the north door of the cella or a possible rectangular extrusion of the podium at the corners of the cella corresponding to the rectangular pillars.

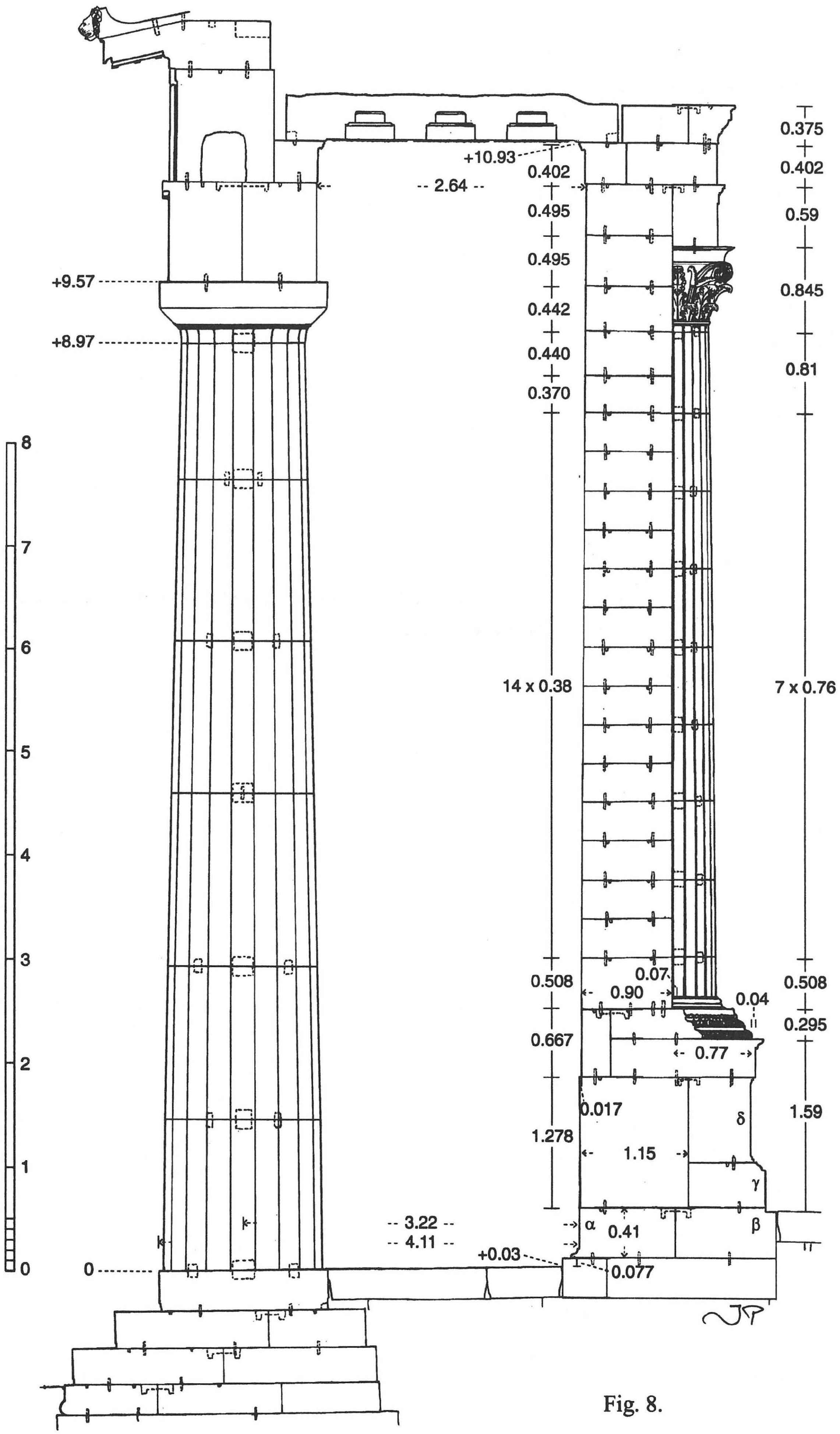
+10.93
2.64
+9.57
+8.97
0.402
0.495
0.495
0.442
0.440
0.370
14 x 0.38
0.508
0.667
1.278
0.375
0.402
0.59
0.845
0.81
7 x 0.76
0.508
0.295
1.59
0.07
0.90
0.04
0.77
0.017
1.15
δ
γ
α
0.41
β
3.22
4.11
+0.03
0.077
0
8
7
6
5
4
3
2
1
0

Fig. 8.

in the French reconstruction.[90] The width of the podium is not certain, but it can be calculated as following (fig. 8): the wall above the orthostate is set back by 0.017 m,[91] the regular wall block width is ca. 0.90 m,[92] the distance between the center of the half-column and the interior wall plane is ca. 0.07 m,[93] and the semi-circular moulding course projects ca. 0.77 m from the center of the column.[94] Allowing ca. 0.04 m for the distance of the moulding from the edge of the block below, we get the width of the podium as ca. 1.80 m. The width of the podium block facing the cella interior (β in fig. 8) is 0.63 m: if it was recessed by 0.02 m, there is 1.15 m for the orthostate blocks. The orthostate course can be either reconstructed as massive single blocks or made of two separate blocks with the widths of ca. 0.68 and 0.47 m; evidence for both possibilities exists.[95]

In figure 8 the two courses above the orthostate are the ones Dugas and Clemmensen regarded as the sub-toichobate and toichobate courses. For the front part of the first course I reconstruct a cyma recta moulding corresponding to the cyma reversa at the bottom of the podium.[96] The

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90 The block lies on the southern edge of the foundations ca. 7 m west of the south-east corner of the temple.

91 For the groove at the top of the orthostate, see Dugas 1924, pls. 66–67.

92 The width of the preserved wall blocks varies from 0.892 to 0.895 m, but since the wall tapers slightly, the exact width is not known. The orthostate width of 0.925 m in the French reconstruction is only estimated; see Dugas 1924, 38–41, pls. 67, 70–71.

93 On the basis of lost fragments Dugas argues that the half-columns had eleven flutes, and therefore the distance of the center from the wall is half of the flute width; see Dugas 1924, 48, pls. 21–26.

94 See Dugas 1924, 46, pls. 21–26, 62B. On the basis of a fragment in the Tegea museum Norman 1984, 176 argues that the projection is only 0.70 m, but the projection can be directly measured on the block as ca. 0.77 m; see Dugas 1924, 62B.

95 The very large orthostate block fragment with a preserved width of more than 1.20 m can be placed at the junction of the long walls and pronaos or opisthodomos cross wall: this is supported by the distance between the preserved parts of the anathyrosis rims, 0.92 m – reconstructing rims of normal width ca. 0.10–0.11 m, the width of the block between the exterior edges of the rims could have well been 1.15 m. The extra width of the block is explained by the fact that it tied the cross-wall to the side wall (see fig. 8 and Dugas 1924, pl. 67A). The only block preserving the full width, 0.683 m (Dugas 1924, pl. 66), could be paired with a ca. 0.47 m wide block. The third preserved block with a reconstructed width of 0.925 m is most likely from the pronaos or opisthodomos side walls (Dugas 1924, pl. 67B).

96 For the block, see above p. 157.

elaborately moulded block of the second course I have moved slightly toward the exterior so that it is flush with the course below it.[97] For the exterior face of the wall at this level I have hypothetically reconstructed a ca. 0.29 m wide and 0.667 m high block.

For the lowest regular wall course I have placed a 0.508 m high wall block.[98] The height corresponds fairly closely to the combined height of the Corinthian base of 0.12 m and a normal wall block of 0.38 m;[99] therefore, I reconstruct the bottom half-column drum as the same height as the wall block next to it.

Next come fourteen courses of regular wall blocks: as we saw above,[100] the range of wall block heights is fairly large. I have used the average height of all the blocks less than 0.40 m high (0.38 m), to reconstruct the cella wall. The height of the half-column drums is tentatively here the same as two wall blocks, 0.76 m.[101] The topmost half-column drum covers the height of the anta capital course and the block corresponding to the lower half of the porch architrave, bringing it to 0.81 m. Contrary to Dugas and Clemmensen the wall thickness at this level should be reconstructed as ca. 0.90 m.[102]

In figure 8 the total height of the Corinthian capital block is 0.845 m, following H. Bauer's reconstruction.[103] The epistyle profile is reconstructed

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97 See Dugas 1924, 37f., pls. 21–26, 64–65.

98 One wall block with the height of 0.508 m lies at the edge of the excavated area directly south of the temple south-east corner. Placing this block into the wall scheme at this level is not certain, but quite likely. Reconstructing a 0.48 m high block as its pair would make it possible to place the two (combined height 0.99 m) to the frieze level, but no such block exists at the site.

99 On the base, see Dugas 1924, 47, pl. 75.

100 See p. 158 and fig. 7.

101 On the half-columns, see Dugas 1924, 47–49.

102 In Dugas 1924, pls. 21–26 a narrower wall is suggested to accommodate a 0.636 m wide epistyle block (on the block, see n. 104), but the wall block illustrated in Dugas 1924, pl. 72 shows that at the level of the 0.442 m high blocks (the porch architrave level) the width should be reconstructed as ca. 2×0.448 m = 0.896 m.

103 The French reconstruction of the capital block as 0.770 m high was based on the preserved fragments and the height of two wall blocks of 0.385 m (the height includes also the astragal and the top of the fluting); Dugas 1924, 49–51; Hill 1966, pl. 29B, accepts this height reconstruction. In H. Bauer's reconstruction the capital height is not connected to the wall blocks; see Bauer 1973, 70f., 142. He gives as the total height of the capital

on the basis of a fragment N. J. Norman reassigns to the epistyle:[104] the crowning moulding height is 0.097 m, and the fascia below is preserved (0.085 m), as is the top of the lower fascia. On the basis of the cella epistyle of the Philippeion at Olympia I reconstruct only two fasciae: in order to bring the height of the epistyle to meet the level of the next wall course I reconstruct the lowest one as 0.405 m and the total height as ca. 0.59 m.[105] The height of the frieze course, 0.402 m, equals the height of the top-most exterior cella wall block. The epikranitis course crowning the interior wall is 0.375 m high.[106]

The total height of the wall above the pteroma floor facing the exterior is ca. 10.90 m; taking into consideration the curvature of the foundations, the cella wall probably starts from a level ca. 0.03 m higher than the stylobate course.[107] When this is added to the wall height we get ca. 10.93 m.

Independently of the previous argumentation, I have proposed that the correct height range for the exterior Doric column is 8.96–9.06 m instead of Dugas' and Clemmensen's 8.885 m.[108] With the varying height of the capitals (0.588–0.609 m) this shaft height raises the height of the exte-

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ca. 0.74 m, and with the 0.105 m high top of the shaft (see Hill 1966, pl. 29B) the height of the capital block is 0.845 m.

104 Norman 1984, 178f., ill. 6; Dugas 1924, fig. 16A (the fragment cannot be found at the site or in the museum). The block placed as the epistyle course by Dugas and Clemmensen (Dugas 1924, 52f., pl. 78B–D) is from the door lintel, as suggested by Hill and Norman (1984, 178): this was confirmed by a very large lintel fragment with a similar profile discovered in the Norwegian excavations (the block lies in sector D5; for a plan of the area, see E. Østby, J.-M. Luce, G. C. Nordquist, C. Tarditi & M. E. Voyatzis, OpAth 20 (1994) fig. 20).

105 The bottom fascia of the Philippeion epistyle is 0.184 m high, the second 0.027 m, and the crowning moulding 0.077 m; Schleif 1944, 49, pl. 14, atlas pl. 6.

106 On the cella wall epikranitis blocks, see Dugas 1924, 53f., pls. 79–80.

107 The curvature measured on the euthynteria blocks *in situ* is ca. 1% (ca. 0.02 m in 2 m; the measurement was done with a theodolite and electronic distance meter) and the distance between the center of the column and the wall is 3.22 m (the distance is shorter by ca. 0.07 m from the French reconstruction due to vertically standing exterior columns; see fig. 8): because the curvature decreases slightly toward the center of the building, the height difference may be estimated as 0.03 m or a little less. The curvature of the krepidoma seems to be laid out already in the foundations: the heights of the euthynteria blocks *in situ* vary between 0.292–0.298 m, but there is no pattern in the variation.

108 The range is based on a study of the preserved column drums and analysis of the entasis curve; for reference, see n. 10.

rior order at ceiling level to 10.92–11.04 m. My previous analysis of the cella wall imposes a limit narrowing the range of exterior order heights: I would propose a height range of 8.96–8.98 m for the shaft, 9.56–9.58 for the total height of the column, and 10.92–10.94 for the height of the exterior order at ceiling level.

In figure 8 the columns of the exterior order are standing straight: the height difference of the bottom drums on different sides of the drum cancels the effect of the curving krepidoma, but it is not enough to tilt the columns inward as Dugas and Clemmensen suggest.[109] Since the length of the coffered ceiling is known,[110] vertical columns bring the cella wall closer to the stylobate edge by the amount of the tilt in the French reconstruction, 0.069 m: the distance between the cella wall and the stylobate edge is ca. 4.11 m.

The height of the interior Corinthian column at Tegea in figure 8 is ca. 7.48 m, which equals 9.71 lower diameters of 0.770 m. The column is proportionately lower than in the two tholoi discussed above, but it should be kept in mind that the rectangular cella proposes a very different aesthetic problem from the intensive interiors of the tholoi. The high podium and the entablature with the richly decorated epikranitis course give emphasis to the horizontal lines; if the elongated proportions used in the tholoi would have been applied for the Corinthian columns at Tegea, the vertical lines in the interior could not have matched the strong horizontals.

Conclusions

In this paper I have suggested small corrections for the Corinthian column shaft reconstruction of the temple of Apollo at Bassai and for the interior of the Tholos at Delphi. For the Tholos at Epidauros I have provided an alternative height reconstruction and affirmed that the exterior columns were vertical. The only major modification on Corinthian interiors suggested in this paper is the rejection of the upper Ionic colonnade at

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109 The height difference of the drums varies between 6–10 mm, and none of the bottom drums have a constant height as is suggested in Dugas 1924, 19, 131. The curvature measured on the euthynteria blocks (see n. 107) *in situ* is ca. 1%, corresponding fairly well to the drums (0.01 m / 1.46 m (lower diameter at flutes) = 0.7%).

110 Dugas 1924, 30–32.

Tegea and reconstructing instead a podium below the Corinthian half-columns.

The proportional height of the Corinthian columns in Classical Greek buildings does not fall into a single category. In the earliest example, the temple of Apollo at Bassai, the proportion of the single Corinthian column, 8.65 lower diameters, is derived from the Ionic engaged columns standing next to it. The fourth century tholoi have relatively slender columns: in the Tholos at Delphi the column is 11.7 lower diameters, in the Tholos at Epidauros 10.3 or 11.2 lower diameters, and in the Philippeion 10 lower diameters. The two peripteral temples, the temple of Athena Alea at Tegea and the temple of Zeus at Nemea have column heights of 9.71 and 8.9 lower diameters: the exceptionally low Corinthian colonnade at Nemea is due to the need to provide more space for the upper colonnade.

One general trend in the fourth century buildings with Corinthian columns in the interior may be observed: the level of the capital is fairly closely aligned with the capital of the exterior order. The only exception is the temple at Nemea, and once again the reason is the scheme of superimposed colonnades.

Finnish Institute at Athens

List of Illustrations