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RESEARCH ARTICLE

Castle architecture in Anatolia: Fortifications of Diyarbakir

Fatma Meral Halifeoglu*

Department of Architecture, Dicle University, Diyarbakir 21280, Turkey

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Typology

Abstract
The ancient walls of Diyarbakir are the city's most important urban element, exhibiting an artistic grace through the arrangement of the towers, architectural values, dimensions, materials, and decorations. Diyarbakir is located at the crossroads of important trade routes, one connecting the Western World to the Far East and the other connecting North to South. Architecturally, its defensive walls and towers make it one of the most important surviving castles. In this study, the history, location, architectural and building properties of fortifications of Diyarbakir were explained and technical dimensioning typology studies on towers and city walls were submitted.

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1. Introduction

Defence was one of the most important requirements of ancient settlements, especially during the Middle Ages. Thus, despite difficulties, settlements were often built on defensible high ground such as hills, cliffs, and slopes, and surrounded by impassable walls. However, such locations lost their security advantage towards the end of 19th century, and were abandoned.

Castles were built primarily to protect settlements from attacks by external forces. It is possible to see castle remnants in the most sheltered parts of nearly all cities that date to the Middle Ages. In addition to these examples, castles or similar defensive systems have also been found in many now-abandoned ancient settlements and mounds (Karul, 2009). Castle architecture improved following innovations in construction practices and rules of engagement. Yet, although there are clear differences between castles dating from different ages and located in different regions, nearly all were built for the same purpose.

Comparisons of castles from different settlements reveal a pattern in which a citadel contains control, administrative, and religious structures and is surrounded by a castle that includes towers and main gates. This design is often found in settlements in which the citadel serves as headquarters. Due to the economic and social requirements of increased populations, settlements began to spread out from citadels. Because defence was a main concern, castle walls and towers were built to maximise security. In addition to these settlement citadels, other castles were built exclusively for military purposes. These are comparatively smaller, and although they

*Tel.: +90 5325620350.
E-mail address: mhalife@gmail.com
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include a surrounding city wall, they did not generally include important settlements. Some of the basic features of castle architecture, such as moats, double wall systems, and defensible gates with double towers, have been used in recent times much as they were in ancient times.

In 1940, Albert Gabriel (Gabriel, 1940) performed the most comprehensive study of the fortifications of Diyarbakir conducted to date. He created a map showing the boundaries of the castle and outer walls and enumerated the towers. He also drew relief and restitution plans and depicted sections of some of the significant towers and gateways.

In the present study, researchers prepared relief plans of those extant towers that were not addressed in Gabriel's study. The measurements of intact and destroyed castle walls were organised into tables. This measurement study was performed with conventional methods using a laser transit and measuring tape. An aerial photograph was used as a control. Measurement studies were performed by a technical group at four castle zones separated by four gateways and in the interior zone of the inner castle.

This study is not an archaeological, history of arts or a historical research but an architectural interpretation based on technical measurements and morphological properties. In this context, in Section 2, the historical development and location assessment of city of Diyarbakir and fortifications of Diyarbakir was made. Afterwards, the fortifications of Diyarbakir were generally introduced; their architectural properties, building techniques and materials were explained. Although there are differences in cover coat, morphology and plan arrangement, a three-D (Fig. 5) cross section of a tower was prepared in order to provide a general idea. In this cross section traditional wall building style, brick vault coating wall thickness, material and building technique were explained. In Section 3, the technical values depending on measurements in city walls and towers were expressed and typology tables of the towers that reached until today according to their outlook. In the number sequence of the towers, the number arrangement made by Albert Gabriel was followed. In Section 4, the evaluation of these studies was made.

2. The location, importance of Diyarbakir in Anatolia and development of Diyarbakir of fortifications

2.1. Location and historical development of Diyarbakir

Diyarbakir is located in southeast Turkey in northern Mesopotamia (Fig. 1). The city is situated on a plain surrounded by mountains. Diyarbakir, which reflects the influence of many ancient and modern civilisations, is located at an important crossroads connecting the West to the Far East, on the one hand, and the North to the South, on the other. For this reason, Diyarbakir has been the centre of administration, trade, art, and science in virtually every historical era.

In Diyarbakir and surrounding, the existence of a settlement originated back to 7000BC can be observed in archaeological diggings. According to the findings in research diggings in upper Mesopotamia region, Diyarbakir was dominated by many civilisations starting from 3000BC Subaru, Hurri, Mitanni, Asur, Urartu (İ. Ö.1260-653) and became the centre of one of the most important states (Amida) of Ottoman Empire in 1515 (Sözen, 1971).

Until the advent of the Ottoman Empire, Diyarbakir was dominated by different states, primarily as a result of war and rarely due to peaceful coexistence. Epigraphy found on the walls and towers reflect that conquerors often restored the city walls. Thus, the city reflects its diverse historical texture in its successive incarnations (Parla, 2005).

2.2. History and location of Diyarbakir of fortifications

The historical past shows parallelism with the city walls. Romans who dominated the city starting from 69 BC,

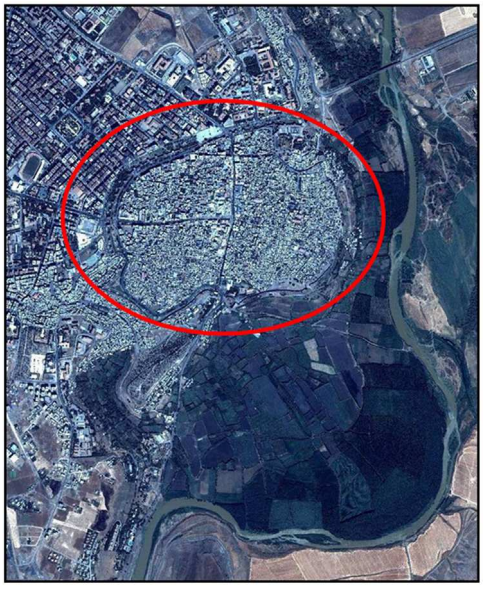


Fig. 2 Historical Diyarbakir City area surrounded by city walls and the Dicle River-2012 (www.google earth.com).



Fig. 1 Location of Diyarbakir in Turkey map.

converted the city to the capital of Mesopotamia starting from the middle of 4th century (Gabriel, 1940). Although the initial building date of the city wall is unknown, according to the sources the city was completely surrounded with city walls starting from 4th century (Marcellinus, 1986) and was completed in Byzantium era (Parla, 2005). It can be observed from many writings that the dominators of the city initially performed the fixation of the city walls. There are tablets belonging to Pre-Islamic era in Dag Gate, Mardin Gate and 4 towers between Mardin Gate



Fig. 3 The city walls in 1960.



Fig. 4 Surroundings of Towers 45, 46, and 47. Remnants of the outer city walls (front city walls) can be seen, 2012.

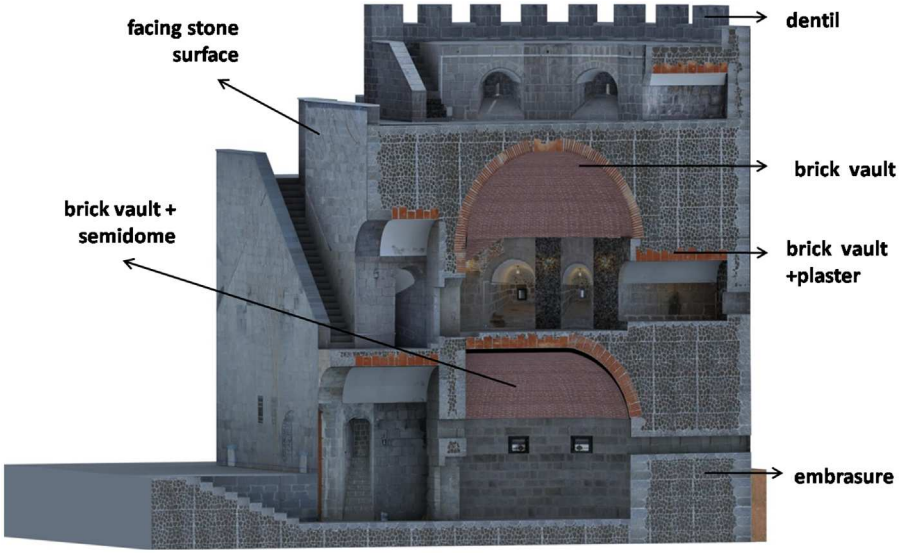


Fig. 5 Place arrangement, construction technique, and materials (T. 8).

and Yeni Gate (Gabriel, 1940, Parla, 2012). In this respect, Diyarbakir ramparts consist of mostly antic bases or renovations on partially preserved wall parts. Renovations were also made in Islamic empires era followed by Abbasid caliphate but majority of these were exterior fixations (Ahunbay, 2012). All towers and city walls in the section facing the inner city walls were remade after expansion and walled city became an administration centre.

The fortifications of Diyarbakir are the best surviving example of a group of castles that were built on plains using a natural feature, such as a cliff, the sea, or a river, as a boundary on one side. A rocky area and a cliff form the

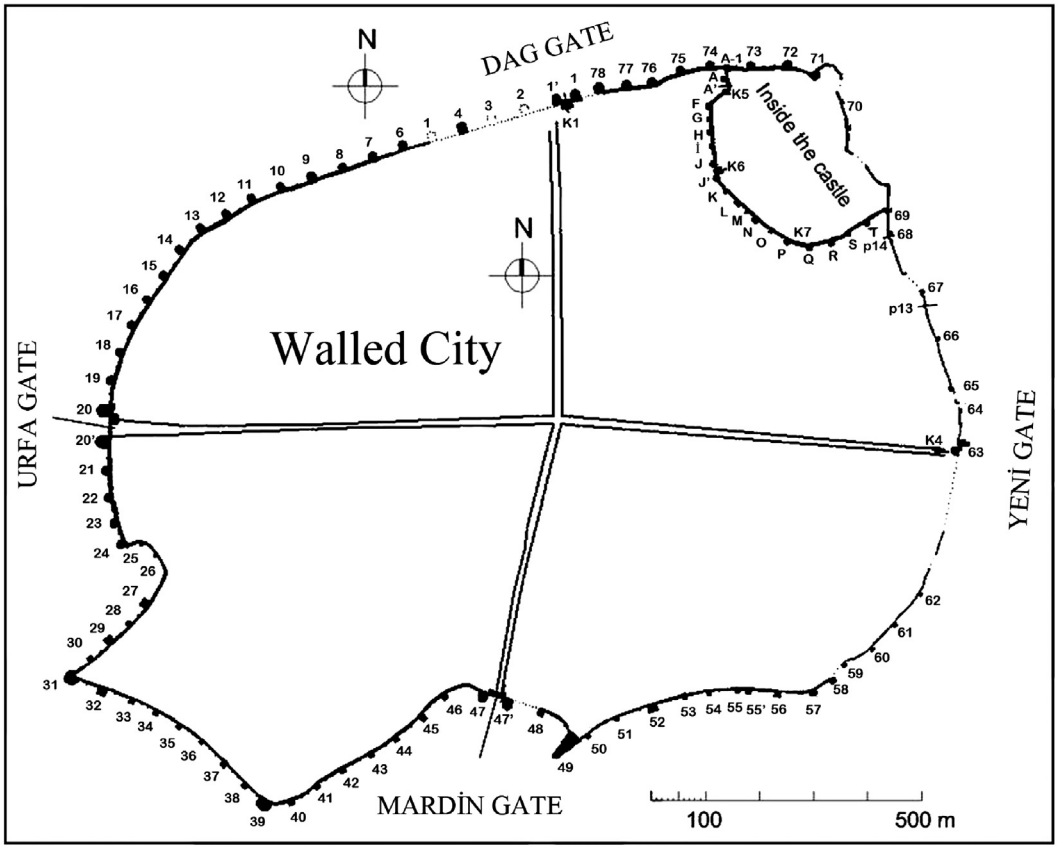
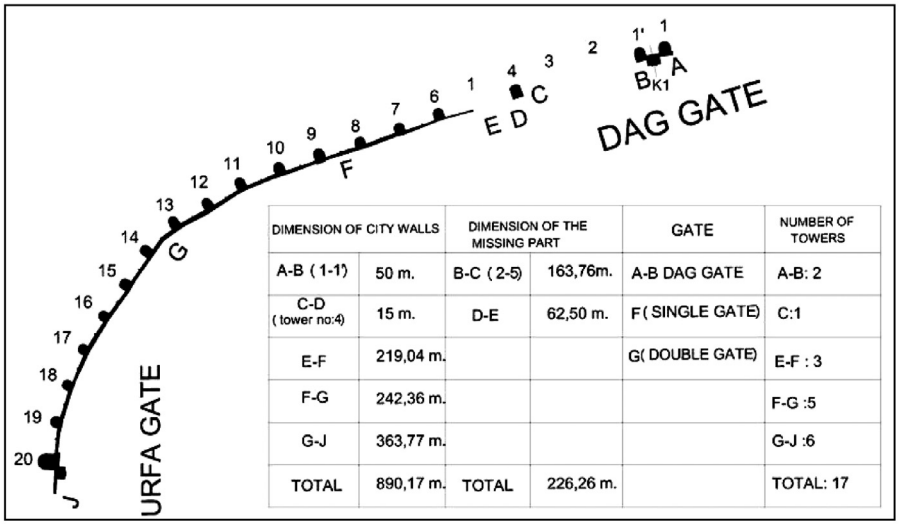


Fig. 6 Plan order and tower numbers of the Diyarbakir city walls.



DIMENSION OF CITY WALLS		DIMENSION OF THE MISSING PART		GATE	NUMBER OF TOWERS
A-B (1-1')	50 m.	B-C (2-5)	163,76m.	A-B DAG GATE	A-B: 2
C-D (tower no:4)	15 m.	D-E	62,50 m.	F (SINGLE GATE)	C:1
E-F	219,04 m.			G(DOUBLE GATE)	E-F : 3
F-G	242,36 m.				F-G :5
G-J	363,77 m.				G-J :6
TOTAL	890,17 m.	TOTAL	226,26 m.		TOTAL: 17

Fig. 7 City wall zone between Dag Gate and Urfa Gate.

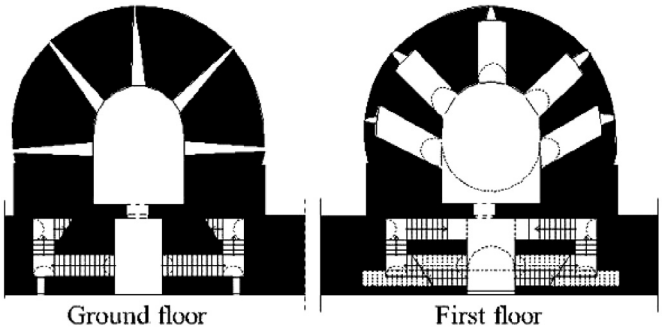
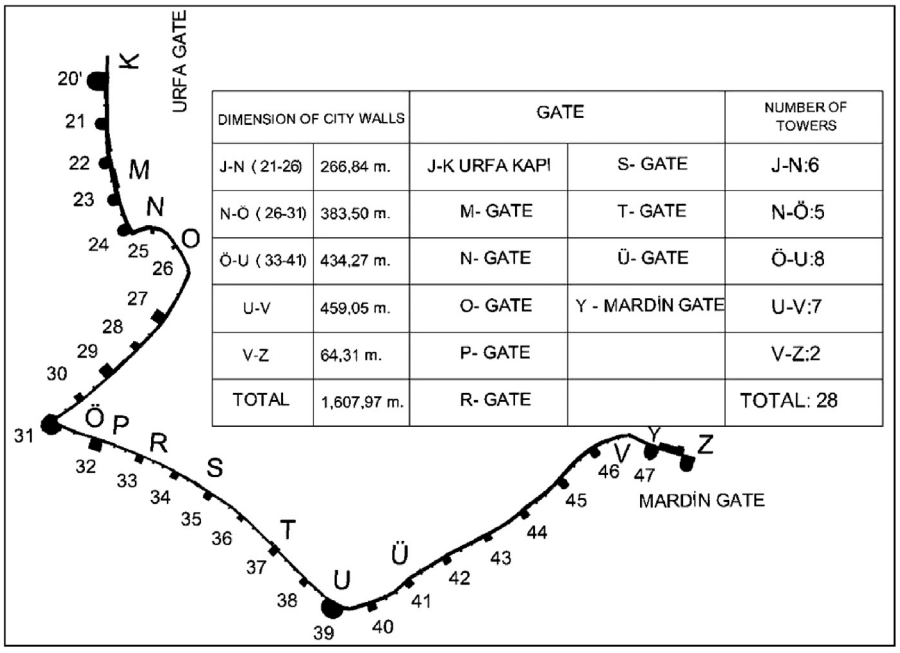


Fig. 8 Towers with semicircle outer surfaces (T. 7,8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19).



DIMENSION OF CITY WALLS		GATE		NUMBER OF TOWERS
J-N (21-26)	266,84 m.	J-K URFA KAPI	S- GATE	J-N:6
N-Ö (26-31)	383,50 m.	M- GATE	T- GATE	N-Ö:5
Ö-U (33-41)	434,27 m.	N- GATE	Ü- GATE	Ö-U:8
U-V	459,05 m.	O- GATE	Y - MARDİN GATE	U-V:7
V-Z	64,31 m.	P- GATE		V-Z:2
TOTAL	1,607,97 m.	R- GATE		TOTAL: 28

Fig. 9 City wall zone between Urfa Gate and Mardin Gate.



Fig. 10 Outer surfaces of Evli Beden (T31) Towers.

southern boundary of the inner castle. The rest of the castle was built on a flat field so that the inner wall and outer wall are on the same level.

Indeed, the symbols, scriptures, and art of those societies that built or repaired the towers are reflected in the city walls and gates of fortifications of Diyarbakir. In this regard, the towers reflect differences in the size, form, and aesthetics of these different civilisations.

Inscriptions on city walls and towers also bear witness to the city's rich history. Many researchers reading these tablets made dating studies (Berchem and Strzygowski, 1910; Gabriel, 1940). Six of the 63 surviving inscriptions date to the Byzantine Period. Four are written in Greek, one in Latin, and the remainder are from the Islamic Period (Parla, 1990). Nasır-ı Husrev, who visited Diyarbakir between AD1045 and 1051, mentioned the height of the walls and towers and explained the passages between the inner and outer walls (Husrev, 1985). Wilson, who visited the city at the end of 19th century, described the second wall and its surrounding ditches (Wilson, 1895). Garden, who visited the city in the middle of 19th century, explained

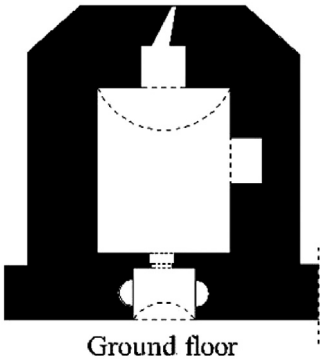


Fig. 13 Plan for Tower 48.

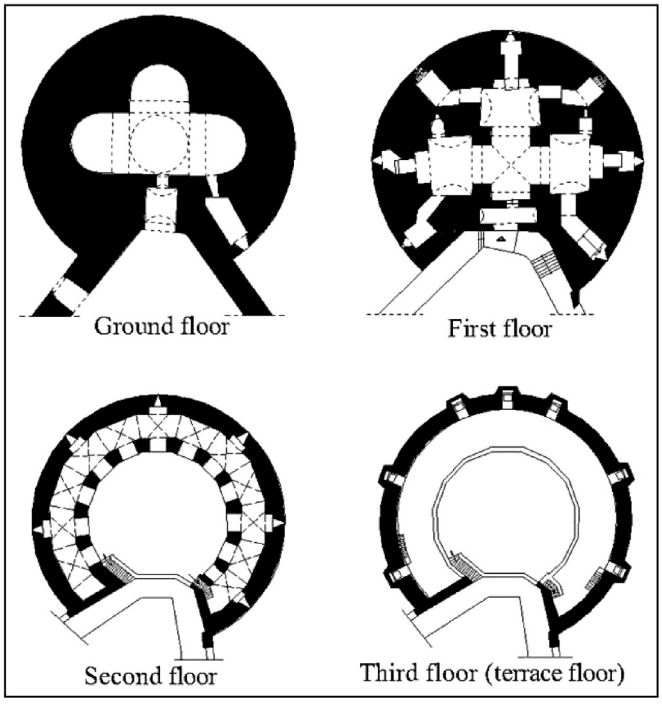


Fig. 11 Floor Plans for Evli Beden Tower: Tower 31 (Gabriel, 1940).

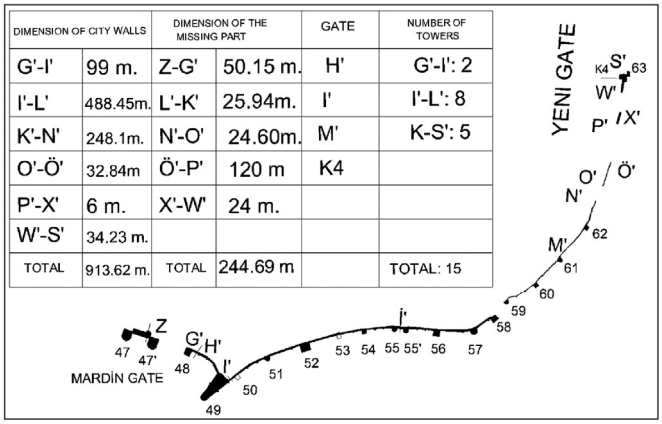


Fig. 12 City wall zone between Mardin Gate and Yeni Gate.

that the city was surrounded with semi-round and square towers, some of which had inscriptions (Garden, 1867).

2.3. Architectural properties of fortifications of Diyarbakir

Since their initial construction, the city walls have been Diyarbakir's most important urban feature. Because of their scale and use of materials, the walls have a symbolical function apart from defence. Restorations and additions to the city walls were performed with an emphasis on securing the lives and material goods of the residents and have provided separation from the outside world when necessary. Towers built over time and stylistically reflecting the long history of the castle, complete the gates and city walls. Their present state reflects damage and destruction experienced very recently. The Dag Gate (north) was demolished in 1936 to expand the city. Other forms of town planning, combined with damage from individual actions, have also taken a toll on some of the towers and city walls (Figs. 2 and 3).

In their present condition, the fortifications of Diyarbakir can be divided into two categories: the bailey and the citadel. The citadel encompasses the first settlement of city and is located in the northeast. The bailey consists of a tower and the city walls, which form the border of the walled city region and encompasses the traditional urban zone. However, in Gabriel's determination studies, he mentions a second city wall surrounding the current city walls and towers. Remnants of the outer city walls were observable at the front entrance to the city because, at that time, there was little or no settlement in that area (Fig. 4).

The bailey has four gates that open outwards. Access is possible at the Dag Gate in the north, the Mardin Gate in the south, and the Urfa Gate in the west. The only access between the city and the Dicle River is through the Yeni Gate in the east. Along the bends of the bailey, which has 82 towers, are some with special properties such as Evli Beden, Yedi Kardes, Keci, and Nur Tower.

2.4. Building technique and material in fortifications of Diyarbakir

Stone, usually of the type found closest to the settlement, was the main building material used in castles, city walls, towers, and fortresses. However, different types of stone were also used to a limited extent. Indeed, structures were designed with the availability of materials in mind. Adobe (stone+adobe) and composite brick castles were built at settlements where access to stone was limited, and the mortar used in castles also reflects regionality. For example, the Diyarbakir city walls are a defensive construction shaped from basalt stone.

Similar to its monuments and civil architecture, the city's defensive walls were constructed with traditional masonry and construction techniques. Towers have two, three, or four floors. The thickness of the tower walls is 4.4 m at the ground floor and decreases towards upper floors. Diyarbakir city walls are approximately 5 m thick. The outward surfaces of the city walls were constructed using dressed facing stone; the inward surfaces were made using consecutive

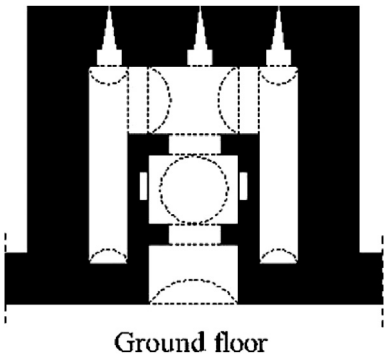


Fig. 14 Plan for Tower 52.

rubble masonry. Interior fill between the wall surfaces was built using rubble and lime-based mortar. There are hackings in a few rows on interior wall surfaces (Fig. 5).

Entrance towers, iwans, stairs, doors and accessways, and loophole rooms were constructed from stone and/or brick. Arches and vaults, which were constructed from single or double rows of bricks, are generally semicircular. Roofs generally consist of barrel vaults, domes, ecliptic vaults, or barrel vaults+semidomes.

As the most important regional resource, basalt was the main construction material used in the Diyarbakır city walls. This durable stone, found in different shapes and masonry arrangements, produces different rigidity ratios. Similar to the other constructions, Diyarbakir city walls include basalt as its main masonry framework. Although the dimensions and masonry arrangement vary according to construction date, the lower parts of towers have larger dimensions compared with other surfaces owing to the requirements of their load-bearing systems.

The primary material used in the construction of the fortifications of Diyarbakir was basalt stone obtained from the Karacadag region west of the city. This stone is also the predominant building material in other monumental constructions within the city. Basalt can be classified into two types, porous and nonporous, and has a high hardness rating.[1] Hardness and endurance are the main contributors to the 2000-year preservation of ancient Diyarbakir structures. Variations in the size of stones and the order of walls indicate different construction periods, with the lower courses of towers larger in size than those of other surfaces. In addition to square, curved, prominent, and free-talus types of order, cylindrical stones were used in some towers (T. 8 and 9). Easily carvable limestone was used primarily for inscriptions (Halifeoglu, 2012).

3. Dimensioning and typological research in fortifications of Diyarbakir

Broad comparisons of castle plans reveal the dominance of two forms, circular and tetragonal, with individual turrets between city walls. Circular turrets can have multiple edges

[1]Although the specific weight of basalt, which is one of the hardest and the most durable stones in nature, ranges between 2.3 and 2.9 t/m^3, the ratio can reach as high as 3.3 t/m^3 in some places (Işik, 2003).

(most often 12), and towers can be semicircular or polygonal (Figs. 10 and 11). The towers forming the Diyarbakir city walls were divided into five groups, and the architectural properties and typological characteristics of the structures were examined. Four sections consisted of the towers around each of the four main gates, and a fifth consisted of the citadel towers (Fig. 6). A total of 65 of the known 82 original towers remain on the outer city walls. In the citadel, 18 towers stand undamaged. A table presenting the general typology was constructed from the observed formational properties of the towers.

Subsequent cultural influences resulted in modifications to the fortifications of Diyarbakir and towers. The reconstructed, repaired, or heightened structures were constructed over a long period. The construction style, materials selected, and modified topography represent the formal differences among diverse cultural influences. However, the present typological evaluation was based on the current forms rather than on these perceived differences.

3.1. Section I: between Dag Gate and Urfa Gate (Towers 1′-20)

Section I consists of the area north and west of the bailey and includes 17 towers. Towers 2, 3, and 5 and the city walls between them were demolished. While 890 m of city walls remain in this section, there is a gap of 226 m (Fig. 7). This section also includes two gates, between Towers 8–9 (Single Gate) and Towers 13–14 (Double Gate), which were built as



Fig. 15 Towers 47′-48 and city walls demolished for road works.

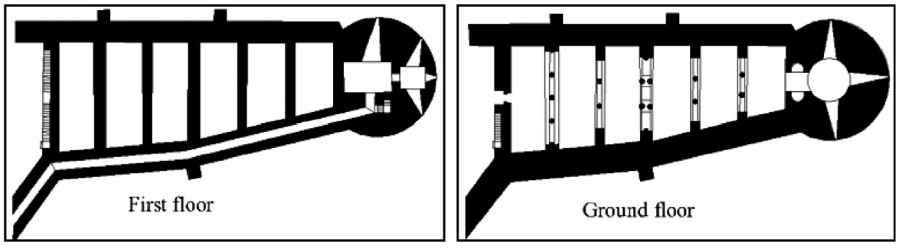
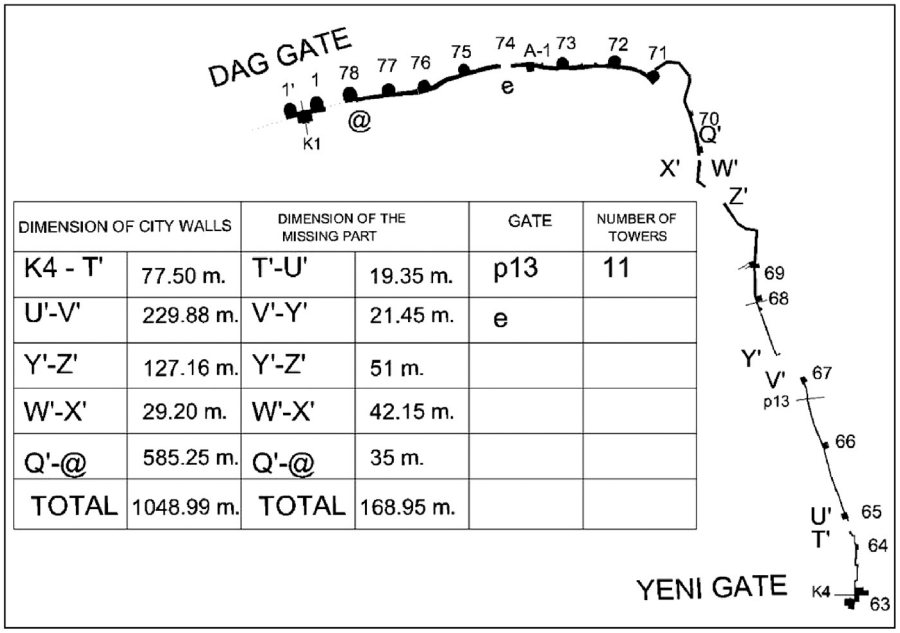


Fig. 16 Floor plans for Keci Tower: Tower 49 (Gabriel, 1940).



DIMENSION OF CITY WALLS		DIMENSION OF THE MISSING PART		GATE	NUMBER OF TOWERS
K4 - T'	77.50 m.	T'-U'	19.35 m.	p13	11
U'-V'	229.88 m.	V'-Y'	21.45 m.	e	
Y'-Z'	127.16 m.	Y'-Z'	51 m.		
W'-X'	29.20 m.	W'-X'	42.15 m.		
Q'-@	585.25 m.	Q'-@	35 m.		
TOTAL	1048.99 m.	TOTAL	168.95 m.		

Fig. 17 City walls zone between Yeni Gate and Dag Gate.

part of a public works programme conducted during the post-Republic Period (1955).

The outer walls of all towers in this zone, with the exception of Tower 4, are semi-circular in shape. The ground floor of each tower has five deep embrasures and is covered with a barrel vault+semidome. Vaulted spaces consist of five loophole rooms and central areas. Although Tower 4 has the same plan, its outer face is polygonal in shape (Fig. 8).

3.2. Section II: between Urfa Gate and Mardin Gate (Towers 20′-47)

The construction arrangement of the towers, city walls, gates, and reinforcing buttresses in this area show continuity. No portion of this zone was completely demolished. However, the original ground floor designs of only some of the towers have survived intact. This zone also contains special towers known as Evli Beden, Yedi kardes, Nur, and Meliksah (Figs. 9 and 10). There are 28 towers in the zone of 1600 m, and buttresses 27 and 28 are also commonly known as towers. Four different types of towers, with outer walls that are circular, semicircular, tetragonal, and polygonal in shape, are represented in this zone (Fig. 11).

3.3. Section III: between Mardin Gate and Yeni Gate (Towers 47′-63)

This section suffered partial losses due to its topographic location, the weakness of sections of its city walls compared

DIMENSION OF CITY WALLS		GATE	NUMBER OF TOWERS
A-A'	45,2 m.	K5 GATE	A-A': 2
A'-F	32 m.	K6 GATE	A'-F:1
F-J	118,02 m.	K7 GATE	F-J:4
J-Q	251,65 m.		J'-Q:8
Q-67	151,46 m.		Q-69 :3
TOTAL	598,33 m.		TOTAL:18

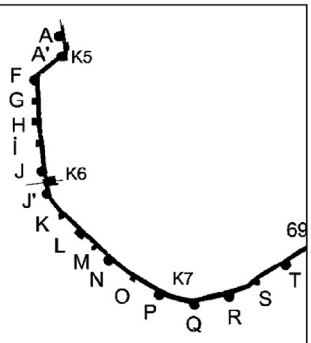


Fig. 18 Citadel city wall zone.

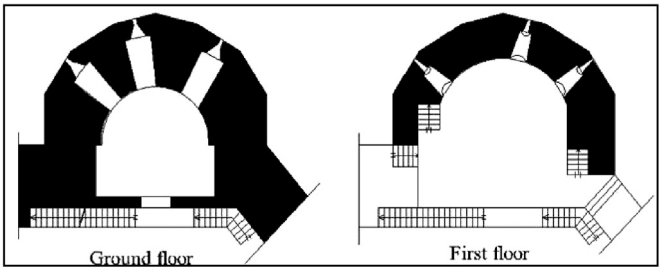


Fig. 19 Polygonal outer surface of Tower F, in the citadel.

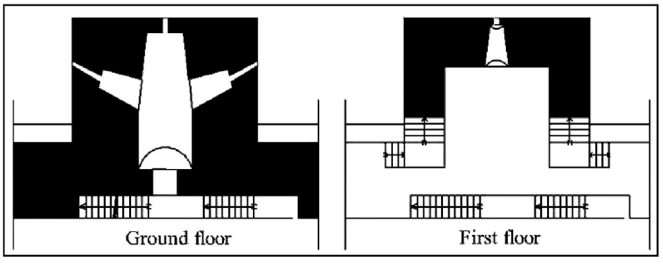


Fig. 20 Tetragonal outer surface of Tower H, in the citadel.

with that of other sections, the wide distances between towers, and damage. Of the 914 m of city wall in this section, 245 m have been destroyed (Figs. 12 and 15). The plan for Keci Tower 49 differs from those for the other towers along the Diyarbakır city walls in terms of both its construction style and its location (Fig. 16). Although Tower 49 was excluded from the group in the typological assessment, this structure is included in the circular-tower group because of its outer form.

The remaining towers are semicircular, tetragonal, and polygonal in shape, with different interior plans for each form (Figs. 13 and 14). A corridor covered by a brick vault connects Keci Tower to Tower 48. Towers 50 and 53 were completely demolished and converted into a communicating passageway. All the city walls and towers in this section, apart from Keci Tower, were extensively damaged.

3.4. Section IV: between Yeni Gate and Dag Gate (Towers 63-1)

The section, between Yeni Gate and Tower 71, includes the weakest portion of the city walls due to partial ruptures effected by the natural topography (Fig. 17). The massively wide and tall towers present in other sections are not seen in this section until Tower 75. The original exterior forms of Towers 64, 65, 67, 68, and 69 could not be determined due to extensive deterioration. Tower 66, whose outer face is tetragonal, is now used as a residence. A typology of the outer walls tower plans is presented in Table 1.

3.5. Section V: the citadel towers (Towers A-T)

This section of wall separates the citadel from the walled city, and the towers and city walls in this area are generally undamaged. This 598-m-long section includes 18 towers and three gates (Fig. 18). Saray Gate, which opens towards the walled city, is an important gate between two towers. The gate between Towers A and A' are closed. Kupeli Gate passes through Tower Q and is the only example of its kind within the Diyarbakir city walls. There are semi-octagonal and triangular-planned towers, which are not seen in any other areas, in this section (Figs. 19–21). The typology of the inner city walls tower plans is presented in Table 2.

4. Conclusions

Diyarbakir, which was a centre of management, trade, art, and science, is one of the most important historical centres of the Southeast Anatolia Region and represents a composite of the historical and cultural heritages of many civilisations. One of the most important expressions of this are the fortifications of Diyarbakir, and the walled city region surrounding the historic city centre. The walled city, composed of monumental structures and traditional houses, has guarded the silhouette of the original city into the 20th century, when it entered into a period of rapid deterioration, especially since the 1960s.

Its towers, city walls, and gates restricting the traditional urban area, the original structures of the Diyarbakir city walls, have survived for centuries. Its fortifications espe-

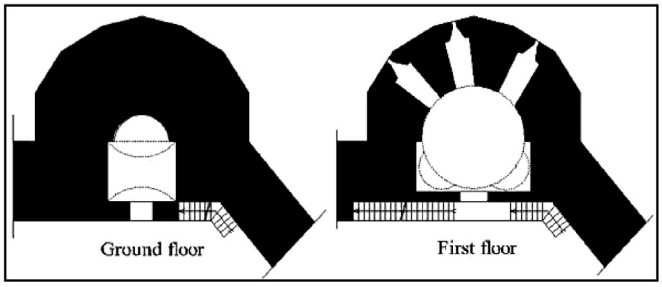


Fig. 21 Semi-circular outer surface of Tower A, in the citadel.

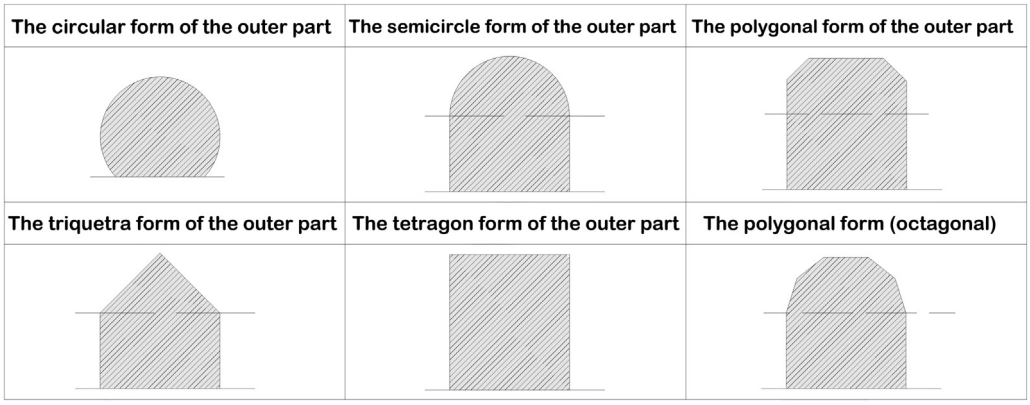


Fig. 22 General tower types determined in fortifications of Diyarbakir.

Table 1 Typology of outer fortress tower plans.

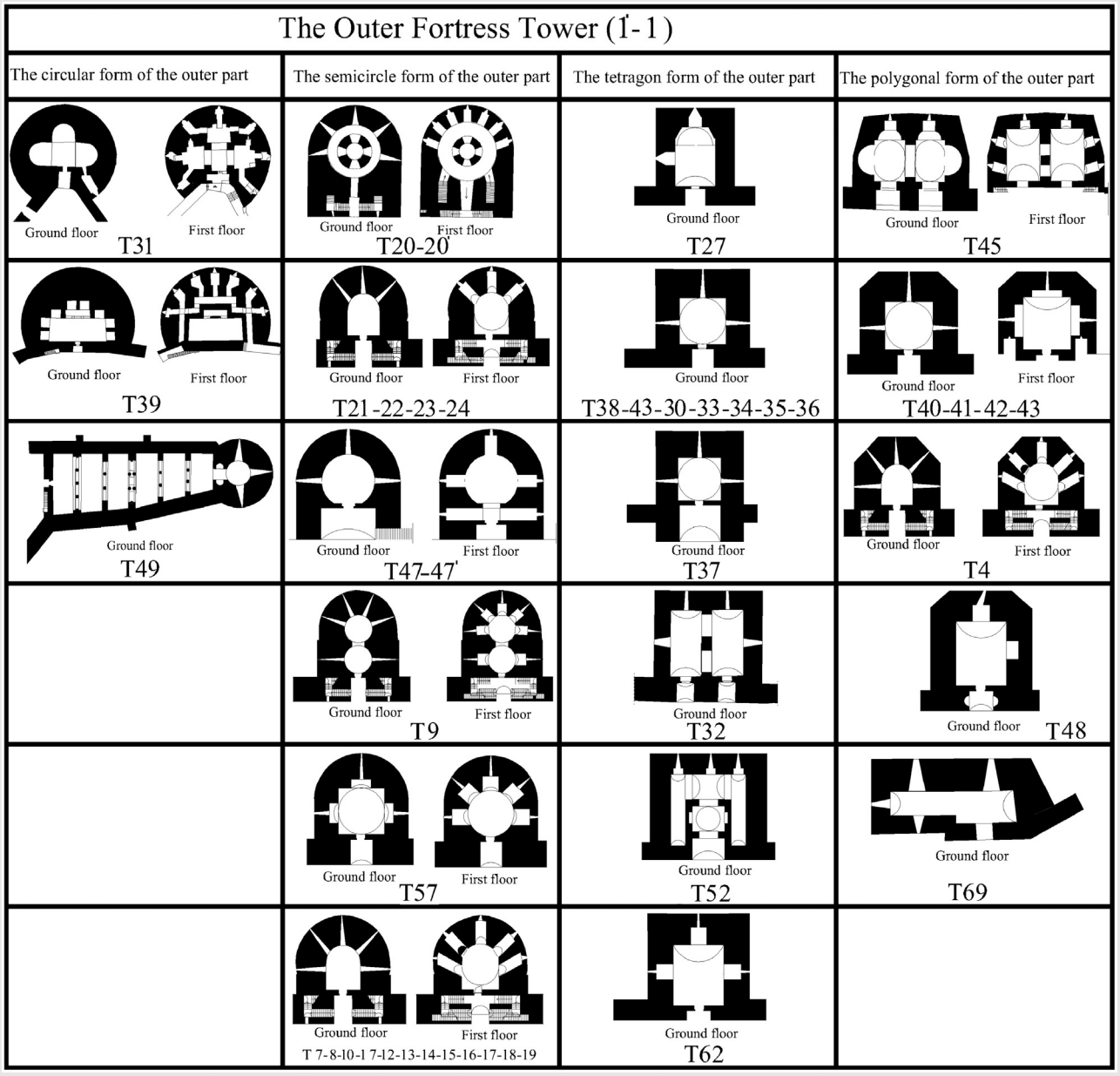
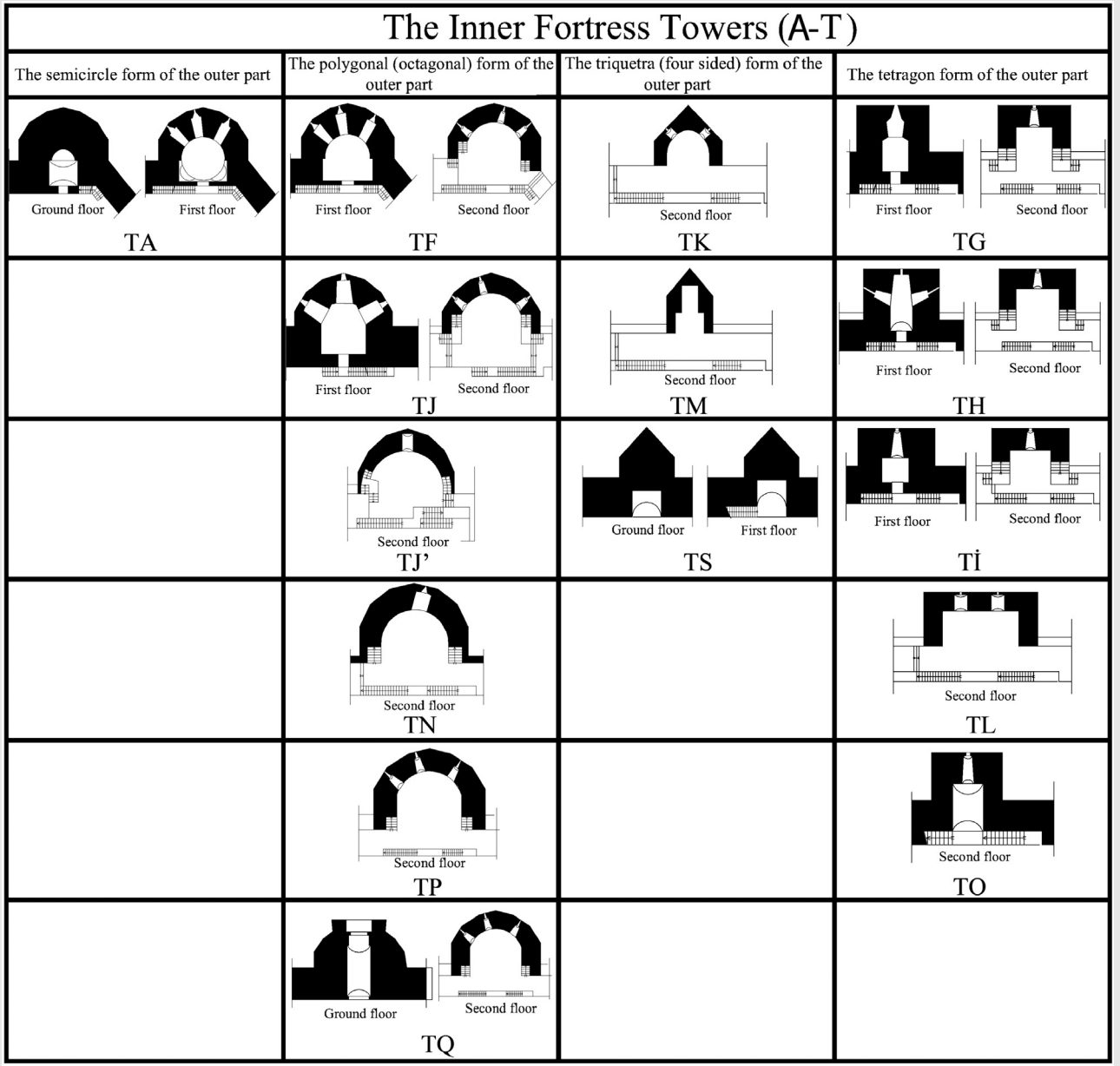


Table 2 Typology of inner fortress tower plans.



cially the towers that were so skilfully shaped from rough, time-resistant basalt, preserve traces of additions and restorations made during different historical periods.

It is expressed in the sources that fortifications of Diyarbakir are approximately 5 km long. However a solid measurement cannot be made. In this study solid measurements of the sections which are still standing and demolished sections (and also plan of all towers) are given. According to the measurements the outer walls which are still standing are 4.460 m long and inter walls are 598 m long. The demolished total dimension of the outer walls is 620 m long. Other than these measurements some results are obtained regarding the sequence and dimensions of the towers and the plan arrangements. Topographic structure, defence dominance and material in fortifications of Diyarbakir were the most important factor in determining the shape and size. In this respect, the city walls determining the eastern border of the city were built weaker due to steep topography. The towers of this section are also smaller in size and lesser in quantity. The dimensioning study made also confirmed this estimation. On the other hand the towers in north, west and south walls are more frequent, big and multilayered. However it is not clear that the building periods are effective in this determination.

After the plans of all towers are obtained classification was made according to shaping on exterior surfaces. Different plan arrangements were obtained in the same exterior shape. In this respect examination was made in all outer walls (65 towers) and inter walls towers (18 towers) and 6 figural shapes were determined (Fig. 22).

Towers like T31 were evaluated as “ones with circular shaped exterior, towers like T8 were evaluated as “ones with semi-circular shaped exterior", towers like T29 were evaluated as “ones with quadrilateral shaped exterior", towers like T4were evaluated as “ones with polygon shaped exterior", towers like TK were evaluated as “ones with triangular shaped exterior, towers like TV were evaluated as “ones with octagonal shaped exterior." Although the towers which were evaluated as semi-circular shaped exterior are like U letter and the towers which were evaluated as rectangular exterior have 4 sides, shaping was made according to most outer surfaces in these types. T49 (Keci Tower) was evaluated as ones with circular shaped exterior as the most outer end shows circular property.

The fortifications of Diyarbakir which were shaped using traditional construction techniques and materials local to the region, reflect the rich construction style of the periods in which they were built. Hopefully, the Diyarbakir city walls, for which protection efforts have increased since the end of the 20th century, will soon be included on the *UNESCO World Heritage List*.

Acknowledgement

The English in this document has been checked by at least two professional editors, both native speakers of English. For a certificate, please see: http://www.textcheck.com/certificate/pqzgCh.

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