14
AN AYYUBID SQUARE-PLANNED TOWER AT THE CITADEL OF DAMASCUS: TOWER 8[1]

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THIS PAPER WILL DISCUSS the results of a study carried out at the citadel of Damascus in the year 2008 in the framework of a project aimed at the consolidation and rehabilitation of the citadel itself, and promoted jointly by the Directorate General of the Antiquities and Museums of Syria (DGAM) and the Cooperazione Italiana allo Sviluppo (Italian Development Cooperation).[2] A team led by the University of Parma took part in the main project with a specific programme of analysis and diagnosis of three structures of the citadel (Towers 8 and 12 and the so-called Ayyubid Hall), while developing a scheme for consolidation. A preliminary stratigraphic analysis of these structures was carried out; the results of the analysis presented and discussed here[3] are confined to those concerning the north-eastern tower of the citadel, the so-called Tower 8.

THE CITADEL OF DAMASCUS AND TOWER 8

The citadel of Damascus is a well-known and exceptionally well-preserved example of Muslim military architecture, inscribed in the UNESCO World Heritage List since 1987. It was first founded by the Saljuks in the second half of the eleventh century. However, its present configuration owes itself mainly to the Ayyubid rebuilding of the early thirteenth century (1203–17), commissioned by al-ʿĀdil (brother of Saladin and sultan of the Ayyubid territories in the period 1200–18). It continued to play a highly significant military and political role in

the following centuries, as shown by major phases of building and restoration carried out by the Mamluk and Ottoman dynasties. In the late Ottoman period it was transformed into a prison, and maintained this function until 1986, when it passed under the control of the DGAM. Archaeological and architectural studies were conducted in the following decades,[4] and more recently projects aimed at conservation and rehabilitation were developed and carried out in order to open the citadel to the public. These various seasons of investigations have contributed significantly to our knowledge of the citadel, but the study of such a complex monument cannot be considered complete without further research. The interpretation and dating of a number of important components are still under discussion, including those of Tower 8.

Earlier studies took into consideration Tower 8's square plan, which differs from the predominantly L-shaped towers of the reconstruction attributed to al-ʿĀdil. This observation suggested that it may have functioned as the *donjon* of the Ayyubid citadel.[5] However, closer study of the inscription located on the eastern façade has led to a different hypothesis. Taking into consideration the fact that the inscription is not set in the centre of the eastern façade, therefore breaking the well-balanced organisation of its various features, and on the basis of an analysis of the text, which he interprets as incomplete, Chevedden suggested that the inscription had been removed from another tower (Tower 10) and repositioned here on the occasion of a major rebuilding phase that followed the Mongol siege in the year 658/1260.[6] Tower 8 was therefore ascribed to the Mamluk period, and this later date would also explain its different plan as compared to the oblong towers of the period of al-ʿĀdil (1203–16). A more recent, very detailed analysis conducted by Hanisch has demonstrated that it would have been technically impossible to place such an inscription in a pre-existing structure, that its asymmetrical position in the façade was determined by its size in relation to the distribution of the arrow-loops, and that the text is compatible with this very tower.[7] In spite of this work, the issue of the dating of the tower and of a possible re-location of the inscription is still regarded as an open question by several scholars; indeed, one of the requirements of the 2008 project's promoters was that of addressing this question afresh.

THE STRATIGRAPHIC ANALYSIS

Within the framework of this programme of analysis and diagnosis, the author had the opportunity to carry out a preliminary stratigraphic analysis of Tower 8.[8] It was felt that the employment of a fresh methodological approach might

provide different information from that already presented in earlier studies. Moreover, the readability of the medieval tower has changed considerably since earlier surveys because of the clearance operations carried out by DGAM in the last two decades. The specific aim of this analysis was to establish the sequence of major building operations using the method of the 'Archaeology of Architecture', a well-known branch of contemporary archaeological research.[9] This analysis was directed at the correct planning of consolidation work and the identification of parts that should be carefully preserved for future investigations. To accomplish this task the author was able to count on a complete digitised series of plans, sections and photogrammetric elevations produced in the previous months by the team of the University of Parma.[10]

Tower 8 shows a roughly square plan and is on four different levels, the fourth of which consists of an open platform.[11] According to the analysis carried out in 2008, Tower 8 in its present condition is the result of five major building periods, a summary description of which is provided in the following paragraphs; minor modifications are not dealt with in this presentation. As stated above, only a preliminary analysis was conducted in the context of this project, and the author is aware that sufficient evidence to characterise and evaluate all the building activities that occurred at the tower must await the eventual completion of the work. However, given that Syria's tragic situation at present will not allow the continuation of the study in the near future, it was felt more important at this stage to share the data collected so far with the scientific community. The following presentation and discussion will focus especially on matters of stratigraphy, concentrating on the medieval phases (Periods I and II).

Period I

Dating evidence:

Architectural and technical features: Ayyubid, al-ʿĀdil programme (1203–17). Inscription dated 606/1209–10 *in situ*?

The stratigraphic analysis showed that the tower of Period I had the same plan and four levels as the tower that we see today; modifications have occurred at all levels over time, and the best-preserved portions of the original building can be seen in the southern (Figure 14.2) and south-eastern parts of the tower. Only part of Level 1 preserves the original four boundary walls. In the upper levels major reconstructions can be seen both in the interior and in the exterior; the north-eastern corner of the tower, including the adjacent arrow loops, was rebuilt in Period II and again in Period III (Figures 14.1 and 14.9), whereas the

north-western quarter of the tower was rebuilt in Period IV (Figures 14.2 and 14.9).[12]

For the building of the tower of Period I rusticated stone was used for the external fronts (Figures 14.2, 14.3 and 14.9), while ashlar blocks with flattened surfaces, dressed with a pointed tool and with no margins, were used for the interior (Figure 14.4); more rarely, rusticated blocks also appear in the interior, especially under the level of the floors, where they could not be seen. The original treatment of the joints survives occasionally in the internal masonry. These are of the so-called *rubané* type (Figure 14.5: the mortar shaped to form a kind

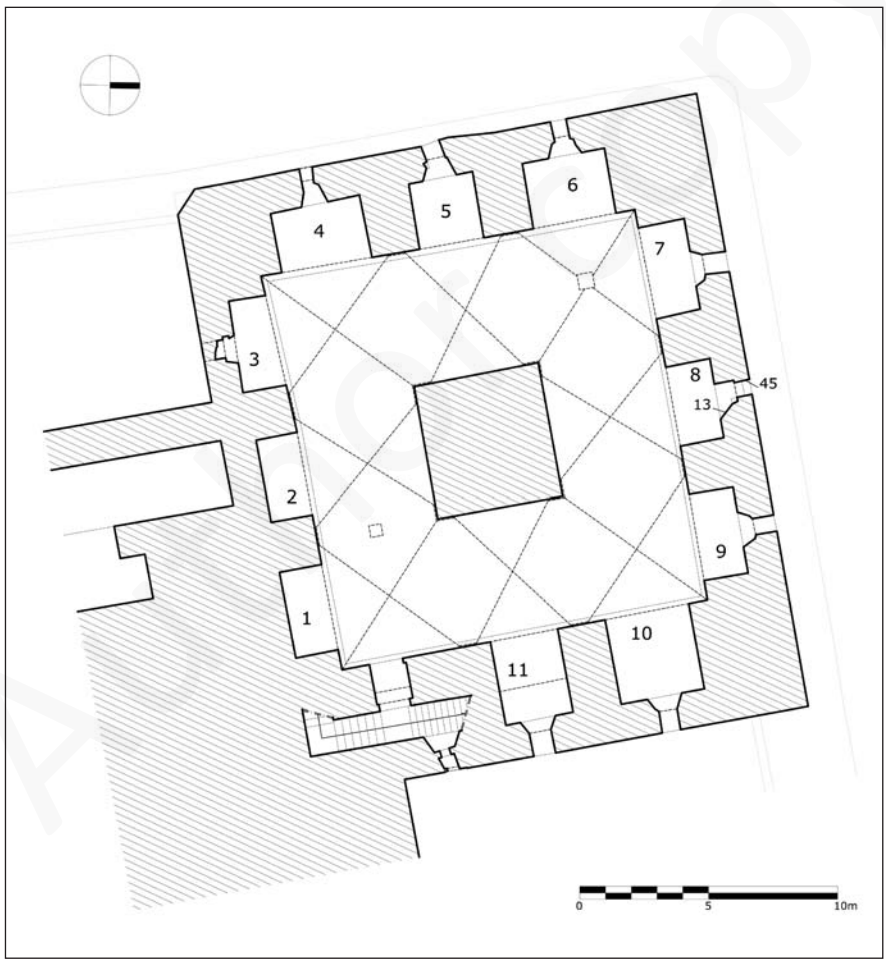

Figure 14.1 *Plan of Level 2 (survey by P. Giandebiaggi, A. Zerbi, R. Roncella, University of Parma)*

Figure 14.2 *Upper part of tower 8, from the south-west; on the west façade the part on the left corresponds to the reconstruction of Period IV (photograph by C. Tonghini)*

of projecting band) that appears in other parts of the Ayyubid citadel, such as the so-called Ayyubid Hall, but they may still have been in use in the Mamluk period. Traces of a similar finish were also noted on the external fronts (Period I, southern front: Figure 14.3), but the absence of scaffolding made it impossible to ascertain if these were related to the original bonding or if they belonged to a restoration phase. A partial collapse of an internal wall at Level 2, in niche 11 (Figure 14.1), enabled the masonry to be examined in section: blocks of different depths alternate in order to ensure better bonding to the core; only the sixth face of the ashlars is not worked (quarry faced).

The tower was constructed on a massive platform made of unhewn blocks of stone, partly exposed by a test trench excavated by the DGAM inside the tower, opposite the western niche of the southern front.[13]

The interior space is organised around a massive pillar, located in the centre of the tower, and visible in the first three levels (Figure 14.1). A series of niches are set into the perimeter walls, some of which are blind while the majority accommodate the arrow-loops. These open in the southern, eastern and northern walls; the openings that we see today in the western front and in

Figure 14.3 *(above) Southern external wall, detail; from the south (photograph by C. Tonghini)*

Figure 14.4 *(left) Level 2, niche 8, from the west (photograph by C. Tonghini)*

Figure 14.5 *Level 2, niche 8: the* rubané *joints (photograph by C. Tonghini)*

the north-eastern corner belong to the reconstruction of Period IV, which has cancelled the original arrangement.

All the Period I arrow-loops feature a flat base. The pointed barrel vaults over the niches in the boundary walls are built with ashlars in Period I only (Figure 14.4); most have a keystone, with some exceptions that are difficult to explain at this stage of the research. A system of groin vaults covers the rest of the internal space, resting on brackets that spring from the central pillar and from the pilasters that define the various niches (Figure 14.1). The groin vaults are built with roughly hewn stones of medium size and abundant mortar, with squared stones set in the centre to underline the spine of the cross. Doors that lead to the staircase or to other spaces, such as latrines, pierce the southern and western walls.

The internal layout of the various levels is fairly similar, although some differences can be noted, such as the height of the ceiling and that of the arrow-loops and the distribution of the internal niches and openings. Latrines were identified at Levels 1 and 3, but not at Level 2 (Figure 14.1). The original paving of all levels has now disappeared (Figures 14.4 and 14.8), but the height of the original floors can be estimated on the basis of various traces still preserved in the masonry. The staircase that serves all floors is accommodated in the thickness of the southern and south-western walls. The vault above the staircase is all built in ashlars, with keystones (Figure 14.6). Only the first flight, along the western wall, presents some irregularities in the bonding of the stones, especially in the vault.

Level 1 may have preserved the layout of Period I more than the other levels, but it was perhaps more severely affected than the others by the

transformations that took place in the most recent Period V, especially as regards the openings.[14] On the basis of the preliminary analysis conducted in 2008 it seems that the original north-eastern corner is still preserved at this level, at least in the lower courses, and that the rebuilding of Period II started approximately above the level of the vaulting (Figure 14. 9, US 40). The original north-western quarter of the tower, which collapsed completely later on (rebuilt in Period IV), can also be seen at this level, albeit modified; the two niches in the western side, and the one niche of the northern front close to the other two were blocked with large ashlars at some stage, but it has not been possible to attribute this operation to a specific building phase.[15] The pilasters between the various niches are provided with a respond, which supports the bracket of the vaults and a further arch that frames the various niches; this feature does not appear in the upper levels.[16]

At Level 2 the entire north-western quarter of the tower is the result of the rebuilding that took place in Period IV (Figure 14.1, niches 2–5), while the north-eastern corner (Figure 14.1, niches 6–7) was reconstructed in Period II. Therefore, only niches 1, 8–11 (Figure 14.1) belong to Period I. The vault of the niches of Period I is built in ashlar (Figure 14.4), while all the others are built with rubble and mortar (Figure 14.8).

Niche 8 (Figures 14.1 and 14.4) was analysed in detail in consideration of its relationship with the large dated inscription located on the eastern façade. The evidence is in places still covered with the cement of Period V, but enough of it is exposed to ensure an in-depth examination. On the basis of the analysis of the mortar, the dressing and size of the stones and the way they are laid, this work clearly belongs to the building phase of Period I. Although conducted from a distance, observation of the external portion leads to the same conclusion: the complex stereotomy of the frame (Figure 14.9, US 46) of the inscription makes a perfect match with the abutment wall south of it and the jamb of the arrow-loop of niche 8 (Figures 14.1, 14.7 and 14.9, US 45). In other words, the perfect bonding and fitting of all the various parts clearly indicate that the building of niche 8 and its arrow-slit (US 45, Figure 14.7) is contemporary with the installation of the frame (US 46) of the inscription. The rebuilding that occurred in Period II abuts the northern edge of the frame of the inscription (Figure 14.9, US 39, 40).

However, it should be noted that this analysis can firmly establish only that the frame (US 46) is contemporary with the building of the tower, not the inscription (US 47, Figure 14.9); this could have been replaced without upsetting the stereotomy of the frame and of the surrounding elements or the statics

Figure 14.6 *The vaulting of the staircase (photograph by C. Tonghini)*

Figure 14.7 *Eastern external wall; detail of the jamb of niche 8, US 45; see Figure 14.9 (photograph by C. Tonghini)*

Figure 14.8 *Level 2, niche 7, from the south west (photograph by C. Tonghini)*

of the tower. If it is true that the inscription fits the frame perfectly and that the missing text indicated by Chevedden[17] could originally have been placed in the upper part, where a blank stone now sits, the possibility of a replacement cannot be disregarded *a priori.* Only a micro-stratigraphic analysis of the inscription, conducted from scaffolding, can provide conclusive evidence in this respect.

The architectural and technical characteristics of the tower constitute the strongest dating evidence for its attribution to the period of al-ʿĀdil, and

support the hypothesis that the inscription was originally meant for this building and designed for this frame. The apparent asymmetry of the façade that results from the location of the inscription's frame may be the result of the disappearance of some other defensive components, such as a curtain wall.[18] Another very important element in this respect should be taken into account: the orientation of the jambs of the arrow-slit in niche 8 does not follow an east–west axis, but bends towards north-east (Figures 14.1 and 14.4). This alignment may be a further indication of the presence of defensive elements external to the tower that have not survived and that would explain the location of the frame of the inscription in this position.

Level 3 has a much more residential character if compared to the other levels; the volume is higher, as is the opening of the arrow-loops (Figure 14. 9). A large window pierces the eastern wall (Figure 14.9, US 53), as occurs in other medieval towers; this window clearly pertains to the original layout, and it is not the result of later modifications, as suggested by some scholars. The central pillar is not built in solid masonry but a room is accommodated in the internal space, the original door of which is on the western side. All niches of Period I are provided with a keystone in Level 3. A door in the western corner of the southern wall leads via a vaulted passage to the curtain walls south of Tower 8.[19] The masonry of this passage has all the characteristics of the masonry of Period I, but some irregularities in its layout may deserve closer examination in the future.

Level 4 has been more severely affected by later modifications and collapse than the other levels. The evidence suggests that in Period I it was conceived as an open terrace organised at two superimposed levels, as occurs with other towers of the Ayyubid citadel (Figure 14.9). However, as noted in previous studies,[20] it does not seem that this tower had an opening towards the interior at this level, but that there was a double parapet around the whole perimeter from the time of Period I. The lower level of defence shows a vaulted corridor that serves both the arrow slits that pierce the wall and the machicolation boxes (Figure 14.9). Above this a line of battlements, with a number of arrow-loops, completes the defensive system of this open terrace, as occurs in the other towers of the citadel attributed to the building of al-ʿĀdil. The preliminary analysis of the interior and observations of the exterior from a distance indicate that the machicolation boxes are contemporary with the rest of the building of Period I;[21] the ashlars used for the exterior are more accurately dressed than the ashlars used for the rest of the wall, since the projecting rustication part is also carefully dressed (Figure 14.9).

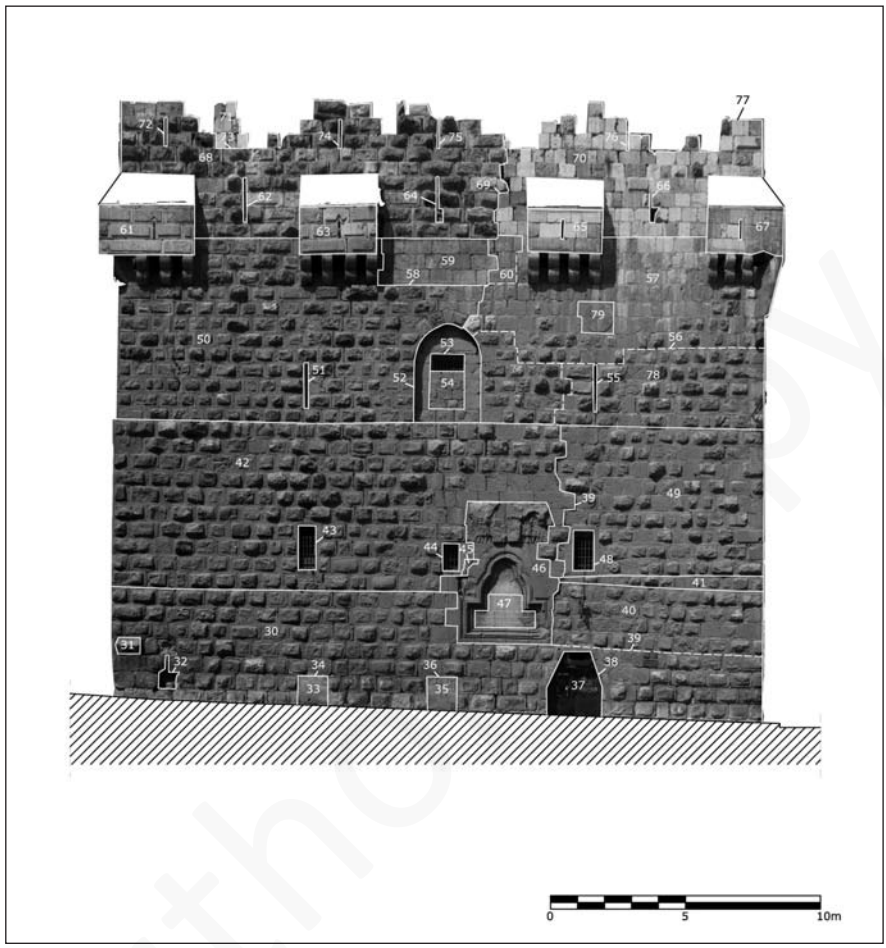

Figure 14.9 *Rectified photomosaic of Tower 8, eastern façade (survey by P. Giandebiaggi, A. Zerbi, R. Roncella, University of Parma; archaeological characterisation C. Tonghini)*

Period II

Dating evidence:

Stratigraphy: post-Period I (al-ʿĀdil, inscription dated 1209–10) and pre-Period III (al-Ghawrī – Mamluk sultan in the period 1501–16 – inscription dated 1509–10).

This period corresponds to a major phase of restoration that involved the reconstruction of the north-eastern corner of the tower. Its interface (US 39)

is clearly perceivable on the eastern façade, with an almost vertical line (Figure 14.9); the lower part of its interface cannot be positioned with the same accuracy because later restoration in Period V partly conceals the evidence; an examination of the interior at Level 1 suggests that this phase of restoration did not affect the original vaulting of Period I, and may therefore be located just above it. The restoration of Period II is clearly identifiable in the interior: at Level II, niches 6 and 7, and the eastern part of niche 5 were built in this period (Figure 14.1); at Level III only the lower portion[22] of the niches corresponding to those at Level 2 just mentioned can be ascribed to Period II (Figure 14.9, US 78), while the vaulting was built in Period III. The rebuilding of Period III makes it impossible to estimate how far this reconstruction extended above Level 3; similarly, the rebuilding of Period IV conceals the extension of this reconstruction on the northern front. More research is needed to establish the nature of the event that caused the collapse of this part of the tower; the vertical interface of destruction on the eastern façade is compatible with an earthquake, which was the cause of the destruction of the north-western quadrant of the tower (see below, Period IV).

The material used for this restoration does not differ significantly in terms of dressing and size from that used in the previous Period I; in fact, many of the ashlar blocks are clearly re-employed. In the external elevations, stones with a dressed face are used together with rusticated blocks (Figure 14.9: US 40, 41, 49, 78). Equally, stones with rustication, often re-cut, can be seen in the interior (Figure 14. 8). A remarkable feature of this phase is the finish of the joints in the external elevations, of the already mentioned *rubané* type; it was not possible to ascertain that these were not the result of a restoration, but it is striking that they only appear in such a good state of preservation in the part of the elevation that is attributed to Period II (Figure 14.9, US 40).

There is an important difference in construction technique in the niches of Level 2: the arch is in ashlar but for the vault rubble and mortar are used instead of the ashlar blocks that characterise the vaults of the Period I niches (Figure 14.8).

The rebuilding of the north-eastern corner also had to face a static problem: this portion seems to have sunk towards the north during the re-construction, and blocks of trapezoidal shape had to be employed to reconstitute the horizontality of the courses (Figure 14.9, US 41).

As for dating, the sequence established places this reconstruction between the period of al-ʿĀdil in Period I (around 1209–10) and that of al-Ghawrī in Period III (around 1509–10). The similarity of certain features with those of

Period I, such as the joints of the so-called *rubané* type, may suggest that this rebuilding be placed in the early Mamluk period; the use of re-employed material may be evidence of the need to rebuild urgently. If the rebuilding took place in the aftermath of an earthquake, we know that two major ones occurred in the period considered: specifically in 1303 and 1322.[23]

Period III
Dating evidence:
Dated inscriptions *in situ* (al-Ghawrī – Mamluk sultan in the period 1501–16 – 915/1509–10).

This phase of rebuilding has already been identified and discussed in all the earlier studies. It consists of a reconstruction of the north-eastern corner of the tower from the impost of the vaults of Level 3 (Figure 14.9, US 57, 70); some repairing can also be identified in the northern part of the central window, with the replacement of some stones of the arch (Figure 14.9); part of Level 4 was also rebuilt, following the same arrangement of Period I, with a double level of defence. This rebuilding phase differs considerably from earlier phases because of the building material: various kinds of limestone are used; the dimensions of the ashlars vary – the height is the same but they are not as long as those employed in the previous periods – and the external face of the new blocks has no rustication; a large number of ashlars are re-employed and often re-cut; in several cases the rustication face is kept. No specific finish for the joints was identified.

The machicolation boxes are similar in shape to those of Period I, but here too only ashlars with a flat face are used; a carved decoration outlines the façade of the machicolation boxes (Figure 14.9). In the interior this phase of reconstruction is clearly visible in the vaulting of the north-eastern corner and the related niches. The vaulting system of Level 3 is built of rubble and mortar, and only small ashlars are used for the arches of the niches.

The main inscription (Figure 14.9, US 59–60) is directly carved on the external face of the wall, extending over part of the original wall of Period I; here the original rustication is flattened to allow the execution of the inscription (US 58). The inscription clearly refers to the collapse of the tower and its rebuilding; the collapse may have been a consequence of a structural problem, since the written sources mention experts discussing the worrying conditions of the tower in the year 913–14/1507.[24]

Period IV
Dating evidence:
Stratigraphy: post-al-Ghawrī (period III, around 1509–10). Sources report major earthquakes in the years 1705 and 1759.[25]

Tower 8 was partly destroyed by a very strong earthquake that caused the collapse of the north-west quadrant of the tower, down to Level 1 (Figure 14.1, niches 2–5).[26] Level 1 may have been partly untouched by this event, but the blocking of the north-western niches may have occurred at this stage in relation to the reconstruction of the levels above. The material used for this reconstruction is not very homogeneous, but basically it consists of blocks smaller than those used in the previous phases; a significant volume of re-employed and re-cut material has been noted.

Period V
Dating evidence:
Stratigraphy: various phases of modification that took place after the reconstruction of Period IV.

This period includes all the activities that modified, partially rebuilt and transformed this tower in more recent times, especially in relation to the establishment of a prison. They may be related to a large span of time, the end of which is connected with the use of cement.

NOTES

1 The author wishes to thank Professor Carlo Blasi for allowing the publication of this study; Professor John Millerchip for editing the English text; and Arch. Dr Enrico Reali for preparing the printing of Figures 14.1 and 14.9.

2 This project for the *Rehabilitation of the Citadel of Damascus* constituted part of an agreement between Syria and Italy; launched in 2004, field-activities started in 2007 but came to a stop after 2012 as a consequence of political instability in the region.

3 This paper summarises the report by the present writer that was included in the general report mentioned above, submitted to the DGAM by the University of Parma in June 2008.

4 For a summary of previous studies see H. Hanish, 'Der Nordostabschnitt der Zitadelle von Damaskus', *Damaszener Mitteilungen*, 7 (1993), pp. 233–4; Berthier in S. Berthier and El-Ajji, E., *Cittadelle de Damas*, Supplement of the *Bulletin d'Etudes Orientales*, LIII–LIV, 2002, pp. 29–30. Between 1999 and 2006 a major Syro-French research project was carried out, focusing on specific areas of the citadel; the final publication of the results is still in progress, see Berthier and El-Ajji, *Cittadelle*.

5 K. Wulzinger and C. Watzinger, *Damaskus: Die Islamische Stadt* (Berlin and Leipzig: De Gruyter, 1924), pp. 166–72; J. Sauvaget, 'La citadelle de Damas', *Syria*, II (1930), pp. 73–4.
6 P. Chevedden, 'The Citadel of Damascus', PhD thesis, University of California, Los Angeles, 1986, inscription n. 7, pp. 22, 345–53.
7 Hanisch, 'Nordostabschnitt', pp. 259–61 in particular.
8 The external fronts could only be analysed from distance because of the absence of scaffolding at the time of the survey, and the study concentrated more specifically on the interior parts.
9 For an outline description of this method and a summary of its development see Montevecchi in C. Tonghini, *Shayzar I. The Fortification of the Citadel* (Leiden and Boston: Brill, 2012), pp. 94–103.
10 The survey was carried out under the supervision of Professor Arch. P. Giandebiaggi, Professor Arch. A. Zerbi, and Professor Eng. R. Roncella (University of Parma), within the project directed by Professor Arch. Carlo Blasi and Professor Eng. Eva Coisson. See unpublished *Final Report: Analysis and Diagnosis of Damaged Structures of Damascus Citadel (January 2008).*
11 The illustrations presented in this paper include the plan of Level 2 and a rectified photomosaic of the eastern façade are published here (Figures 14. 1 and 14. 9). For the complete set of drawings see the note above. For the most recently updated and published set of plans and sections see Hanisch, 'Nordostabschnitt'.
12 The major rebuilding of the north-western corner in Period IV is the most evident, and it is already reported in Wulzinger and Watzinger, *Damaskus*, p. 168 and fig. 53; however, the rebuilding they indicate in a similar position at the level of the basement is not correct, as already noted by King, D. J. Cathcart, 'The Defences of the Citadel of Damascus; A Great Mohammedan Fortress of the Time of the Crusades', *Archaeologia or Miscellaneous Tracts Relating to Antiquity*, XCIV (1951), p. 82, note 2. The rebuilding of the upper part of the north-eastern corner of the tower is already discussed by a number of authors (for example, Sauvaget, 'Citadelle'), but not that of Period II.
13 This test trench was opened in order to verify the possible presence of an earlier tower; the evidence clearly showed that the Period I tower is the earliest structure here. A test trench had also been excavated outside the tower, along the southern wall, but it had already been filled in by the time the present writer surveyed the building.
14 King, 'Defences', reports the function of the various spaces by the time of his survey; Level 1 was at that time used as a stable, as confirmed by a photo by Creswell: Creswell Archive, Oxford, EA.CA.942.
15 The hypothesis shown in the plans of King, 'Defences', fig. 3a, is not very accurate, since it suggests a complete rebuilding of this part, while only a blocking of the original niches seems to have occurred.
16 Compare the pilasters of Level 1 with those of the other levels in Hanisch 1993, figs 2, 5 and 6.
17 Chevedden, 'Citadel', inscription n. 7.
18 An arch springs from the eastern façade, close to the south-eastern corner, indicated by the letter Q in King, 'Defences', fig. 3a. It is not possible in the light of the present evidence to interpret this element, but it certainly deserves to be reconsidered.
19 Hanisch, 'Nordostabschnitt', fig. 6.
20 For example Sauvaget, 'Citadelle', p. 73.
21 I refer to the two machicolation boxes of the southern front, the double box that occupies the south-eastern angle, and the one next to it, located on the southern part of the eastern

façade (Figure 14. 9). For a specific discussion of this device see H. Hanish, 'Die Maschikulis der Zitadelle von Damaskus', *Damaszener Mitteilungen*, 9 (1996), 227–62.

22 The interface is not very regular in the interior; it can be identified at the level of the impost of the vaults along the eastern front but it is lower along the northern front.

23 M. R. Sbeinati, R. Darawcheh and M. Mouty, 'The Historical Earthquakes of Syria: An Analysis of Large and Moderate Earthquakes from 1365 B.C. to 1900 A.D.', *Annals of Geophysics* 48/3 (2005), 347–435.

24 Chevedden, 'Citadel', ns 46–7 (172–3, 181) and pp. 509–15.

25 Sbeinati *et al.*, 'Earthquakes'.

26 See Blasi, Ottoni, Carobbi, '6. Structural Analysis, Collapse Mechanisms and Reconstructions', in *Final Report: Analysis and Diagnosis of Damaged Structures of Damascus Citadel (January 2008)*.

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