A Harbour Structure at Beylikdüzü, Istanbul

In the district of Beylikdüzü, in İstanbul province, on the southern headland of the peninsula between the Kuçükçekmece and Büyükçekmece lakes, structural remains thought to belong to a harbour and associated buildings have been located (Figs 1 and 2). In 2008, the complex was declared a ‘first degree’ protected area (İstanbul Cultural and Natural Asset Conservation Board declaration no. 1, 14.02.2008, decision no. 625). These remains, first studied by Şengül Aydıngün, were subject to more detailed investigation in 2011 and 2012 with the aim of determining the function, date and extent of the complex, and to explore its surroundings. The work, carried out within the framework of the ‘Prehistoric Research of Istanbul’ project, included clearing the vegetation that covered the site and cleaning the existing section in order to draw and photograph the structural remains. No excavation proper has as yet been carried out. During this process, pottery sherds, other ceramics, lamps, glass, marble flooring s and bones were found in and around the construction, and were recovered as surface finds. A great number of such finds can be observed in the surrounding area, buried under the sand and in the sea; those dated suggest the complex was used between the 4th century BC and the 10th century AD.

The site is located on the coast of a high plateau which is deeply dissected by streams, and forms part of the Çatalca peninsula which, together with Kocaeli peninsula, comprises Istanbul province. In front of the remains, lies a narrow beach. The geological formation is dated to between the Middle Oligocene and Early Miocene periods, and is formed of loose sandstone, loam and schist intercalated with sand and loam. It also includes sandstones and pebbles with rounded grains of quartz, quartzite, vulcanite and radiolite. The formation is 100 m thick on average (Duman et al., 2004: 16, 17). As it is composed of weak elements and includes clay, it is liable to landslides. The area just to the north of the remains available for public viewing could not be achieved until the remains had been fully conserved. Passive conservation of the remains began on site; active conservation at Greenwich, using Polyethylene Glycol, finished in the late 1980s. After the North Lincolnshire Council and the NMM had reached an understanding, the Council arranged for York Archaeological Trust to clean excess PEG off the timbers and to re-assemble the constituent parts. The remains were subsequently displayed (Fig. 6) in a new heritage centre within the former Angel Inn in Brigg Market Place (www.northlinces.gov.uk/leisure/briggheritagecentre for opening times). It is well worth a visit.

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(G) The boat was dated by radiocarbon assay to 825–760 cal BC.

The second part of the Brigg project began in mid 1973, thus it has taken 40 years, to work through the seven stages that are generally considered necessary for such ancient boat investigations: Research; Excavation; Record; Analysis and Conservation; Interpretation; Synthesis; Publication (McGrail, 2004: 5, fig 1.2). Eight years after excavation, most of these phases had been completed when the definitive account (McGrail, 1981) of the project was published. On the other hand, if mature thoughts (McGrail, 1985) are included, the major part of this project took 12 years.

Although publication, by articles, talks and book, was thus completed within a not-unreasonable time, publication in the sense of making the excavated boat available for public viewing could not be achieved until the remains had been fully conserved. Passive conservation of the remains began on site; active conservation at Greenwich, using Polyethylene Glycol, finished in the late 1980s. After the North Lincolnshire Council and the NMM had reached an understanding, the Council arranged for York Archaeological Trust to clean excess PEG off the timbers and to re-assemble the constituent parts. The remains were subsequently displayed (Fig. 6) in a new heritage centre within the former Angel Inn in Brigg Market Place (www.northlinces.gov.uk/leisure/briggheritagecentre for opening times). It is well worth a visit.

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discussed here shows traces of previous landslide events (Kaya et al., 2008: 992–4).

The region is a first-degree earthquake zone. The North Anatolian Fault passes to its north. The surviving buildings are thought to have been severely damaged by the major earthquakes that have occurred in the past. Istanbul experienced its first-recorded earthquake in AD 342 when it was the capital of the Roman Empire, Constantinople. According to written evidence, in the Roman and Eastern Roman Empire Periods, it suffered severe earthquakes in AD 447, 542, 558, 1042, 1064, 1202, 1296, 1419 and 1437 (Sancaklı, 2004: 29, 30; Ortaylı et al., 2008: 141). It is recorded that during the earthquake of AD 447 the defensive walls of the city were partly demolished; in that of AD 558, the dome of Saint Sophia collapsed; and in AD 1419, a tsunami was recorded (Istanbul Ansiklopedisi, 2010: 339–41). The last great earthquake in the Byzantine Period occurred in AD 1437. No remains dated to the Ottoman Period were found at the site, but the structures are also likely to have been affected by earthquakes after they were abandoned. According to Ottoman sources, earthquakes occurred in Istanbul in the years AD 1509, 1719, 1766, 1894 and 1912. In the Republican Era, the earthquakes of AD 1935, 1963 and 1999 also caused extensive loss of life and property in the region.

The building complex

The 41-m-long building complex is built parallel to the coastline. Its rear section to the north has been buried beneath a previous landslide, over which a coast road has been built, 1.30 m above the highest remains of the building. The building comprises eight walls, built perpendicular to the sea, delimiting seven cells, of which five have an average width of 4.5 m (Fig. 3). The width of the walls is 0.50 m up to a height of 1 m above sea-level, above which, the width of seven of the walls increases to c.0.75 m (Fig. 4). Two different stonemasonry techniques are used in the walls visible in the cleaned-up section. Towards the top of some of the walls, four courses of brickwork are visible, while in two of the walls, in the western part of the complex, no brickwork has been recorded. The remains of another

Figure 1. a) Places mentioned in the text; b) Location of the building and possible harbour structure site at Beylikdüzü on the coast south of Istanbul province.

Figure 2. The structure located at Beylikdüzü. (Photograph: H. Oniz)
Three distinct archaeological layers have been detected in the recorded section of the first and second cells at the eastern end of the building. Since no excavation was carried out, the original floor of the building was not reached. Based on the recorded section, it appears that the building underwent three episodes of rebuilding following its construction. Tiles found both inside and outside the building are evidence of how the roof was covered. Sherds and amphora handles found in the fill within the building and in layers lying against it are dated between the 4th century BC and the 10th century AD. A lamp found between layers 1 and 2 is dated to the 1st-2nd centuries AD (Fig. 6). Since the earliest finds date to the 4th century BC, it can be assumed that the original building was constructed in
this period, which marks also the beginning of the deepest layer (layer 4). Marble pavement fragments found in layer 3 indicate that in this period, the floor was partly or fully covered with this material. Layer 2 appears to represent a period of reuse of the original construction after some minor repairs, and cannot at present be dated. As mentioned above, at this level, the walls are 0.25 m wider than at lower levels, and the masonry is more elaborate. The form of the wall and associated building, comprising the stone masonry and four courses of brickwork, are typical of Byzantine architecture (Figs 4–5).

The apparently uninterrupted use of the structure might indicate that it was a significant and important building, while successive episodes of destruction and rebuilding might be associated with three of the above-mentioned earthquakes.

The buildings and the probable harbour structure are open to a southerly wind, as is the Theodosian harbour at Yenikapi, situated some 30 km east of the site. The Theodosian harbour is known to have fallen into ruin in the wake of a natural disaster or a ferocious storm in the late 10th century or early 11th century (Başaran et al., 2007: 190; Pulak, 2007: 204). Since the 10th century is also the terminus ad quem for the finds recovered from the site, its demise may have been caused by the same catastrophe.

By analysing the surviving visible foundations and walls it is possible to speculate on the function of this building; yet, systematic excavation will be necessary to confirm its use. The marble pavement fragments found in layer 3, between the first and the second walls at the eastern side of the building, and fragments of high-quality terra sigillata, found in abundance in the fill between layers, demonstrate that part of the building had a high-status function in at least one period of its use, although at present there is insufficient evidence to determine what this could be. However, considering the layout of the building, two possibilities come to mind: a granarium (granary) or a shipshed.

The general appearance of the complex on the coast of Beylikdüzü is similar to recorded granaries: large rooms are characteristics of such buildings where stable temperature and humidity levels were required to store grain in good condition (Rickman, 1971: 1). At this stage of research, no evidence of systems to control temperature and humidity have been found; however, the shape of the structure is comparable to the granary.
in Andriake, one of the most important harbours of Lycia. The Andriake granary was built in the Roman period on the harbour at Demre-Antalya, the entrance of which is protected with a sea wall (Marksteiner, 2006: 73). It has survived in very good condition (Fouache et al., 1999: 305; Pehlivaner et al., 2004: 28, 30). It measures 65 x 32 m, has eight rooms, and is adorned with reliefs of Isis, Serapis and Pluto, as well as an inscription, carved over the central door (Tıbıkog˘lu et al., 2010: 57). The granary at Andriake occupies 2081m², and is much larger than the structure in Beylikdüzü. Yet, this difference in scale might be considered an indication of the relative importance of Andriake in the network of interregional trade.

Another granary with a similar shape is situated in Patara, also an important harbour on the Lycian coast (Fig. 7). It is known that the Theodosian harbour at Yenikapi was used for the import of grain from Egypt and the Crimea (Asal, 2010: 154). The structure at Beylikdüzü might also have been used in the same period to store imported grain.

The form of the structure can also be compared to shipsheds of the type constructed from the Greek to the Seljuk period. The shipshed exposed in 2011 at Portus, the harbour of Rome, has a similar form. It was in use between 27 BC and AD 565. However, its dimensions (some 247 m in length), are much larger than the structure in question (Keay, 2013: 7). The Portus shipshed is rectangular in form and its primary phase dates to the Trajanic period (possibly AD 110–117). Another shipshed, similar in shape to the building at Beylikdüzü, is located in the harbour of Alanya (Fig. 8). This structure was built in the Seljuk period on older remains.

**Harbour structure**

The archaeological remains in the water and on the coast also indicate a harbour structure at the site. An alignment of blocks of stone that continues into the sea, thought to be the initial part of a sea wall, has been located 250 m from the western end of the complex (Fig. 9). A mortared wall is located 5 m south of and parallel to these blocks. That these two remains are situated parallel to each other and at a distance of 5 m, and that no other remains have been found in the surrounding area, supports the suggestion that they are part of a harbour. The bathymetrical survey of the area revealed a shelf 100 m offshore. Local divers mention the existence of some man-made structural remains on the shelf. The headland, about 1400 m east of the buildings, effectively cuts off the easterly wind and waves; the buildings, on the other hand, are open to the southerly and westerly winds and waves—hence the necessity of a protective harbour structure.

**Risk factors for the complex**

The buildings are only 4–6 m from the sea and are directly open to waves, wind and salt-water spray; and to thus to erosion. The loose nature of the layers allows the walls to be washed out at sea-level, with devastating results. Every storm results in the loss of about 50 to 100 mm of earth causing remains to be lost. This coast is also subject to landslides: the northern part of the building is liable to collapse under the pressure of such earth movements. Moreover, in an attempt to protect housing, modern rubble has been dumped on the site which may have caused the wall at the eastern end of the structure to fall to the south (Fig. 5). Modern rubble has covered the remains of another historical building reportedly situated on the coast approximately 27 m from the building investigated here. Some 3 m north of the building and less than 2 m above it, an earth road is being constructed; vibrations produced by heavy vehicles constitute a further risk to these remains.
Investigations and artefacts recovered to date, such as amphora and lamp fragments, demonstrate that the structure had an uninterrupted occupation sequence from the 4th century BC to the 10th century AD. The visible stratigraphy suggests that the structure was probably renovated twice following its construction, and that, later, it was rebuilt on top of the original remains. In addition, the existence of a harbour to the south of the structure is suggested by remains detected in the sea and on the shore. A project of archaeologically excavation should be conducted on the site in order to date it more precisely, to deduce its function, and to procure secure evidence for the existence of a harbour structure. The risks that threaten the survival of the structure mean a consolidation and conservation project is urgently required.

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A Medieval Boat Graffito from Silves, Algarve, Portugal

The excavation of a medieval cemetery in an area to the north-west and west of Silves Cathedral took place in 2004, supervised by one of the authors (AIV) (Fig. 1). In one of the graves, a red sandstone block, delimiting the tomb, was found to be engraved with the image of a boat (Casimiro et al., 2008: 247). The grave (No 156) consisted of an earth-dug pit, where a single male was buried in a supine