

# THE CITADEL OF AMMAN

## THE CONSERVATION AND RESTORATION OF THE AYYUBID TOWER\*

by  
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### The Architecture of the Tower

The Tower formed part of the Ayyubid fortifications of the Citadel and was constructed in the late 12th to early 13th century AD. It was built against and over the remains of the temenos wall of the Great Temple, about 28 m south of the temple itself. The Tower was 9.3 m long, 7.6 m wide, and over 5/10 m high (north/south walls). It was a one-room and a one-storey structure (Figs.1-4). The room (4.8 m by 3.1 m) was entered through a doorway (1.1 m wide and 2 m high) placed in the north wall of the Tower. There was a recess (2 m wide and 1.2 m deep) in each of the three other walls. An arrow slit (0.85 m high, 0.16 m wide on the outside and 0.85 m on the inside) was set into each recess. A staircase (0.9 m wide) built within the north and east walls of the Tower led up to the top of it. There was a doorway giving access to the staircase from the inner part of the doorway leading to the room of the Tower. The walls were 2.2 m wide (Fig. 5).

The room was most probably covered with a barrel vault. The recesses must have been covered with arches and the slits with flat stone blocks. The outer part of the doorway leading into the room was covered with a lintel. There is no evidence for the kind of

covering of the inner part of this doorway or of the doorway leading to the staircase. There is equally no evidence for the staircase itself or for the flooring of the room.

The Tower was built mainly of stones from the nearby Roman temple. The building technique was simple. The outer and inner faces of the walls were built of dressed stone and the core of the walls, between the facing stones, was filled with rubble laid on hard mortar mixed with ash.

### The State of Preservation

At the time the restoration began, the structure was well preserved from the level of the foundation to the level of course 1. From course 1 upward, the state of preservation of the four walls of the monument varied considerably. This was true of both the outer and inner masonry of the building.

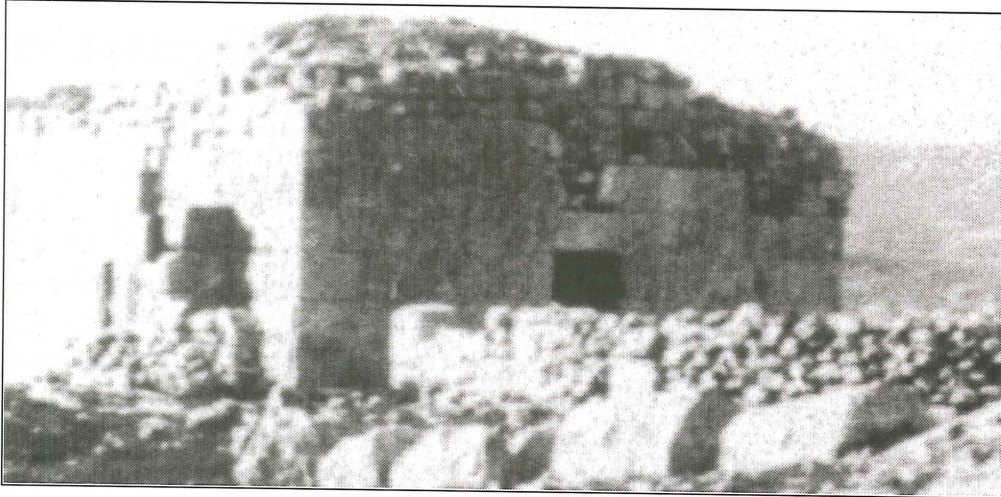
The earliest record of the Tower, a photograph taken by Bonfils in the 1870s (see Figs. 1-2), shows that since that time, the state of preservation of the monument worsened dramatically. The photograph features the east and north façades of the Tower. In the 1870s, the stonework of the east façade was preserved to the level of course 5. By 1996, all stones of the north section of this course were missing (see Figs. 2-3). The

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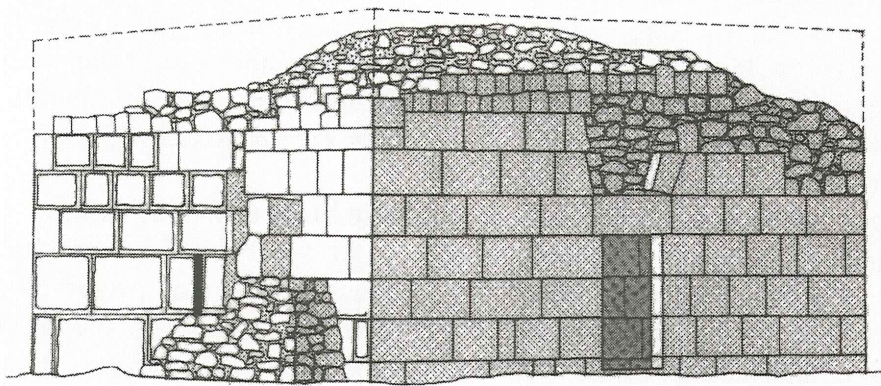
\* The Ayyubid Tower Restoration Project was sponsored by the American Center of Oriental Research (ACOR) and funded by the United States Agency for International Development (USAID). Antoni Ostrasz conducted a study of the Ayyubid Tower between Nov. 1995 and Feb. 1996. This article is based on the report he submitted to ACOR on February 18, 1996. Between May and Aug. 1996, he implemented the project exactly as outlined in his Option 2. Just before his untimely death, he began rewriting the original report for

publication. It is clear from the notes he made that he intended to include much more detail in the final report. There was to be a section on previous research on the monument as well as on techniques used in the original construction such as the naïve manner of bossing, the mortar, and the adaptive manner of fitting stones. The originals of the drawings are in color and are archived at ACOR. They have been electronically modified for presentation here [Patricia Bikai, ACOR].

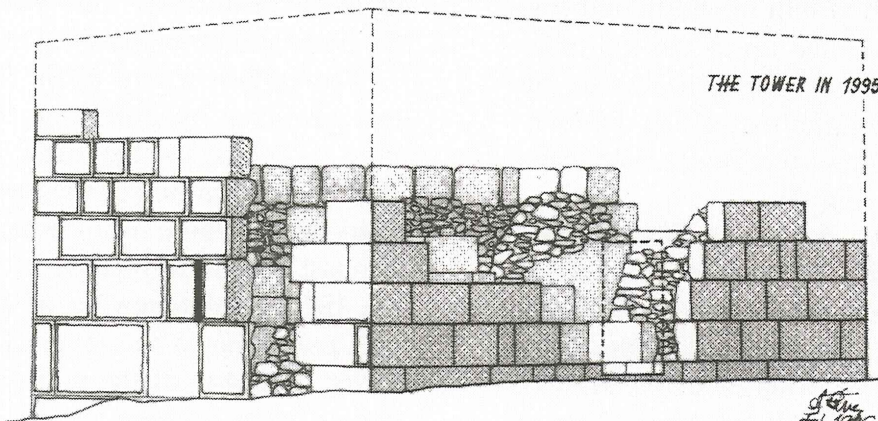




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THE TOWER IN THE 1870s  
INTERPRETATION OF BONFILS' PHOTOGRAPH



THE TOWER IN 1995

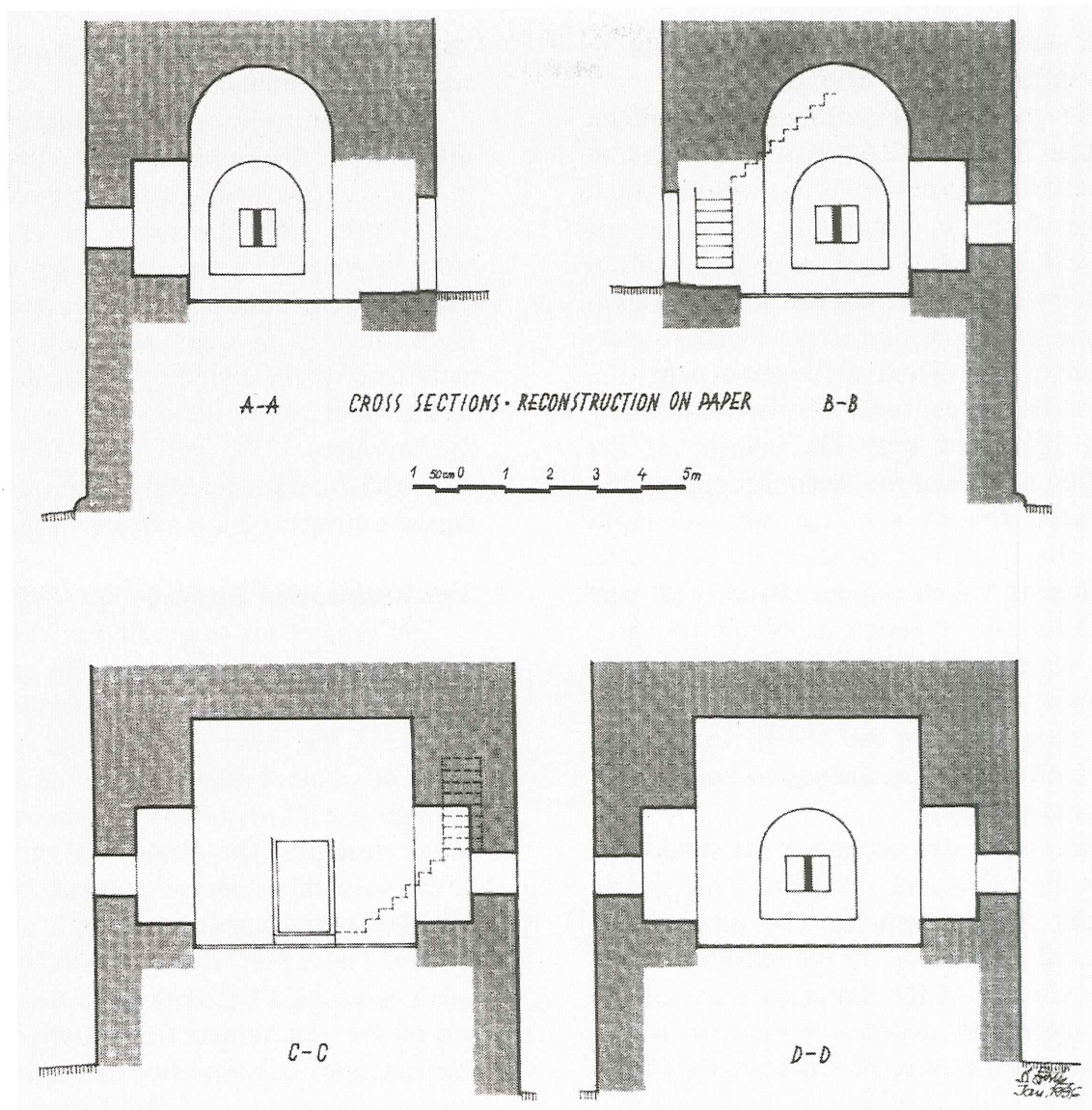
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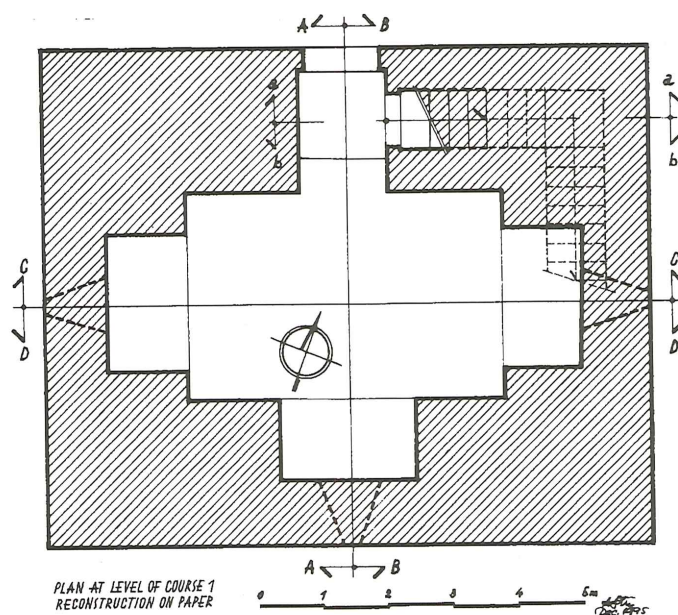


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north section of the west facade seems to have suffered similar damage.

The north facade suffered much greater damage. In the 1870s, it stood to the level of course 6 (the eastern section), with the lintel of the doorway (course 4), all stones of course 4, as well as many of course 5 still in place. By the 1990s, most stones of courses 4, 5 and 6 were gone and so were many stones of courses 2 and 3 and two stones of course 1.

Bonfils' photograph shows some masonry preserved over the interior of the building. A part of the masonry seems to be the inner stonework of the east and north walls (back side) of the room in the Tower. The feature which is seen beyond that part (southwest of it) seems to be the top of a vault which covered the room. This shows that most of the masonry of the room must have been intact in the 1870s. Only some stones of the lowest courses of masonry of the room survived.

The Tower was robbed of its stones between the 1870s and – it seems – the earlier decades of this century. The robbing endangered the stability of the masonry of the upper courses of the structure. Parts of the three uppermost courses of the east, south, and west walls were in a precarious condition. It was the condition of the Tower that prompted the American Center of Oriental Research (ACOR) to sponsor work on safeguarding the monument.

What remained of the original masonry of the Tower was in good condition in static terms up to the level of course 1, but parts of the stonework above this level were in danger. The stonework of the facade of the south wall, west of and above the slit, was in a precarious condition. There were two stones missing there (see below, Figs. 12; courses 2 and 3) – it is a mystery how this has happened – and, in consequence, several stones tilted from the horizontal (see below, Fig. 13). Due to the process of weathering of the tilted stones, that part of stonework was in danger of collapse; this could have

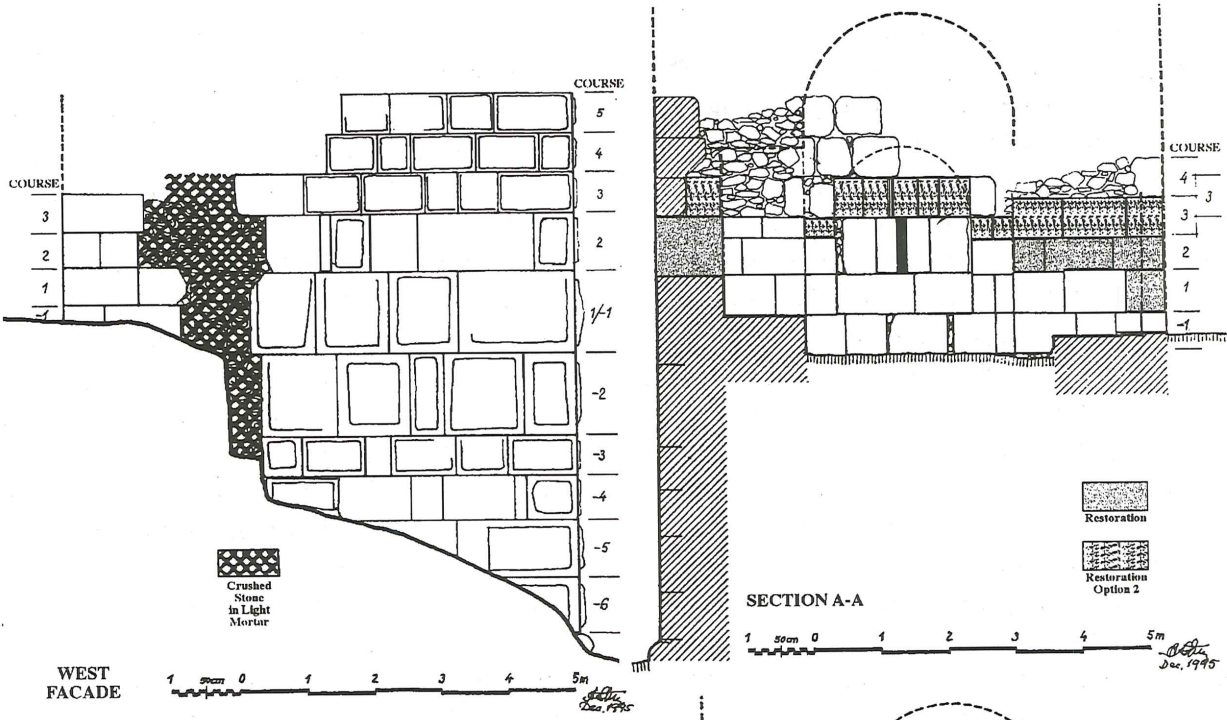
happened at any time if a strong earthquake occurred in Amman.

In less precarious, yet endangered, condition were the remains of the uppermost masonry of the median parts of the east and west walls. Only the stones of the facade were in place. The three surviving masonry courses were almost 2 m high, the stones were only 0.5 m wide, and they were not stabilized on the inside by the facing stones of the room nor by the mortar core between the two faces of the wall (Figs. 6-7; courses 3, 4, and 5). That masonry could have collapsed during even a moderate earthquake.

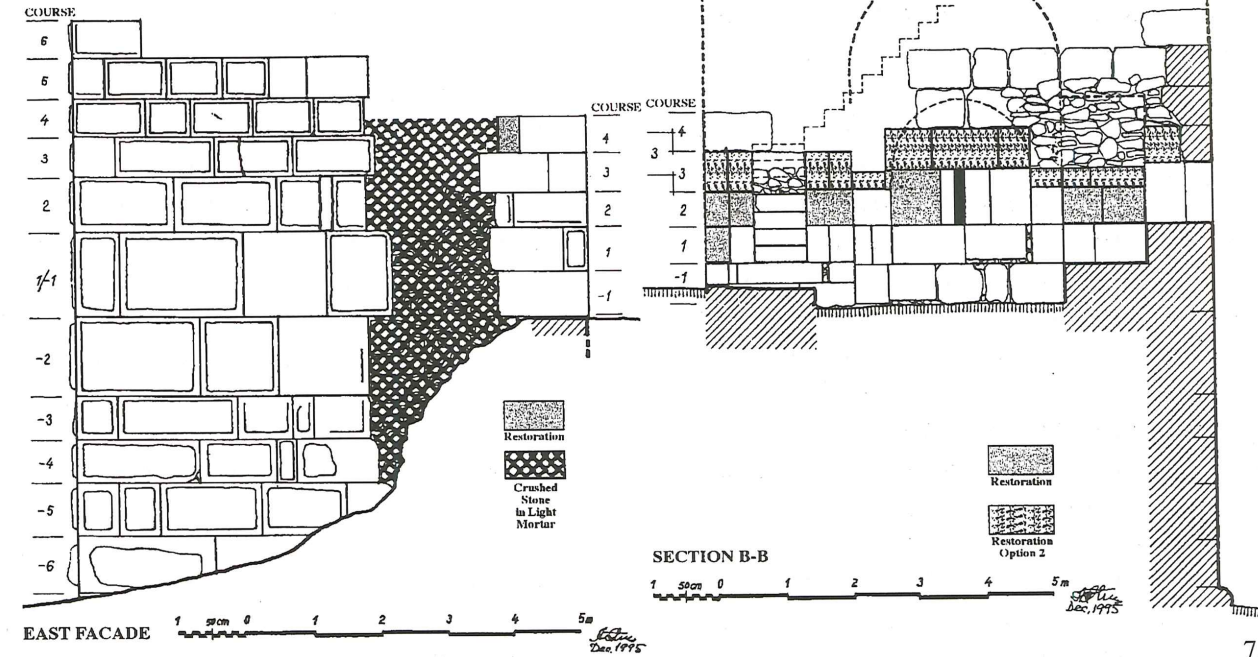
### The Restoration Project (Figs. 6-8)

The project for restoration of the Tower had two objectives. One was the conservation of the remaining masonry of the monument and the other one was the improvement of some features of its architecture through partial restoration of missing parts of the structure. The former was paramount to the survival of the monument; the latter aimed at a better understanding of its architecture. The achievement of both objectives was conditioned by technical consideration and by the requirement for compliance with the principles of restoration of ancient monuments. In the case of the Tower, a compromise had to be sought to achieve both objectives. The following illustrates the issues faced in this project:

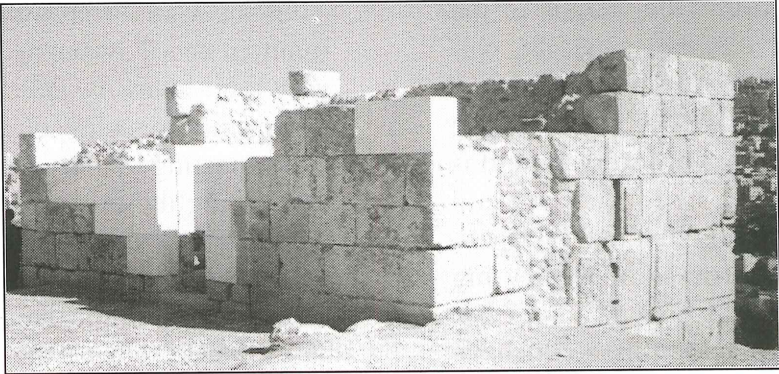
The conservation of the remaining stonework of courses 3, 4, and 5 of parts of the east, south, and west facades would require rebuilding the inner masonry of these courses of the walls (masonry of the face of the room in the Tower). However, there were very few stones *in situ* which attested to the size of the stones in course 3 and there were none attesting to the size for courses 4 and 5. Rebuilding these courses of masonry could be done only on the basis of the restorer's (arbitrary) decision concerning the size of new stones used for the rebuilding; this may be viewed as contrary to the stric-test prin-



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ciples of restoration. There was fairly good evidence for the size of stones which made up courses 1 and 2 of the stonework facing the inner and outer façades of the walls of the Tower. Rebuilding these faces would meet no objections of even the most orthodox restorer. This project therefore considered two options, one in which only the strictest interpretation of restoration would be followed. Under Option 1, a program of simply rebuilding the walls, the stability of the surviving masonry above course 2 of the east, south, and west façades would not be ensured. To improve the stability of that masonry, the missing parts of at least course 3 of the face of the room in the Tower would have been completed with new stones. This was the option implemented.

#### **“Option 2” and Evidence for Implementation (Figs. 9-14)**

The crucial problem of implementing “Option 2” was the rebuilding of course 3 of the masonry of the room in the Tower. The rebuilding had to be based not only on direct but also on indirect evidence. There was almost complete evidence for the size of missing stones in courses 1 and 2 but in the case of course 3 the situation was different. There is complete evidence for the height of the stones in course 3 of the façades but the length of the missing stones in this course was attested only in a few instances.

Evidence for the size of missing stones in course 3 of the masonry of the room was even poorer. Three sections of this course were still in place and the height of the stones in the parts missing could be confidently reconstructed on direct evidence of the parts in place. However, there was no direct evidence whatsoever for the length of stones in course 3.

That lack of evidence had a bearing on the rebuilding of the masonry over the three arrow slits. The slits are built in a wall 1 m thick. The external half (0.5 m) of each slit

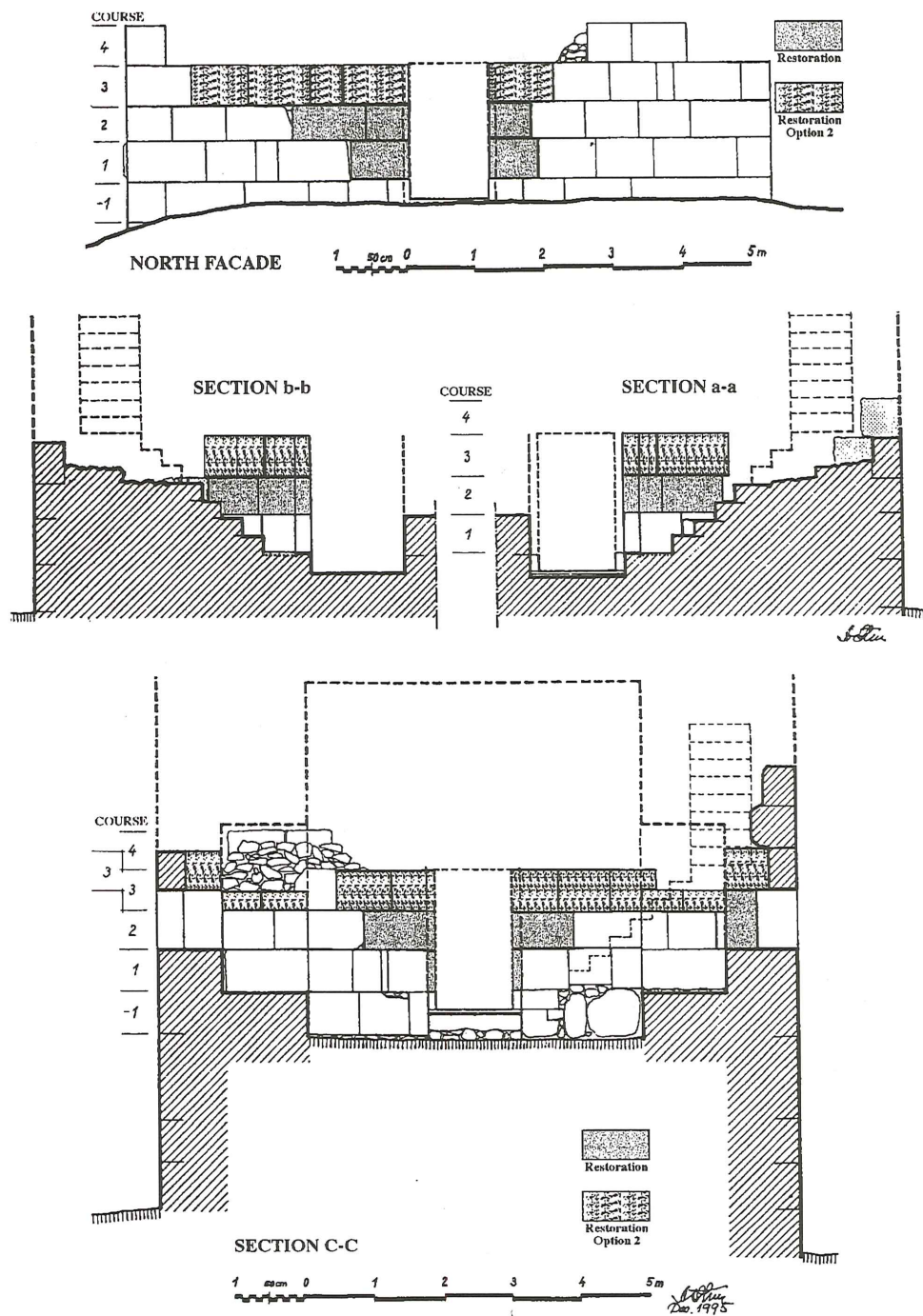
is covered with a flat stone (see below, Figs. 12 and 14). The stones over the other (interior) half of the slits are missing. The interior aperture of the slits is 0.85 m wide. This span could be easily (and must have been) covered also with a flat stone but the length of the stone was but a matter of conjecture.

The lack of evidence for the length of the stones over the slits did not significantly impede the rebuilding of course 3. The builders of the Towers were haphazard in their choice of lengths of the stones for the courses. The restorer could simply follow their example of there being no principle in this respect.

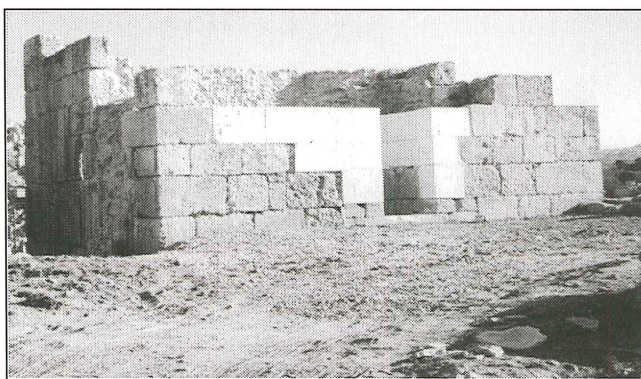
It would have been expedient for the stability of the uppermost surviving parts of the east, south, and west façades to complete the missing stones of courses 4 and 5 of the face of the room but that was not done for several reasons. First, there was no evidence for the size of the missing stones in those courses. Second, there may have been a relieving flattened arch (course 4) over the stone covering the inner part of each slit, for which, however, no evidence exists. Third, there were no remains of the arches over the recesses which contained the slits. Finally, there was no material evidence for the level of springers of the vault covering the room. In this situation, the stability of the stones *in situ* in courses 4 and 5 of the façades could be improved instead by a core-like structure of crushed stone laid on light mortar, built at the back of the stones.

#### **Conclusion**

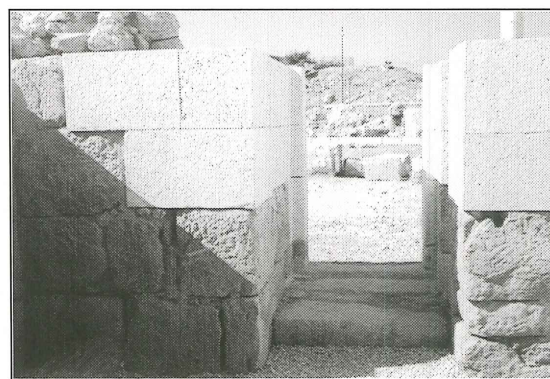
The program of partial rebuilding of the Tower was a compromise between the requirements of ensuring the stability of its surviving masonry and the theoretical principles of restoration of ancient monuments. It was conceived on the assumption that the priority of the project was to ensure the survival of the remains of the monument without, however, encroaching upon the basic principles of restoration. This is the reason for choosing “Option 2” for the imple-



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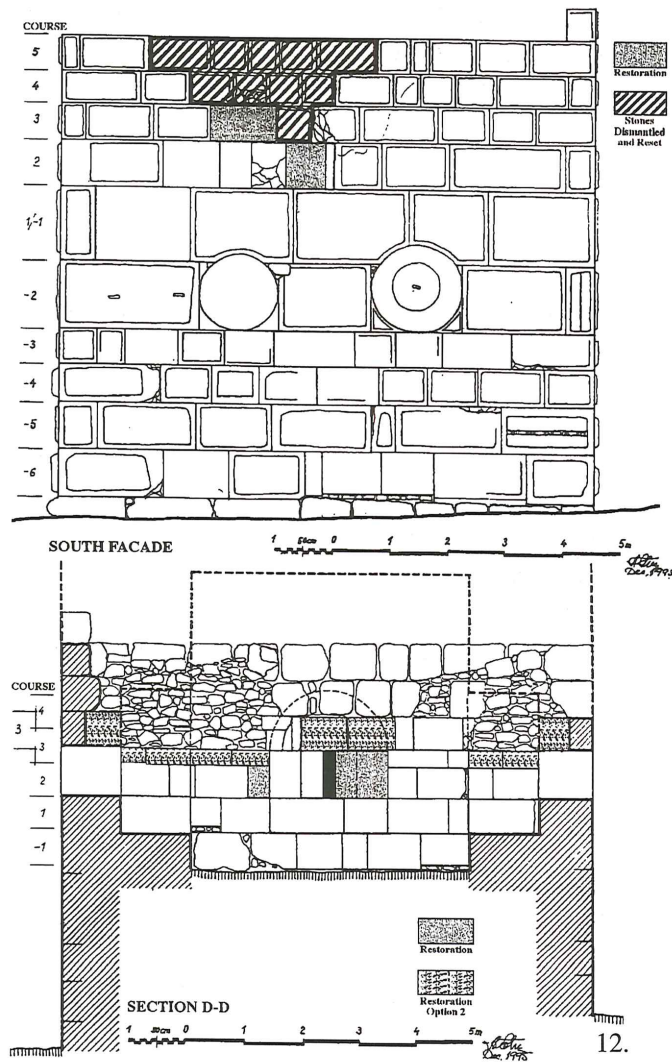


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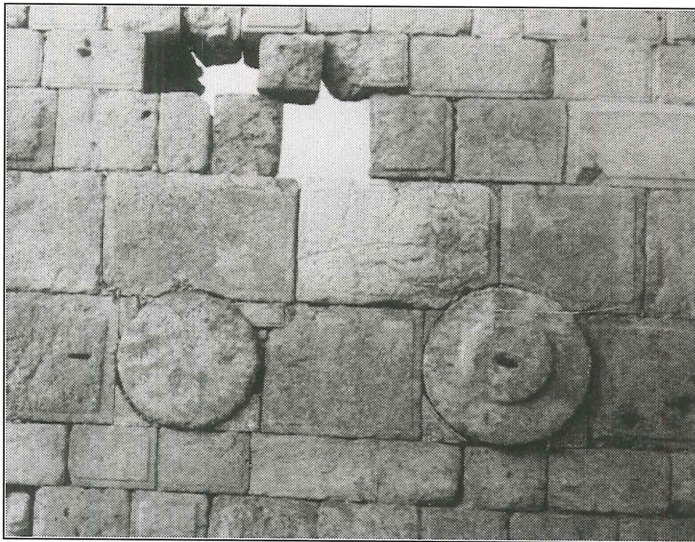


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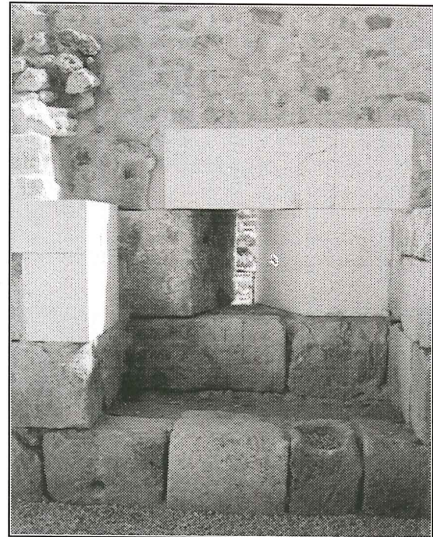




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mentation instead of "Option1" which would not have improved the stability of the uppermost stonework of the Tower.

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