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İçindekiler

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Periaktoi at the Theatre of Kaunos

Burhan VARKIVANÇ*

Dedicated to Prof. Dr. Bernhard Schmaltz, my doctoral advisor

The stage buildings of ancient theatres display radical changes in their structure and accoutrements after their initial construction depending on the political, social and economic conditions of their settlements as well as to their different periods of formation and dimensions. As much as can be determined, this process of change started in the Classical period and culminated in the formation of the high stage building with lavishly decorated façade in the Roman period. Each new phase concealed the remains of the preceding ones that would allow their identification, sometimes by removing them to a great extent or entirely. Observations have shown that the stage building of the theatre of Kaunos, which displays a significant number of construction and renovation phases, houses remains that will contribute greatly to research on ancient theatres[1].

The theatre of Kaunos (Figs. 1-2) is located on the north-west foot of the large acropolis. Initial work at the monument goes back to 1967 when excavations were initiated at the ancient city[2]. However, the orchestra and the stage building were only cleared of earth filling and rubble in 1982[3] and 1984[4]. As this work aimed mostly at cleaning and landscaping, no careful architectural study or comprehensive scientific examination was carried out[5]. Thereafter, no scientific research was conducted at the monument for a long time.

In 2005 this author observed remains from various construction phases in front of the final phase of the stage building (Figs. 3-4). These remains lie on levels that are very close, but their materials, locations and forms are different from one another. Thus, it was determined that

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1 The research was conducted with the support of TÜBİTAK within the frame of SOBAG Project no. 106K204 titled "Excavation, Restitution and Partial Reconstruction of the Proskenion of the Theater of Kaunos".

2 Serdaroğlu 1967, 133 ff.; Öğün 1968, 125; Öğün 1972, 196, fig. 3 ff.; Öğün 1973, 164, fig. 5; Öğün 1974, 133, fig. 2. The theatre has not been comprehensively published but has been presented with short notes many times since the 19th century: Collignon 1877, 342; Maiuri 1921, 269; de Bernardi Ferrero 1970, 209 ff., fig. 253 ff., pl. XLIII ff.; de Bernardi Ferrero 1974, 25, 31, 45, 108 ff. figs. 19, 37, 57, 148 ff. 154 pl. V; Bean 1974, 186 ff.; Wagner 1977/78, fig. 26; Rossetto - Sartorio 1994, 414; Chase 2002, 54 ff.; Sear 2006, 331, fig. 323.

3 Öğün 1983, 240.

4 Doruk 1985, 524, fig. 2.

5 Data obtained and evaluations thus made regarding the work until 1984 were briefly reviewed in a site guide published by the excavation directorate in 2001: Öğün et al. 2001, 56 ff.

these remains belong to five different phases, the earliest of which goes to the Classical period. It was observed that the stage building had a winged layout, a type frequent in the Classical period[6]. Many *in situ* blocks and bases (Fig. 7) indicate that the stage building had a columned façade in the Hellenistic and Roman periods[7].

Among the remains lying along the stage building, certainly the series of blocks before the southern parodos are the most interesting ones for the trained eye (Figs. 3-9). These remains surround block no. V[8] of the bases forming the proskenion, and they form a circle of 2.10 m. external diameter with the concerned block at the center (Figs. 4-9). This series of stones originally had twelve pieces and eleven are still *in situ*; the missing one could not be found anywhere nearby despite our efforts. Noteworthy is the 3 cm. thick layer of lime mortar on the surface of the place of the missing block (Fig. 8). Considering the fact that the stage building's façade was faced with marble plaques using lime mortar[9], it is understood that the missing block was removed in Late Antiquity at the latest. The western half of the circular installation towards the stage building was entirely covered with blocks and a mortar layer in this process. All the blocks rest directly on the bedrock (Figs. 7-8). As the rock surface was leveled only coarsely, the differences were resolved by filling with stone flakes and lime mortar beneath the blocks. No technical joinery like dowels or clamps was used for fixing the blocks to each other or to the bedrock.

Although the installation is circular, each block is almost rectangular (Figs. 6-9). The faces of the blocks that contact each other were cut like the voussoirs of an arch but not in the direction of the circle's center. Other than the top sides, all faces of the blocks are chiseled only roughly. Their lengths vary from 0.40 to 0.60 m.; they are 0.30 m. high and their widths are 0.25-0.30 m. on average. The top sides are scooped out 5 cm. along the long outer edges forming a regular round molding 0.20 m. wide. On the top sides of the blocks on the orchestra side is a recess, like a shallow channel, with a width of 5 cm. running parallel to the circular form.

The block in the center of this installation has partial similarity with the other blocks of the proskenion with regards to position, dimension and workmanship. This square block with edges measuring 0.48 m. is also 0.30 m. high, like the blocks around it. Its vertical faces are carefully worked for two-thirds while the bottom third is left coarse and bossed (Figs. 8-9). The bossing on the faces, other than the one facing the orchestra, were chiseled roughly. The very fine surface of the bossing by the bottom edge of the side facing the orchestra indicates that this block was possibly worked from another block. About the middle of the top side of this block is a square hole for a dowel measuring 10x10 cm. with a depth of 3 cm. Contrary to the expected standards, the diagonally placed dowel hole is surrounded with coarse workmanship, but along the edges is a careful workmanship like anathyrosis. Multiple and parallel circular lines caused by abrasion are noted on the half of the block towards the orchestra (Figs. 6, 10). The outermost line of abrasion has a diameter of 0.63 m.

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6 For more information on the earliest stage building see Varkıvanç 2015, 1015 ff.

7 There are sixteen rectangular limestone bases at regular intervals in the front row of the proskenion closest to the orchestra. Thirteen of them are similar with respect to dimensions, workmanship and Greek letter system. Together with the numerous marble architrave, frieze, and geison blocks in and around the theatre as well as marble columns reused in the temple terrace in the Late Roman - Early Byzantine period (Diler 1995, 9 ff.; Öğün et al. 2001, 87 ff.), they constituted the Doric façade of the Hellenistic proskenion.

8 These bases are numbered from left to right I-XVI (see here fig. 4).

9 Öğün 1983, 240.

Among the extant remains of the stage building and the theatre there is no other circular installation or any blocks indicating such an installation, especially considering that at the symmetrical layout in front of the stage building a similar installation would be expected around block no. XII (Fig. 4). Indeed, marks and workmanship noted on the top side of block XIII (Figs. 11-12) indicate a similar installation before the northern parodos as well. This block, with careful workmanship on all faces, is similar to block no. V at the center of the circular installation by the southern parodos with respect to its dimensions (0.485x0.485x0.30 m.) and material. Like the other blocks forming the façade of the Hellenistic proskenion, it has ancient Greek letters on its top: **Γ** and **KI** on the top and an upside down **Δ** on its front side[10]. Like block no. V, block no. XIII has a dowel hole measuring 10x10x3 cm.[11]. Different from block no. V, this dowel hole is not in the center, and on its eastern edge is a circular dowel hole 3 cm. in diameter with a depth of 3 cm. just like on many blocks of the proskenion. This circular dowel hole is in the center of the top side. A groove for pouring lead runs into each dowel hole. In the center of two parallel edges of this base is a parapet hole, one of which is partly broken. On the top side of the block are two circular marks: the superficial one has a diameter of 0.34 m. with a circular dowel hole in its center whereas the other one deeper has a diameter of 0.30 m. with a square dowel hole in its center. Thus it is offset southward and continues over the parapet hole there. This mark has a sharp line on the exterior, where traceable, and there are many other concentric circles in it. These two marks certainly do not look related because their diameter, centers and depths as well as their surface workmanships are different from each other. The superficial mark centered at the circular dowel hole at the center of the block is also attested on all the blocks of the proskenion with a circular dowel hole. It is clearly understood that these formed an anathyrosis surface for the columns. On the other hand the deeper mark centered at the square dowel hole and inscribed circles are similar to the details attested on the top side of block no. V. Consequently, block no. XIII should be a member of an installation similar to that around block no. V.

The above-mentioned remains were uncovered in 1982 but have not been studied in detail since then. Only a superficial comment on it was made stating that this "circular installation was the foundation of one of small marble structures built at certain intervals along the façade of the *proskenion*"[12]. However, technical details such as the irregular workmanship on the bedrock where the circular installation rests and that the blocks rest on loose bedding clearly indicate that this installation could never be a foundation. Intensive and regular marks of wear attested on the top sides of the central block and the circular installation blocks suggest that these door wings were used intensively[13]. Thus, it is inferred that these remains were part of a moving mechanism that was rotated and that block no. XIII was another member at another position of the same system. Furthermore, a revolving mechanism centered at the central block originally tilted towards the orchestra, and thus it did not contact the rear half of the circular installation.

Door wings are the only moving mechanisms attested archaeologically at ancient stage buildings of ancient theatres. However, ancient sources state[14] that many technical and

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10 See supra n. 7.

11 These dowel holes attested on the top sites of blocks no. V and XIII are not found on the top of the remaining fourteen blocks of the proskenion.

12 Öğün et al. 2001, 57.

13 For instance, see Wiegand - Schrader 1904, 305; Haselberger 1978, 357, fig. 7; Ducrey et al. 1993, 64, fig. 70.

14 For instance, see Plato, Kratyl 425d; Polybios XI, 5; Vitruvius V, 6, 8; Pollux IV, 126-128.

mechanical installations such as *deus ex machina*[15], *ekkyklema*[16], *eiskyklema*[17], *exostra*[18] and *periaktos*[19] were used during performances at the theatres[20]. Mostly built with wood and metal because they were moveable and portable, these systems have not survived to the present day. Stone sections, onto which they were fitted, usually changed positions or disappeared entirely as the stage buildings underwent structural renovations. Therefore, research on the moving equipment of ancient theatres is usually based on the interpretation of written sources[21] and rarely associated with archaeological evidence.

The location before the stage building, circular layout, and abrasion marks indicate that a system fixed on a rectangular block at the center of the remains of Kaunos theatre was rotated around a vertical axis. Existing research suggests that this system may be related with an *ekkyklema* and *periaktos* at first sight.

Researchers agree that an *ekkyklema* was a platform on wheels and used to carry heavy loads such as actors and statues between the orchestra or stage and the stage building. Speculation exists regarding how this wooden system should be reconstructed, thus two suggestions have been advanced. First, the *ekkyklema* was proposed as a rectangular or circular platform that could move in all directions on wheels, a proposal that has been widely accepted[22]. The second proposal suggests that the *ekkyklema* was a semi- or full circular platform revolving around a shaft, like a door wing, fixed at an opening in front of the stage building[23].

The *periaktos*, which was built with wood like the *ekkyklema*, would be of much lighter construction. No examples have survived due to the organic material used, and no depictions from antiquity have survived either. Therefore, no clear-cut conclusions can be derived regarding the form and technical details of the *periaktos*. That pieces of its substructure have been identified archaeologically along with its description in ancient sources have facilitated the formation of these proposals. Thus, the system was rotated on a vertical shaft placed in sockets at the bottom and top, like a door wing[24]. There is no clue regarding the shaft: was it a post

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15 Haigh 1889, 189 ff.; Flickinger 1922, 292 ff.; Fensterbusch 1934, 1402 ff.; Fensterbusch 1937, 704; Bieber 1961, 76, fig. 282; Mastronarde 1990, 247 ff., fig. 2 ff.; Newiger 1990, 35 ff.; Poe 1993, 337 ff.; Ashby 1999, 81 ff.; Chondros 2004, 87 ff., fig. 14; Papadogiannis et al. 2010, 87 ff.; Seidensticker 2010, 63 ff., fig. 25; Chondros et al. 2013, 172 ff., fig. 7 ff.

16 Donaldson 1875, 271 ff.; Haigh 1889, 185 ff.; Flickinger 1922, 284 ff., fig. 74; Bethe 1934, 21 ff.; Fensterbusch 1934, 1400; Mahr 1938, 101 ff., fig. 27; Bieber 1961, 76, fig. 280; Dale 1969, 264; Newiger 1990, 39 ff.; Ashby 1999, 90 ff.; Seidensticker 2010, 67 ff.; Marrow 2002, 135, fig. 176.

17 Fossum 1898, 187 ff.; Bieber 1920, 21; Lewis 2001, 8 ff., fig. 1. For discussions on movable stage buildings see Billig 1980, 35 ff.; Buckler 1986, 431 ff.; Waywell - Wilkes 1999, 441 ff., fig. 2 ff., pl. 48 ff.; di Napoli 2010, 254 ff.

18 Körte 1897, 333 ff.; Bulle 1928, 90. *Exostra*, which may be similar or identical to *ekkyklema* (Trapido 1949, 21), is considered different equipment by Körte.

19 Donaldson 1875, 263 ff., 272 ff.; Overbeck 1866, 154, fig. 115; Kelsey 1902, 396, fig. 4; Fiechter 1914, 116 ff.; Fensterbusch 1934, 1404; Jungmaier 1971, 1 ff.; Ashby 1999, 92 ff.; Connolly - Dodge 2001, 98.

20 For other installations not mentioned above, such as *theologeion*, *anapiesma*, *bronteion*, *keranoskopeion* and *strophеion*, see Genelli 1818, 72 ff.; Haigh 1889, 192 ff.; Fensterbusch 1934, 1403 ff.

21 Research on this issue goes back to the 18th century; cf. infra fn. 33-34.

22 Cf. references in supra fn. 16.

23 Flickinger 1922, 284 ff., fig. 74; Mahr 1938, 101 ff., fig. 27b; Bieber 1961, 76, fig. 280b; Connolly - Dodge 2001, 98. On the other hand J. L. Franklin, 1987, 106, defined the system incorrectly as "possibly *periaktoi*" with the description "a revolving platform on which the pantomimist and the slave stood", which should have been defined as the *ekkyklema*. In addition, M. P. Nilsson 1914, 14, and E. Hermann 1918, 275, describe the *ekkyklema* as a system that can rotate around its axis on a wheeled platform, like a *periaktos*.

24 For instance, see Overbeck 1866, 154 fig. 115.

placed in the center of the system, or were there shafts placed only at the top and bottom? Vitruvius states that the *periaktos* carried "three individual paintings"[25]. Furthermore, it is usually agreed that the system would have been designed as a vertical triangular prism[26] due to technical requirements for placing this within an opening in a wall[27]. Each face of the triangular prism was embellished with *katablemata* on wood or a textile base[28]. It could be placed individually on its own[29] or placed as an array of multiple examples within a *thyroma*[30]. It was a simple and practical construction facilitating a quick change of images during the performance of a play.

The remains at the theatre of Kaunos may be linked with "the second proposal presuming a system revolving around an axis"[31] for an *ekkyklema*. In this case it has to be kept in mind that the *ekkyklema* was a large and heavy system carrying a load, that its platform could not be rotated with a shaft in the center only, and that it had to be supported along the edges during rotation. The platform had to rotate at least 180 degrees each time to complete the task. Due to its own weight compounded with the load it carried, the *ekkyklema* would cause a 360-degree abrasion on the blocks, not a 180-degree abrasion, and the abrasions would have to be deeper. The abrasions on the blocks of the circular installation and the central one are attested only on the eastern half. Therefore, the system rotating on the extant remains did not touch the blocks inside the stage building, so it is not possible to attribute the superficial abrasions on the remains to the agreed function of *ekkyklema*.

The *periaktos*, on the other hand, would have been built with wood to facilitate rotation, just like the *ekkyklema*. In addition, considering the possible weight of the shafts, its wooden construction, and three *katablemata*, it would never be as heavy as the *ekkyklema*, which got heavier during use. A *periaktos* rotating perfectly around a vertical axis would have caused full circular abrasive marks on the central block and the blocks of the circular installation, just as for the *ekkyklema* described above. However, the surviving marks of abrasion can be explained only when the axis of the *periaktos* was tilted forward. In this case, the system could not function fully vertically, either due to the wearing away of the lead poured in the square hole or to the pressure exerted during rotation inside the stage building. In its course then, round and possibly wooden pieces[32] with varying diameters placed under both *periaktoi* would have caused such marks after having direct contact with the blocks. Therefore, the

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25 Vitruvius V, 6.

26 Some researchers argue that the system at the theatre of Epidauros could not be triangular due to technical reasons and that a two-sided *periaktos* with a wooden plate rotating around a vertical axis would have been used there; see Dörpfeld - Reisch 1896, 126 ff., fig. 51 ff.; Bethe 1897, 724; von Gerkan - Müller-Wiener 1961, 52 fig. 10, n. 6; Jungmaier 1971, 26. 50. However, the accounts of ancient writers do not suggest a two-sided *periaktos*; see Gardner 1899, 260.

27 Overbeck 1866, 154, fig. 115; Kelsey 1902, 396, fig. 4; Connolly - Dodge 2001, 98; Schörner 2002, 69, fig. 80-82. The same form and system are also proposed for the *axones*, which are thought to have been built with wood and on which laws were inscribed during antiquity; see Holland 1941, 35 ff., figs. 1-4; Davis 2011, 5 fig. 2.

28 Pollux 4, 131. H. Bulle, 1928, 289, fig. 18, and C. Jungmaier 1971, 30 ff., 44 ff., 70, 75 ff., suggest that only two sides of the triangular prism were closed while the third side was open. Since heavy objects and actors were carried on it like the *ekkyklema*, they propose an "open *periaktos*". For other researchers confusing the *periaktos* with the *ekkyklema* without a triangular prism, see supra n. 23.

29 von Gerkan - Müller-Wiener 1961, 52.

30 Schörner 2002, 69, figs. 80-82.

31 Cf. supra n. 22.

32 Numerous circular lines attested as abrasion marks suggest that the round pieces were wooden rather than metal.

form of the remains in front of the stage building of Kaunos' theatre coupled with the abrasion marks caused by use indicate there was a *periaktos* here rather than an *ekkyklema*. A *periaktos* was easier to rotate due to its lighter weight, and it was also slightly tilted.

Research on the use of *periaktoi* in antiquity started about over two centuries ago[33] and was mostly concerned with the interpretation of ancient sources[34]. For over a century its existence has been questioned archaeologically, and some individual blocks were ascribed to *periaktoi*. These finds are usually blocks with a hole and not found *in situ*[35]. Almost all such finds are debatable and unfortunately lack detailed and clear documentation, thus preventing a comprehensive evaluation in light of the finds from the Kaunos theatre. Even if their find-spots are known, the holes and abrasion marks on such blocks[36] are not always helpful for drawing clear conclusions. The system is thought to have been used in the Hellenistic period[37]; for example, at Epidauros, its use is claimed at the orchestra level. However, no convincing proposals are noted when technical details are taken into consideration[38]. All the other examples thought to be *in situ* are related with the *logeion*[39], and therefore the existence of *periaktoi* in some theatres[40] with openings, despite the absence of any finds, is assumed[41]. Regarding

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33 The system was intensively used in the theatres of the Renaissance period based on the account of Vitruvius. See Nagler 1954, 360; Miller 1959, 1 ff.; Miller 1964, 61 ff.; Mullin 1966, 28 ff.; Richter 1966, 351; Priest 1982, 44 ff. and Peters Coy 1983, 99 ff.

34 During this period archaeological data and research were quite limited; therefore, many studies focused on the philological sources. For instance, see Rode 1796, 279 ff.; Genelli 1818, 57 ff.; Geppert 1843, 125 ff.; Schönborn 1858, 73 ff.; Lohde 1860, 6 ff.; Gardner 1899, 259 ff.; Rees 1911, 377 ff.; Nilsson 1914, 8 ff.; Rambo 1915, 411 ff.; Richards 1921, 105; Fensterbusch 1936, 117 ff.; Beare 1938, 205 ff.; Pickard-Cambridge 1946, 126 ff., 234 ff.; Bieber 1954, 279; Robertson 1959, 387; Beare 1968, 252 ff.; Smith 1970, 887; Jungmaier 1971, 1 ff.; Curetti - Richardson 1989, 175 ff.; Beacham 1991, 177; Love 1993, 195 ff.; Wiles 2004, 42 ff.; Wilson 2007, 190 and Small 2013, 117.

35 For example the finds at the Dionysus Theatre of Athens; see Fiechter 1936, 23, fig. 12; Bieber 1961, 75, fig. 278 ff.

36 For example, abrasion marks attested on a block at the Italica Theatre are linked with a *periaktos* by A. M. Canto 1973, 311. However, B. Jansen 2005, 281, argues that the concerned block could be part of screen technique or any other system as it was not found *in situ*.

37 For instance, see Gardner 1899, 260; Schörner 2002, 69. C. Jungmaier 1971, 71 ff., purports that *periaktos* already came into use in the Classical period.

38 Dörpfeld - Reisch 1896, 126 ff., fig. 51 ff., pl. VI ff.; Bethe 1897, 724; von Gerkan - Müller-Wiener 1961, 52, n. 6, fig. 10; Jungmaier 1971, 14 ff. The round holes at the centers of thresholds of *paraskenia* located at both ends of the stage building are attributed to a door wing or a *periaktos* as they are different from rectangular *pinax* dowels. The positions of the holes do not allow the rotation of a triangular *periaktos* technically; therefore, the scholars cited above proposed a two-sided *pinax*. However, P. Gardner 1899, 260, plausibly states that ancient sources cite the *periaktos* as triangular prism, and therefore a two-sided *pinax* would not even be a matter of discussion. In addition to the position of the hole mentioned by the researchers, the recesses in the jambs of the paraskenion suggest that the opening was possibly equipped with a fixed *pinax*; cf. Puchstein 1901, 22 ff., 34; Mikedaki 2005, 137.

39 del Amo y de la Hera 1982, 224 ff., pl. X,2 (Acinipo); Courtois 1989, 155 ff. (Faesulae), 167 ff. (Pola); Jansen 2005, 307, n. 85, 320 (Acinipo), 381 (Italica); Sear 2006, 8 (Lyon), 175 (Acelum), 262 (Italica), 270 (Tarraco) and 392 (Corinth).

40 Ephesos, Elis and Eretria: Kelsey 1902, 395 ff., fig. 4; Frickenhaus 1917, 94 ff., fig. 9b; Bulle 1928, fig. 18; Jungmaier 1971, 35. Pergamum and Herculaneum: Genelli 1818, 57 ff.; Dörpfeld - Reisch 1896, 151; Bieber 1961, 75; Ling et al. 1984, 153, n. 198. Magnesia: Bulle 1928, fig. 6b; Jungmaier 1971, 36. Priene: Wiegand 1898, 312; de Bernardi Ferrero 1974, 104, fig. 140; Yıldırım 2013, 71, fig. 34 ff. The author has observed a similar round depression at the Alabanda Theatre's *logeion*.

41 It is usually agreed that the *periaktos* was used at the orchestra level or at the *logeion*. However, C. Jungmaier proposes two definitions for *periaktoi* according to the areas of use. According to Jungmaier 1971, 66 ff., "one of them was located on the roof of the stage building and instead of paintings on its faces it had shiny metal plaques which created the lightning effect with the rotation of the system reflecting the sunlight; the blocks with wide holes at the theatres of Elis, Eretria and Athens Dionysus should have been part of this heavy system". The other proposal of Jungmaier 1971, 69 ff., based on the accounts of Vitruvius and Pollux, positioned the *periaktoi* in front of the parodoi thus allowing access of the spectators into the theatre.

the holes on the remains, researchers sometimes have different opinions, and the same find is identified as a *periaktos*, *pinax* or velum[42].

The reason for such ambiguity in the examples that are accessible, as mentioned above, is mostly due to the lack of good documentation accompanied by description and visual materials in their publication. Nevertheless, beside the accounts of ancient sources, it has to be considered that décor is an indispensable part of theatres. Thus it should not be disallowed that *periaktoi* may have been used at every ancient theatre, at least during the Hellenistic period. At this point, the remains at the Kaunos theatre are of utmost importance for they permit this interesting and important ancient installation to be attested *in situ* and without any hesitation. That the stage buildings underwent comprehensive structural alterations or rebuilding, especially during the Roman period, renders it almost impossible to identify such systems through archaeological evidence and to interpret them correctly without the accounts of ancient sources. Hence, the Kaunos theatre presents us with the only example of a full substructure that allows us to define the form, dimensions and position of the system. Contrarily, only individual blocks have been interpreted as a *periaktos* tentatively because they are not *in situ* or are known through the evaluation simply of philological sources in the course of research going back to the 19th century. The *periaktos* presented here would have been used for the first time in the second phase, i.e. the Early Hellenistic period of the theatre's stage building, for which five building phases have been identified starting from the High Classical period[43] to Late Antiquity. That these remains have survived on the orchestra, which lost its function with plays being performed at the logeion when the stage building was built in two storeys in the Roman period at the latest, is extremely fortunate and a great gift from all the cultures that have used this theatre in the past.

It was noted above that the abrasion marks attested on the top of block no. V at the center of the circular installation (Figs. 6, 10) are also attested on the top of block no. XIII (Figs. 11-12). Both of these blocks have a square dowel hole at their centers, and the positions and sizes of dowel holes and abrasion marks on them differ from each other. The centers of the circular abrasion marks are about at the square dowel holes on both blocks. The abrasion mark on block no. V has a diameter of about 0.60 m., and the dowel hole is positioned about at the center of the block. The circle on block no. XIII has a diameter of 0.34 m., as could be measured, and its center is offset towards the orchestra in parallel to the dowel hole offset from the block's center.

The finds clearly indicate that the stage building of the Kaunos theatre was equipped with at least two, or only two, *periaktoi* at the orchestra level. The circular installation clearly suggests that block no. V at its center is *in situ* (Figs. 4-9). Considering that the axis of the stage building (first phase datable to the Classical period) did not shift in the later phases, there were only two *periaktoi* attested with the second phase and placed symmetrically based on the accounts of Pollux[44] (Figs. 2, 13). In this case, it can be understood that block no. XIII, which is

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42 The finds at the Elis Theatre identified as blocks of a *periaktos* by M. Bieber 1920, 26 ff., fig. 21; 1961, 75, and A. Frickenhaus 1917, 94, are ascribed to velum poles by O. Walter 1915, Beibl. 74, and H. Bulle 1928, 90 ff. For this discussion see also Jungmaier 1971, 15 and Glaser 2001, 253 ff. A similar difference in opinions is also noted for the Athens Dionysus theatre (Fiechter 1936, 23; Bieber 1961, 75) and the Ialysos theatre (Mikedaki 2005, 120, n. 25).

43 For the first phase of the stage building and possibly of the Kaunos theatre, see Varkıvanç 2015, 1015 ff.

44 According to Pollux IV, 126, upon entering through the parodoi there was one *periaktos* at each end of the stage building, one facing the city and the other facing the harbor. Pollux's account almost describes the *periaktoi* of the Kaunos theatre.

not encircled with a circular installation like that around block no. V, would have been originally at the place where block no. XII is positioned today. Later it was moved about 0.90 m. northward in the course of modifications at the stage building in later periods (Fig. 4). In the course of the same process the circular installation north of the stage building was removed so that we are not able to locate any pieces today.

Besides the similarities, there are also differences between blocks V and XIII regarding workmanship and technique. Their materials are both limestone, and their heights are the same, i.e. 0.30 m. But there is a difference of 5 cm. between their horizontal edges. Circular abrasions on their top surfaces have different diameters and positions. The lower part of the vertical sides of block no. V are bossed and have coarse workmanship (Fig. 8) whereas the vertical sides of block no. XIII show careful workmanship (Fig. 11). The positions and directions of square-shaped dowel holes on their top surfaces do not match. The round dowel hole, lead channels, letters, parapet holes and round anathyrosis[45] attested on the top side of block no. XIII are not attested on the top side of block no. V. The workmanship on the top side of block no. XIII, not common for both, indicates that this block supported a heavy object with a diameter of 0.34 m., either before or after it was used in the substructure of the *periaktos*. This heavy object was affixed with dowels, and the parapet holes suggest that it was a column. These features along with the ancient Greek letters on it clearly designate block no. XIII as part of the collection of twelve blocks in front of the stage building. Round and square overlapping dowel holes, parapet holes, or circular abrasion marks do not help at all for the chronological order of use. But the lead channels connecting to the dowel holes from two sides give some hints. As can be understood from block no. V of the *periaktos*, these channels would have fallen out of use during the time when this block served in the substructure of the *periaktos*[46]. Considering the equilateral triangular construction of the system, which will be elaborated below, it is noted that the top side of the block and the channels there were completely concealed beneath the *periaktos*. Therefore, these channels should be related only with the dowel; that is, they were chiseled when the block served as a base for a column. In this case we have another point of interest arising: the remaining twelve blocks with the same workmanship and round dowel hole do not have any such channels. Actually this is normal because not much lead is needed to affix the dowel in a hole measuring 3 cm. in diameter; therefore, no channel is needed. In addition, taking into consideration the anathyrosis and the diameter of the column that once stood there, it becomes clear that these channels were concealed beneath the column and thus no lead could be poured using them. At this stage when both dowel holes are assessed individually, it does not look possible to find a plausible technical solution to the issue. In case both dowel holes were in use at the same time, the addition of a small, round dowel hole does not make a lead channel necessary for using the rectangular hole to serve the *periaktos*. However, in case the small dowel hole uniting with the large rectangular dowel hole was half exposed and the dowel core beneath the column was not affixed in this hole, then it became necessary to fill the rectangular hole with much molten lead. At this stage when the full joining of the base and the column is statically important, it is required to have such overflow channels to allow excess lead fill into available space and to overflow, if necessary. Therefore, these lead channels would have been

45 Block no. V has a band of rectangular anathyrosis extending along its edges.

46 The mechanism of placing a *periaktos* on such blocks would not have required lead-pouring channels and must be the same as placing door wings on sockets on the thresholds. For example, see Wiegand - Schrader 1904, 304 ff., fig. 323 ff.

used for fixing the column, not for the *periaktos*, at a time when both dowel holes existed side by side.

It is not technically possible to determine the sequence and dates of marks and workmanship that indicate the two phases of use on block no. XIII. It is also not possible to take block no. V as a gauge for use as a *periaktos* block because differences in dimension and surface workmanship attested between these two blocks clearly indicate they were not formed at the same time. Therefore, block no. V should be assessed together with the circular installation whereas block no. XIII should be assessed together with the twelve blocks with similar features.

Archaeological evidence obtained from the excavations carried out in front of the stage building does not help to date these blocks. The floor of the orchestra was cleared of its deposits down to antiquity in the course of excavations in 1982, and in this process all the blocks previously mentioned were exposed with about one-third visible (Figs. 3 and 5). Most of the blocks rest at a depth of about 0.20 m. either directly on bedrock (Fig. 7) or on a retaining wall of the Late Classical period (Fig. 11). Considering the renovations to the stage building in the 2nd century A.D. when its façade was extended[47] and thus its blocks changed position, the finds from the Classical into the Roman periods are insufficient to able to assess the phases uncovered in a layer 0.20 m. thick where these blocks rest today.

The palaeographic study of the Greek letters on the thirteen blocks including block no. XIII appears as the only possibility for dating them. These letters are found on the vertical and top sides of the blocks; they are very carefully worked and in similar sizes. Paleographically they have forked tips and equal-sized beams. These features have numerous parallels among inscriptions from Kaunos, and close parallels date to the mid-2nd century B.C. at the latest[48]. That the theatre was adorned with a marble and Doric proskenion rising on these bases in the 2nd century B.C. is verified with finds from the excavations and numerous other architectural elements lying around[49].

At this point the date of block no. V, which has nothing to do with the above-mentioned inscribed blocks, has to be investigated as well. It does not seem plausible that this block on the south side of the stage building and the circular installation around it were formed at the same time as the *periaktos* with block no. XIII about the mid-2nd century B.C. For its construction at a later date requires that block no. XIII, which was part of the columned façade at that time, had to be released from this function, and this does not sound reasonable either. The likeliest scenario is that the *periaktos* around block no. V would have been formed at an earlier phase before the columned façade of the stage building. In this case, it should be understood that when the stage building was rebuilt with stone about the mid-2nd century B.C. at the latest, the existing *periaktoi* retained their function. In this process block no. XIII would have replaced the previous block as the base of the northern *periaktos* due to some unknown damage. Thus block no. XIII was originally designed with anathyrosis and a round dowel hole as part of the columned stage building; however, it was modified with a large and rectangular dowel hole for the new function.

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47 The Corinthian capitals from the upper tier of the stage building and other decorated architectural pieces of the columned façade are the main factors for this dating; see also Öğün et al. 2001, 59 (A.D. 150-200).

48 The comprehensive palaeographic analysis by C. Marek 2006, 110 ff, in his publication on Kaunian inscriptions has been a great contribution.

49 Cf. supra n. 7.

This hypothesis also explains reasonably the channels for pouring lead on block no. XIII. In the new construction phase of the 2nd century A.D. the façade of the stage building was extended by adding two more bases, and so inscribed bases and the northern *periaktos* block had to be removed from their original positions. Therefore the symmetrical positioning of the *periaktoi* was disturbed. In this process, the theatrics were moved to the *logeion*, but there is no evidence whether the southern *periaktos* retained its function. However, the asymmetrical positioning and removal of the circular installation in the north indicate that at least block no. XIII fell out of use. Then, the lead-pouring channels on block no. XIII discussed above were formed, as this block became an element of the columned façade.

The conclusions attained above, although some are based on technical presumptions, should allow for a reconstruction of the *periaktoi* and proskenion of the time at the Kaunos theatre. The earliest phase of the monument goes to the Late Classical period when the stage building had a timber and adobe paraskenion[50], whereas at the latest in the mid-second century A.D. it had a marble-columned proskenion in the Doric order. Due to their positions, the *periaktoi* had nothing to do with the early stage building, which had a paraskenion. Since they had to be built in between, there has to be a second phase of the stage building intermediately. The façade of the stage building occupied the western half of the orchestra in the first phase[51], but possibly in the 3rd century B.C. it was shifted westward to its current position (Fig. 2). It is difficult to comment on the depth and structural details of the stage building, although it was possibly built with the materials of the earlier phase and at the same width[52]. Although not certain, the positions of the *periaktoi* suggest that the stage building had a shallow *paraskenia*. It can be stated that the floor of the orchestra was always compressed earth[53], and considering the workmanship on the vertical sides of the blocks carrying the system, this suggests that this circular installation was buried in the ground two-thirds of its height inside and outside. The *periaktoi* would have been positioned in the wood-framed *thyroma*[54] and removed in the rainy and windy periods when no performances were held. The openings were then temporarily blocked.

The identification of the *periaktoi* at the Kaunos theatre, and especially the good condition of the southern *periaktos* with its full substructure, paved the way for the author to design a project for the reconstruction of the *periaktos* on block no. V as an exercise in experimental archaeology. During the modification of the stage building's façade in the Late Roman period the western part of the southern *periaktos* was concealed by three vertical blocks (Figs. 5-8) and thus some structural intervention became inevitable. As one of these blocks remained in the system, it was moved inside the stage building. The other two blocks standing upright were laid horizontally in order not to block the implementation (Figs. 9 and 15). During the preparation of the project and its implementation, reconstruction proposals in drawing[55] and former experimental applications independent of any particular building[56] were taken into

50 Varkıvanç 2015, 1015 ff.

51 Varkıvanç 2015, 1020, fig. 1.

52 The excavations at the stage building, whose last phase dates to the Roman Imperial period, have not been completed, thus making it impossible to identify possible traces of earlier phases.

53 Varkıvanç 2015, 1018, n. 12.

54 Cf. Schörner 2002, 69, figs. 80-82.

55 For example, see Darby 2002, 207 ff., fig. 1 ff.

56 For example, see Schörner 2002, 69, figs. 80-82; Holland 1941, 357, fig. 2; Davis 2011, 5, fig. 2; Yıldırım 2013, 71, fig. 35; http://www.hstech.org/how-to-s/how-to-tech/carpentry/tools-materials/176-periaktoi (accessed 22 Jan. 2015).

consideration in addition to the features of the remains and accounts of ancient sources. The triangular prism was calculated to have a side of 1.80 m. based on the existing circular installation, but there is no clear evidence regarding its height. The system was understood to have been used during the third phase of the stage building dating to the Middle Hellenistic period. Therefore, based on the heights of the columns[57] and proskenion[58] in this period, a height of 2.40 m. for the *periaktos* was estimated[59]. Unlike its ancient version, we built it rather sturdily by using thick wooden beams and plaques because it is used outdoors and exposed to the elements (Figs. 14-15). In order to prevent any intervention to the original abrasion marks, a hiatus of 0.10 m. was created between the system and the substructure. For the balance of the system and in order to avoid direct contact and facilitate easy rotation, the wheels of office chairs were used at the corners. In order to carry the heavy system and facilitate its montage, a metal plaque was used on the central block instead of a round wooden piece, which actually caused the circular abrasion marks. The shaft on which the *periaktos* revolved is thought to have been metal, thus it was placed in a cylindrical metal socket that was affixed in the dowel hole with molten lead, as was the practice in antiquity. According to the advice of experts, a shaft with a conical bearing was added next to the central block in order to rotate the heavy system easier and to avoid damage to the central block by the experimental system. The bearing was placed in a cylindrical metal piece welded on the center of a thin metal plaque, which was then fixed on the triangular wooden plaque beneath the system (Fig. 14). The skeleton of the *periaktos* was built with three wooden beams and three triangular plaques (Figs. 14-15). These pieces were connected by a mortise and tenon joint fixed only with wood glue. A triangular plaque was used in the horizontal center of the skeleton to make the system heavier and to improve its static capacity. This plaque was further reinforced with diagonal wooden bars beneath. The vertical faces of the triangular prism were adorned with various unrelated paintings[60] reflecting tragedy, comedy and satire as mentioned by Vitruvius. These paintings were chosen from the wall paintings of villas in Boscotrecase, Boscoreale and Pompeii that depict respectively columned architecture, houses and street texture, and a rural sanctuary[61]. They were reproduced with modern offset technique (Figs. 16-17). The system has been taken under protection within a sleeve, as in antiquity, and put in the baths.

As mentioned above, metal plaques, bearings, screws as well as electrode welding and modern offset printing techniques were used because a complete experimental archaeology implementation could not be targeted and realized. The reason was that it is very difficult to keep the heavy, movable system as a unit in open air without using modern materials and technology. This interesting, and for the time being unparalleled implementation on such remains, was realized actually to contribute to academic studies and to present the decoration of an ancient stage building to inquisitive visitors.

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57 Diler 1995, 9 ff.; Öğün et al. 2001, 87 ff.

58 Öğün et al. 2001, 56.

59 C. Jungmaier 1971, 42, 67, states that the *periaktos* supposed to have existed at the theatre of Epidauros was about 2.70 m. high with the one erected on the roof of its stage building being at least 3 m. in height.

60 Vitruvius V, 6.

61 Beyen 1938, figs. 18, 56, 61; Little 1956, 27, pl. 20, fig. 1.

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Özet

Kaunos Tiyatrosu Periaktosları

Antik tiyatroların sahne binaları, ilk inşaları sonrası köklü yapısal ve donanımsal değişim gösterirler. Genellikle yüksek ve oldukça bezeli cepheye sahip bir sahne binasının oluşumu ile Roma Dönemi içlerinde sonlanan bu değişimde her sonraki evre, bir önceki evrenin yapısal ve donanımsal niteliklerinin saptanmasında etken olan kalıntıların kapanmasına, genellikle de büyük oranda ya da tamamen ortadan kalkmasına neden olur. Gözlemler, önemli sayıda yapım ve tadilat evrelerinin algılanabildiği Kaunos Tiyatrosu sahne binasının Antik Dönem tiyatro araştırmalarına önemli katkılar sağlayacak kalıntılar barındırdığını ortaya koymuştur.

Yazarın yaptığı gözlemlerde, Kaunos Tiyatrosu'nun son evreye ait sahne binası önünde farklı yapım evrelerine ait kalıntılar dikkat çekmiş; birbirilerine çok yakın düzlemlerde yer almalarına karşın farklı konum, form ve malzeme içeren bu kalıntılara yönelik inceleme sonrası mevcut sahne binası önünde en erkeni Klasik Dönem'e tarihlenen 5 farklı evreye ait kalıntıların varlığı saptanmıştır. Günümüzde in situ konumda korunan çok sayıda blok ve altlık, sahne binasının Klasik Dönem'de sıkça karşılaşılan kanatlı bir yapıya sahip olduğunu, Hellenistik ve Roma Dönemi içinde de sütunlu bir cephe içerdiğini göstermektedir.

Sahne binası boyunca uzanan bu kalıntılar arasında dikkatli bir göz için şüphesiz en ilginci güney parodos önündeki blok dizinidir. Proskenionu oluşturan altlıklar arasındaki V nolu blok etrafında karşılaşılan bu kalıntı, anılan blok merkezde kalmak üzere dışta 2,10 m. çapa sahip dairesel bir taş dizisi içermektedir. Özgün durumunda 12 kireçtaşı bloktan oluşan dizinin 11 bloğu yerinde korunmuştur. Orkestra yönündeki blokların üst yüzeyinde, ortalama 0,05 m. genişliğe sahip ve dairesel akışa koşut sığ bir kanalı anımsatan derinlik ile karşılaşılmaktadır. Bu oluşumun tam merkezinde yer alan bloğun üst yüzeyinin orkestraya yönelik yarısı üzerinde aşınma sonucu oluşan çok sayıda ve birbirine koşut dairesel çizgi ile karşılaşılmaktadır.

Sahne binasının ve tiyatronun günümüzde korunan kalıntıları arasında bir başka dairesel dizine veya buna ilişkin bloklara rastlanmamasına karşın, XIII nolu blok üzerinde göze çarpan işçilik ve izler, bir zamanlar kuzey parodos önünde de benzer bir düzenlemenin var olduğuna açıkça işaret etmektedir. Anılan bloklar üzerindeki yoğun ve düzenli aşınma izleri, kalıntıların, bir zamanlar hareketli bir mekanizmanın döndürüldüğü bir sistemin alt yapısını oluşturduğunu göstermektedir.

Hareketli ve taşınabilir olmaları nedeniyle büyük ölçüde ahşap malzemeden imal edilen ve geleceğe taşınamayan çok sayıda teknik ve mekanik donanımın sahnelenen etkinlikler sırasında tiyatrolarda kullanıldığı antik kaynaklar vasıtası ile bizlere aktarılmaktadır. Kaunos Tiyatrosu'ndaki bu ilginç ve şimdilik benzeri olmayan kalıntılar vasıtası ile antik kaynaklar ışığında yaklaşık 200 yıldır araştırılan sahne donanımlarından biri olan döner perde sisteminin (periaktos) arkeolojik olarak tanımlanması ilk kez gerçekleştirilmiştir. Her bir yüzünde satirik, trajik ve komik olmak üzere farklı içerikte resmin yer aldığı ve oyunların içeriğine göre döndürülebilen bir üçgen prizmadan oluşan periaktosun deneysel bir uygulaması da gerçekleştirilerek bilim dünyasına katkı sağlanması yanında, özellikle de kenti ziyaret eden kültür meraklılarına Antik Dönem sahne binası dekorasyonunun tanıtılması amaçlanmıştır.

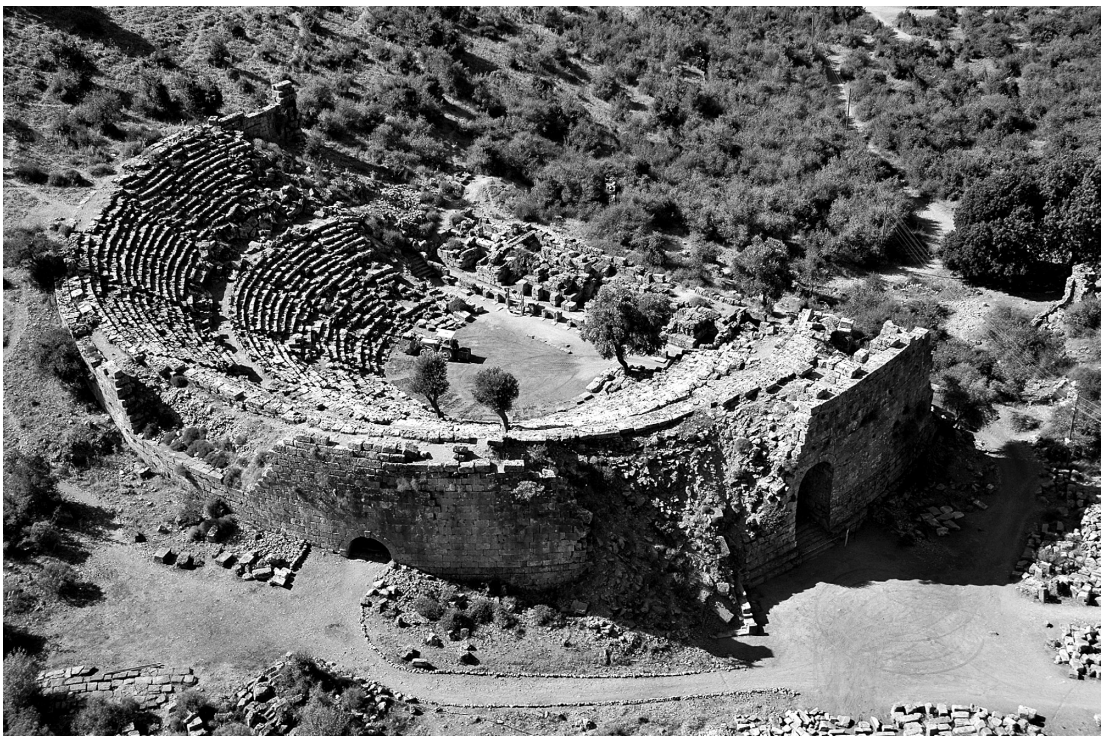

Fig. 1 Theater of Kaunos, view from north (C. Işık)

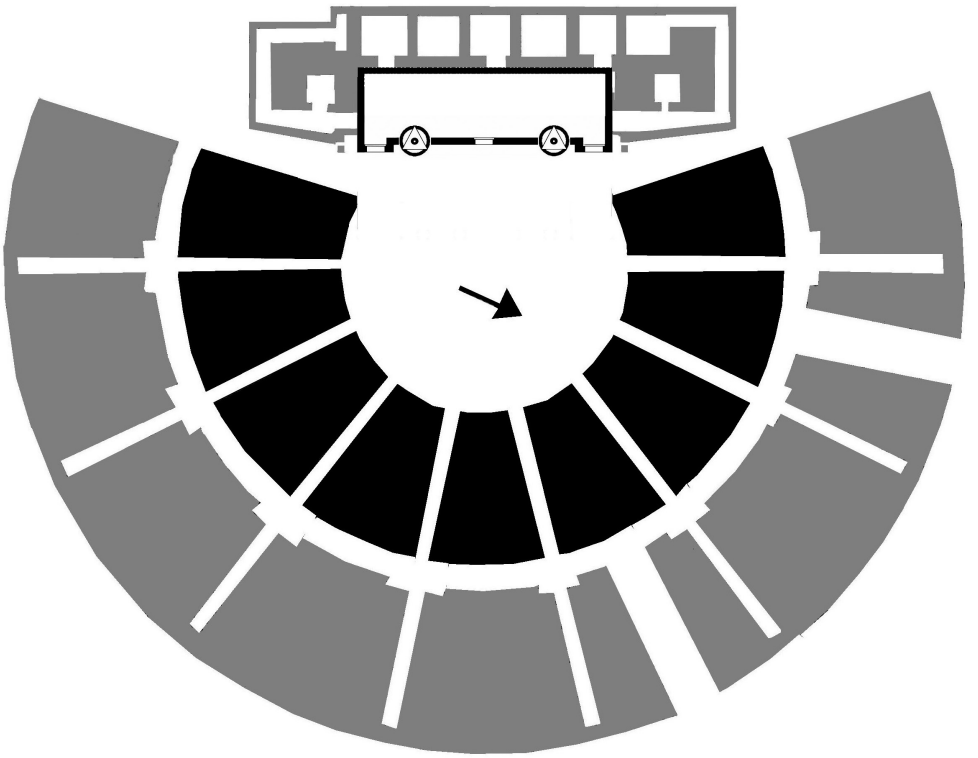

Fig. 2 Theater of Kaunos, schematic plan

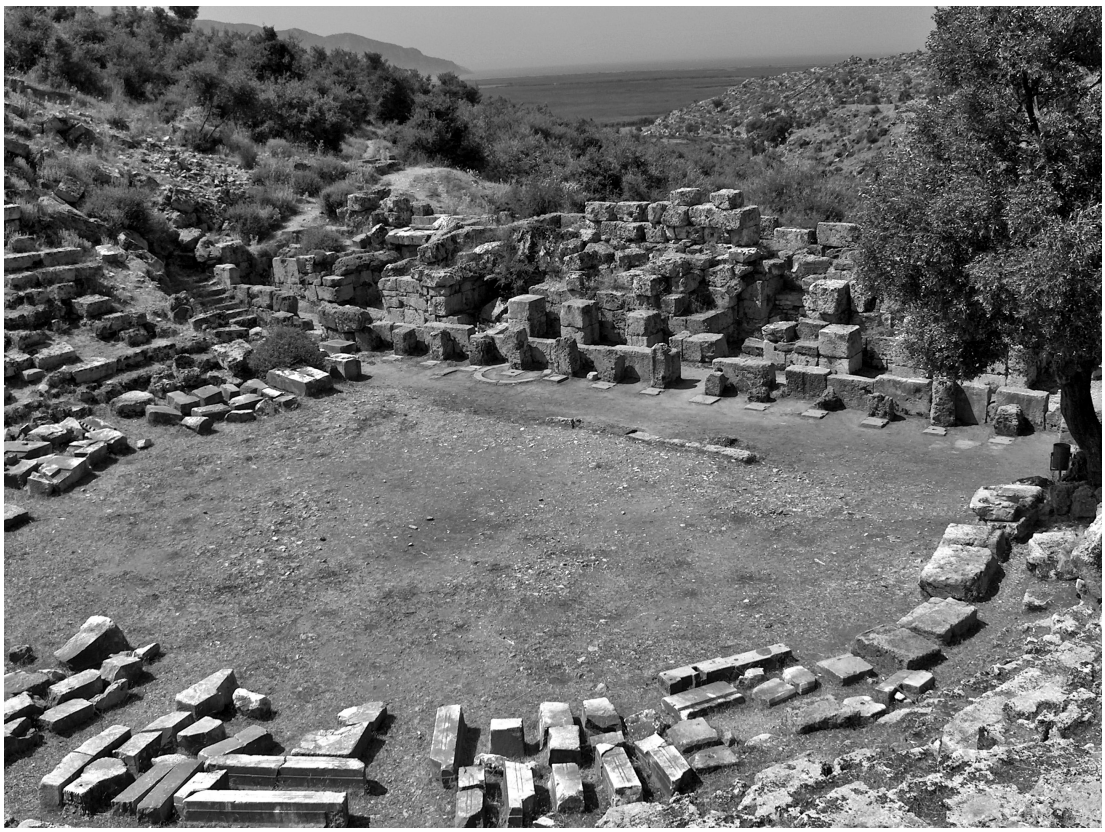

Fig. 3 Theater of Kaunos, remains of orchestra and stage building

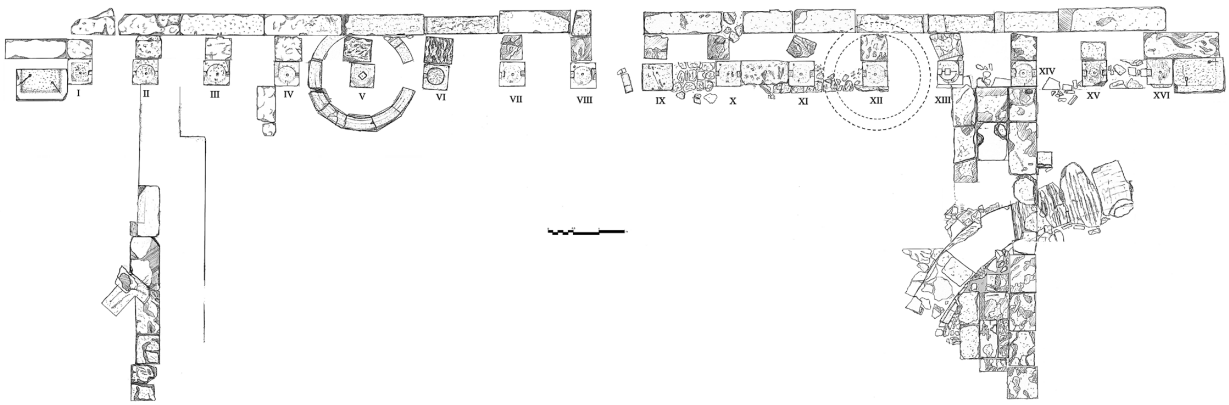

Fig. 4 Remains of proskenion

Fig. 5 Southern *periaktos*

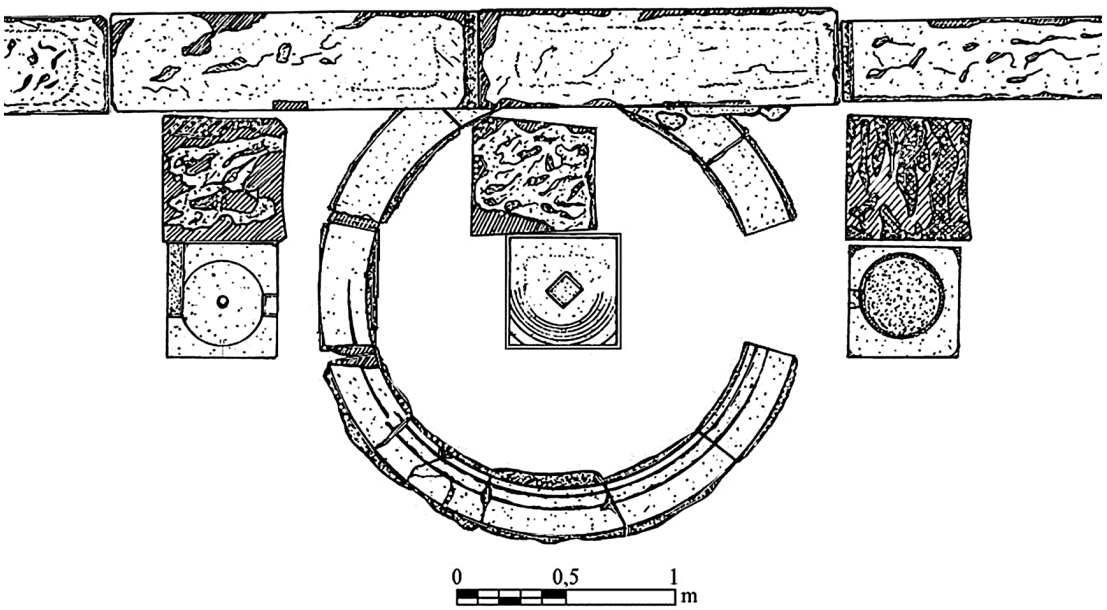

Fig. 6 Southern *periaktos*, ground plan

Fig. 7
Southern *periaktos* and surrounding area

Fig. 8
Southern *periaktos*

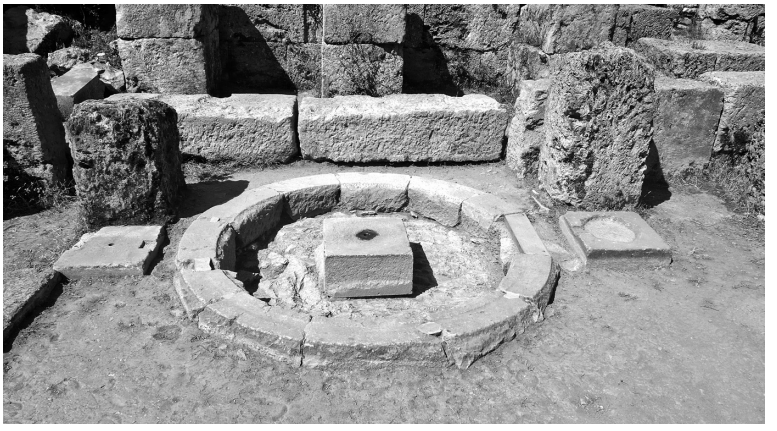

Fig. 9
Southern *periaktos*

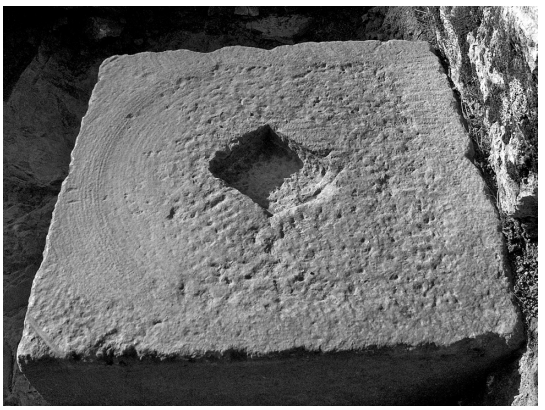

Fig. 10 Southern *periaktos*, central block

Fig. 11 Remain of northern *periaktos*, block on the right

Fig. 12 Northern *periaktos*, central block

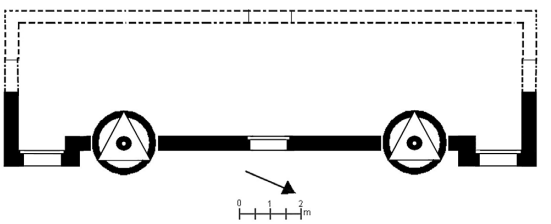

Fig. 13 Theater of Kaunos, plan proposal for *periaktoi* and second phase stage building

Fig. 14 *Periaktos*, reconstruction work

Fig. 15 *Periaktos*, reconstruction attempt

Fig. 16
Periaktos,
reconstruction attempt
(C. Işık)

Fig. 17 *Periaktos*, reconstruction attempt (C. Işık)