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Study and Restoration of the Zeyrek Camii in Istanbul: First Report, 1997–98

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Rising majestically on the brow of a hill in the heart of the old city of Istanbul, the Zeyrek Camii has until recently held a prominent position in the city's history. Built originally ca. 1118–36 by John II Komnenos and Eirene as three large, interconnected churches, the complex served as the core of the Pantokrator monastery and as an imperial mausoleum (Figs. 1, 2). The general outline of its Byzantine history is well known.¹ The South Building was constructed first as the monastic church dedicated to Christ Pantokrator. To this, the North Building was added: a second church dedicated to the Virgin Eleousa, which was open to the laity and served by a lay clergy. The Middle Building, sandwiched between these two, was the imperial mausoleum church, or *heroon*, dedicated to St. Michael. A south courtyard and the exonarthex were added in the final phase. The elaborate commemorative services that linked the buildings are enumerated in the monastic *typikon*, which was written in 1136.² In the thirteenth century, the monastery became, briefly, the residence of the Latin rulers, and in the final decades of the

Byzantine Empire, church complex was the setting for additional imperial burials.³

The Pantokrator was converted to a *medrese* under Mehmet II, shortly after the Ottoman conquest of the city, with Zeyrek Molla Mehmet Efendi serving as its first *müderris*.⁴ The *medrese* was closed with the completion of the nearby Fatih Camii, and the complex became a mosque known as Molla Zeyrek Camii, Zeyrek Kilise Camii, or simply Zeyrek Camii. It was restored on several occasions in subsequent centuries, most significantly after a disastrous fire in the late eighteenth century. It continues to function as a mosque but has been partially neglected in recent years. Little attention has been given to the Zeyrek since the limited excavations and restoration work of the 1950s and 1960s.⁵ When A. H. S. Megaw undertook his examination in 1960, only the Middle Building was in use as a mosque; since that time, this function has been shifted to the South Building, so that most of its *opus sectile* floor is now covered by a raised wooden floor and carpeting.

With the permission of the Vakıflar Genel Müdürlüğü (Directorate of Pious Foundations), we undertook a survey of the building in order to prepare for its much-needed restoration. Initial funding for this endeavor was provided by the Kress Foundation/World Monuments Fund, the University of Illinois Re-

¹W. Müller-Wiener, *Bildlexikon zur Topographie Istanbul* (Tübingen, 1978), 209–15, with extensive bibliography; also R. Janin, *La géographie ecclésiastique de l'Empire byzantin*, vol. 1, *Le siège de Constantinople et le patriarcat oecuménique*, pt. 3, *Les églises et les monastères*, 2nd ed. (Paris, 1969), 515–23, for a survey of the sources. For additional comments, see R. Ousterhout, "Contextualizing the Later Churches of Constantinople: Suggested Methodologies and a Few Examples," in this volume. Because the three churches now house a mosque, we refer to them in this paper by the neutral term "building."

²For the *typikon*, see P. Gautier, "Le typikon du Christ Sauveur Pantocrator," *REB* 32 (1974): 1–145; and English translation by Robert Jordan in *Byzantine Monastic Foundation Documents: A Complete Translation of Surviving Founders' Typika and Testaments*, ed. J. Thomas and A. Hero (Washington, D.C., 2000), 725–81, with notes and commentary.

³These are summarized in Janin, *Églises*, 515–23; and in A. van Millingen, *Byzantine Churches in Constantinople: Their History and Architecture* (London, 1912), 219–40.

⁴T. Öz, *Zwei Stiftungsurkunden des Sultans Mehmed II Fatih* (Istanbul, 1935), 11.

⁵A. H. S. Megaw, "Notes on the Recent Work of the Byzantine Institute in Istanbul," *DOP* 17 (1963): 333–64; F. Çuhadaroğlu, "Zeyrek Kilise Camii Restitüsyonu," *Rö-löve ve restorasyon dergisi* 1 (1974): 99–108.

search Board, Istanbul Technical University, and two Dumbarton Oaks Project Grants (1997 and 1998), whose support we gratefully acknowledge. Our first proposal for intervention was accepted by the Kültür ve Tabiat Varlıklarını Koruma Kurulu (Monuments Council) of Istanbul in August 1997, and the first phase of the restoration began shortly thereafter. In the following pages we present the first report on the ongoing work.

SURVEY

The most complete published survey is still that by Jean Ebersolt and Adolphe Thiers, whose detailed measured drawings were published in 1913; this may be supplemented by Megaw's 1960 analysis of the South Building, which included a revised plan of the South and Middle Buildings, a detailed plan of the *opus sectile* floor, and important revisions to the construction history.⁶ A new survey, overseen primarily by Metin Ahunbay, has thus far produced ground plans of the North and Middle Buildings and their narthexes, including a stone-by-stone floor plan of the Middle Building (Fig. 3), elevations and a detailed exterior facade of the Middle Building (Fig. 4), exterior profiles of the North and Middle Buildings, and a plan of the complex at roof level—the last necessary to accompany the proposal for the restoration of the roof (Fig. 5). In order to measure for the sections and elevations, it was necessary to erect scaffolding; the work thus proceeds slowly as the scaffolding is moved from one part of the building to another. The opportunity for a detailed examination of the fabric of the building has permitted new observations on the history of the complex, several of which appear in Robert Ousterhout's paper in this volume.⁷

RESTORATION

Although the Zeyrek offers many exciting possibilities for investigation, our first concern is the stability and security of the building. No serious intervention can take place in the inter-

rior before these issues are addressed. Moreover, we must emphasize that a valid restoration must treat the building in the sum of its history, and this means respecting the modifications effected during the Ottoman period. Although stable, the building has been subject to the ravages of weather and vandalism, and the first phase of intervention is consequently directed toward the replacement of the roof and windows. The roof had become a weighty palimpsest of repeated repairs, primarily in concrete, and almost all of the windows have been broken since the last restoration. The replacement of the roof was made possible with an initial budget of more than \$200,000 provided by the greater Istanbul municipal government that has paid for materials, a general contractor, and workers.

The modern roof level is considerably higher in places than the Byzantine roof, adding a steeper angle to the undulating forms of the original covering (Fig. 2). Although attractive, the complicated form of the Byzantine roof probably encouraged leakage, and a slope has been maintained in the new roof. The modern form of the roof was the result of interventions in the 1960s, but the steeper pitch was already present in the nineteenth century. This has left an attic level between the concrete roof and the vaulting along the west side of the building. In places, the pitched roof rises more than 1.40 meters above the Byzantine vaults. In this protected area, considerable information is preserved from the early history of the building.⁸

Work on the roof commenced with the removal of the concrete along the eaves, so that the historical cornices could be studied. Three different types of cornices were observed, and all have been preserved in the restoration. The Byzantine scalloped eaves of the domes were altered in the Ottoman period and replaced by a horizontal cavetto cornice of plaster laid over projecting courses of brick. The eastern cornices of the apses, extending onto the cross-arms, are also Ottoman in date; they are made of greenstone and have a chamfered profile. The individual blocks were fixed together with iron ties set in lead (Fig. 6). The surfaces of the greenstone cornices have been severely damaged. Although brick dogtooth cornices were

⁶J. Ebersolt and A. Thiers, *Les églises de Constantinople* (Paris, 1913), 171–207; Megaw, "Recent Work," esp. figs. A, D.

⁷Ousterhout, "Contextualizing," for additional observations; an independent photogrammetric survey of the Zeyrek Camii is being directed by Lioba Theis.

⁸Discussed by Ousterhout, "Contextualizing."

common in the Byzantine period, at the Zeyrek they were preserved only in small areas on the pastophoria of the South Building; those of the west facade are the result of the previous restorations. Several minor areas of cornice have been replaced in brick dogtooth.

For the restoration of the roof, the layers of concrete were removed and the vault surfaces cleaned, so that the original roof levels could be examined and documented. Numerous repairs were necessary. In several areas, the haunches of the vaults were broken; there were also structural cracks at the bases of the domes and over the vaults. A crack in the north crossarm of the North Building had been repaired with lead in the Ottoman period (Fig. 7). The fractures were inspected by Professor Müfit Yorulmaz, a structural engineer and a specialist in masonry structures, who recommended that the cracks be filled with a proper mortar mix that could bind the masonry together. Associate Professor Ahmet Ersen of the Istanbul Technical University's Conservation Department prepared a repair mortar consisting of lime, brick powder, white cement, and epoxy resin.

Eight cracks at the base of the western dome of the South Building and one major crack over the eastern dome of the Middle Building (Fig. 8) were similarly treated. A crack running parallel to the north wall of the North Building became visible after the fill over the prothesis was removed. It had been previously stitched with lime mortar, and stone blocks had been placed over the crack. The old mortar had disintegrated, so the fracture was cleaned to a depth of 22 centimeters and filled with the repair mortar.

During the removal of the old roofing materials from the apse of the North Building, we encountered a packing of Byzantine amphorae embedded in ash and charcoal (Fig. 9). These had been employed during the original construction to fill the void between the apse semi-dome and the eastern wall.⁹ A similar practice was observed in the eastern vault of the South Building. In addition, many large fragments of

amphorae were found in the area below the modern roof over the western part of the building and undoubtedly had a similar function.

This packing of amphorae on the North Building was carefully excavated by archaeologist Aysin Özügül, whose report appears as an appendix to this study. Nineteen amphorae were removed, studied, and restored; they have now been deposited in the Museum of the Vakıflar in Istanbul. They were replaced by similar ceramic vessels of modern production before this area of the roof was recovered.

During an earlier repair, probably in the eighteenth century, the roof level was changed, with greenstone cornice blocks placed above the amphorae on the north apse. Most of the greenstone blocks of the eastern elevation had been broken, and their surfaces had deteriorated. These required *in situ* repair, facilitated by a mortar mixture that included an aggregate of the same stone, prepared by Dr. Ersen. Greenstone from the same quarry was acquired and crushed into particles no larger than 4 millimeters in diameter. The aggregate was then mixed with white cement and epoxy resin to create the repair mortar. Stainless steel rods were secured onto the cornice blocks, and a wooden formwork was constructed around them, into which the mortar mix was poured and allowed to dry. In a later stage, the profile of the cornice will be recarved.

After the cleaning, repair, repointing, and replastering of the vaults and domes, a layer of mud plaster was spread over the finished surface, and lead sheeting 2 millimeters thick was fixed into place with nails (Fig. 8). Following traditional practices, the mud plaster provides a protective cushion beneath the lead roofing. In places where it was necessary to raise the roofline, ceramic sherds were used as fill material. As of August 1998, approximately 50 metric tons of lead had been applied, with an additional 10 metric tons necessary to complete the roof work. However, the roofing system over the western part of the building will require further study before it can be replaced (Fig. 2). The raised, reinforced concrete roof was added here in 1967, and a proposal must be presented to the Monuments Council before it can be removed. The modern brick columns and reinforced roof slabs exert concentrated loads onto the historic structure and may cause damage to it.

⁹This appears to be common Byzantine practice. Amphorae have been found in similar positions in the churches of the Lips monastery (Fenari İsa Camii) and in the sub-structures of St. George of Mangana; the practice is discussed by R. Ousterhout, *Master Builders of Byzantium* (Princeton, 1999), 227–30.

The repairs to the roof revealed several surprises. We have as yet found no new evidence for the survival of interior mosaic decoration; however, in the Ottoman fill material on the roof, quantities of mosaic tesserae were discovered, mixed with earth. We hypothesize that the tesserae were removed from the interior and discarded during one of the Ottoman restorations and that they subsequently found their way into the fill material during a later intervention to the roof. In addition, although the original roofing was probably of lead throughout, Byzantine ceramic roofing tiles were found *in situ* on the prothesis apse of the North Building. These had been buried in an area where the roof had been raised during the Ottoman period (Fig. 10). The original lead roofing may have been removed during the Latin Occupation.¹⁰ The tiles may represent the Palaiologan or early Ottoman roofing; their form corresponds with that of late Byzantine tiles excavated at Pergamon.¹¹

OBSERVATIONS ON THE CONSTRUCTION HISTORY

It is becoming apparent that the Byzantine history of the complex was indeed complex. The evidence seems to suggest a virtually continuous process of addition and modification extending over a period of several decades during the twelfth century, with modifications in the Palaiologan period as well.¹² There is also evidence of numerous repairs and remodelings from the Ottoman period, including the simplification of the roof lines and of some facade details—for example, the exterior setback from the eastern crossarm to the bema was suppressed on the north facades of both the North and South Buildings. The odd, slightly pointed form of the western crossarm of the North Building is the result of previous repairs to the vaulting, probably in the eighteenth century.

¹⁰Baldwin II, the last Latin ruler, who had his residence at the Pantokrator, was forced by poverty to sell the lead from the roof of his palace; see van Millingen, *Byzantine Churches in Constantinople*, 228, for discussion.

¹¹K. Rheidt, "Bautechnik und Bautradition im byzantinischen Pergamon," *Bautechnik der Antike* (Mainz, 1991), 187–96.

¹²Megaw, "Notes," for preliminary observations; also Ousterhout, "Contextualizing."

The construction technique of the Byzantine building phases tends to be sloppy, as if rapidly executed, incorporating much brick of different sizes. In all three phases, the recessed brick technique was employed. Much, if not all, of the brick is reused from the late antique period, and the recessed brick technique may have been intended to take maximum advantage of the reused materials. The brick sizes vary between approximately 38 by 38 by 4.5–5.0 and 24 by 24 by 3 centimeter.¹³

The brickstamps are now being studied. Their presence indicates the antiquity of the building materials, as brickstamps were apparently not employed after Iconoclasm. More than forty have been identified, on loose bricks uncovered in the cleaning of the roof, as well as on bricks *in situ*. The brickstamps include round (Fig. 11), rectangular, cruciform, and long-bar formats. Most inscriptions are in Greek, as was standard in Constantinople, but, unusually, two are in Latin (Fig. 12).¹⁴ Several round marks were formed by rosette or star patterns without inscriptions. The first example illustrated, a roundel ca. 12 centimeters in diameter, must be read vertically and horizontally to decipher Θ[εο]υ χαρις Θεοδουλου τ(δικτιῶνος) τ[-]. The second, in Latin, reads DDDNNNINDXIII—possibly "trium Dominorum nostrorum indictio 13." Although many sculptures from the nearby sixth-century church of St. Polyeuktos found their way into the Zeyrek, the brickstamps do not correspond, and the ruin of the neighboring church was probably not the source of the reused brick.¹⁵

The Pantokrator monastery was constructed on a prime piece of real estate that had undoubtedly been occupied in earlier centuries. However, its prehistory is not mentioned in the *typikon* or in other twelfth-century texts. Paul Magdalino has speculated that the site was pre-

¹³For dimensions of bricks from Byzantine Istanbul, see most recently, Y. Kâhya, "İstanbul Bizans Mimarsinde Tuğla Boyutları Üzerinde," in *Prof. Doğan Kuban'a Armağan* (Istanbul, 1996), 171–82.

¹⁴The Byzantine brickstamps of Istanbul are now being restudied by Jonathan Bardill; see for now C. Mango, "Byzantine Brickstamps," *AJA* 54 (1950): 19–27; and J. Bardill, "A Catalogue of Stamped Bricks in the Ayasofya Collection," *Anatolian Archaeology* 1 (1995): 28–29.

¹⁵S. J. Hill, "The Brickstamps," in R. M. Harrison, *Excavations at Saraçhane in Istanbul* (Princeton-Washington, D.C., 1986), 1:207–25.

viously the late antique estate known as the house of Hilara (τῆς Ἰλαράς), which the emperor Maurice had given to his daughter.¹⁶ This may have been the source of the reused building materials.

Much of the irregularity in the wall construction, as well as the awkward joints from subsequent modifications, was originally masked by an exterior plaster covering. That the facades were plastered had been hypothesized, but the proof of this is now visible in the attic, where two layers of plaster are preserved in several different places from the first construction phase. The inner coating is of white plaster, whereas the outer coating is pinkish, apparently utilizing crushed brick to add hydraulic properties. The later Byzantine additions about the plaster surface.

Probably all three phases of the twelfth-century construction were carried out by the same workshop of masons. Although they were covered with exterior plaster, the construction details are identical. One small detail emphasizes this point: the mortarbeds of all three buildings were scored with similar incised lines along the edges of the brick courses. Moreover, the mortarbeds of both the South and Middle Buildings include identical cruciform incisions in several places (as seen, e.g., around the central arch in Fig. 4). These unusual details may have appeared on the North Building as well, but very few of its original mortarbeds are preserved. Because the facades were covered with plaster when completed, the distinctive incised details could not have been the result of imitation and must represent the standard construction practices of the workshop of masons responsible for the building.

FUTURE INTERVENTIONS

In several areas of the facades, the masonry must be repaired or replaced, for example, on the arch of the western crossarm of the North

Building and on the narthex arcades of the South Building. For repairs to the damaged parts of the facades and arcades, it was necessary to order custom-produced bricks from a kiln in Merzifon, which was the only brickmaker in Turkey who could successfully produce brick to the Byzantine sizes. (These include $38 \times 38 \times 4.5$ cm, $38 \times 19 \times 4.5$ cm—the whole and half-sized bricks used in the arcades, and $24 \times 24 \times 2-3$ cm—which appear in the recessed courses. Other bricks $36 \times 36 \times 4$ and $30 \times 30 \times 5$ cm corresponded to sizes encountered elsewhere in the masonry where repairs are necessary.) The new bricks were delivered in September 1998, with the largest weighing as much as 10 kilograms each.

The examination of the eastern facade of the Middle Building indicated that it had been repaired several times in the past (Fig. 4). At present the wall is damaged by the loss of bonding mortar at its joints and by the accumulation of soot. Some of the stone has also deteriorated. The capital of the north column is cracked, and its surface is eroded. Two of the apse windows are blocked, and the remaining one much reduced. During the work in this area, the damage was recorded, and a tentative proposal for the restoration was developed. To implement the project, we needed the analysis of mortars and plasters from this surface, as well as expert advice for cleaning the brick, limestone, and marble. Specialists from the Ministry of Culture's Central Laboratory for Conservation and Restoration are now addressing these problems.

The replacement of windows will be undertaken in the next campaign. Our intervention was temporarily halted in the fall of 1998 because of bureaucratic difficulties in the metropolitan municipality.

The comments on the Zeyrek Camii presented here are preliminary observations. The complexity of the building's Byzantine history is complemented by the equally puzzling alterations effected during the Ottoman period. As our examination and restoration progress, we hope that further clarification will become possible.

¹⁶P. Magdalino, *Constantinople médiévale: Études sur l'évolution des structures urbaines*, TM, Monographies 9 (Paris, 1996), 46.

Appendix: The Amphorae

Ayşın Özügül

During the restoration work carried out on the roof of the Zeyrek Camii, forty-one amphorae were uncovered over the apse of the North Building and on the eastern vault of the South Building. They were uniform in form, size, and material. Thirty-six were exposed at the North Building and five at the South. Of these, nineteen were removed from the North Building for detailed study. They were subsequently deposited in the Museum of the Vakıflar; the rest were left *in situ*.

The amphorae in the North Building were positioned upside-down, forming two parallel rows around the apse semidome (Fig. 9). The great majority were broken at their bases, probably during a previous restoration at the monument. Some sherds were mixed into the fill material around them, and the sherds proved useful in reconstructing the profiles of a number of broken amphorae.

The Zeyrek amphorae are characterized by remarkably high handles, a narrow neck, a piriform body, and a round bottom (Fig. 13). The two handles are roughly ovoid in section and flattened on one side. They are attached to the upper rim and to the upper part of the neck. They rise high above the rim and curve down vertically toward the shoulder. The high neck widens slightly as it joins the swell of the shoulder. The piriform body terminates in a rounded bottom. The surface of the body is decorated with narrow horizontal bands of combing. The inner surface was left rough. The clay is of a light red color (2.5 YR 6/6), and a light grey (10 YR 7/2) slip covers the body. Some of the amphorae have graffiti or dipinti on their necks or shoulders.

Because the dimensions are roughly identical, it will suffice to give the dimensions of one complete amphora (KB Aps. 3): Full height, with handles, 64 cm; height to rim, 54 cm; rim diameter 7.3 cm; maximum body diameter, 30 cm.

The Zeyrek amphorae are of a type common in the later Byzantine centuries, found in particular around the Aegean, the eastern Mediterranean, and the Black Sea. A large number of similar amphorae from the twelfth to thirteenth centuries have been studied from Paphos, the Athenian Agora, Dobroudja, Mstislav, Tmutarakan, Chersonese, Odessa, Kertch, Kiev, Otranto, Kythera, Bodrum, and the coastal regions of Anatolia.¹⁷

¹⁷In general, see Ch. Bakirtzis, *Byzantina Tsoukalogenia* (Athens, 1989), 80, pl. 20, esp. fig. 2. For specific examples, A. H. S. Megaw, "Supplementary Excavations on a Castle Site at Paphos, Cyprus (1970–1971)," *DOP* 26 (1972): 322–43, esp. 334, fig. 27; J. Rosser, "Excavations at Saranda Kolones, Paphos, Cyprus, 1981–1983," *DOP* 39 (1985): 81–97, esp. 85, fig. C; J. Hayes, *Excavations at Saraçhane in Istanbul* (Princeton-Washington, D.C., 1992), 2:76 (type 61), fig. 26/10; J. Cangova, "Amphores du Moyen-Age en Bulgarie," *BIABulg* 22 (1959): 243–62, esp. 256–57, fig. 11; A. L. Yakobson, *Keramika i keramicheskoe proizvodstvo srednevekovoj tavrki* (Leningrad, 1979), 111, fig. 68/5–8; P. Arthur, "Aspects of Byzantine Economy: An Evaluation of Amphora Evidence from Italy," in *Recherches sur la céramique byzantine*, ed. V. Déroche and J.-M. Spieser, *BCH* 18, suppl. (1989): 79–91, fig. 13; J. N. Coldstream, "Deposits of Pottery from the Settlement," in *Kythera, Excavations and Studies*, ed. J. N. Coldstream and G. L. Huxley (London, 1972), 77–204, pls. 16–58; T. O. Alpözen, A. H. Özdaş, and B. Berkaya, *Bodrum Sualtı Arkeoloji Müzesi Ticari Amforalari, Eski Çağda Akdeniz Deniz Ticareti* (Bodrum, 1995), 119; N. Günsenin, *Les amphores byzantines (Xe–XIIIe siècles): typologie, production, circulation d'après les collections turques* (Paris, 1990), 28–30 (type III), fig. 16.