JSBS Journal of Sistan and Baluchistan Studies
Volume 1, Issue 1 (2021) 31-48
Doi: 10.22034/JSBS.2021.146228

THE PRELIMINARY RESULTS OF THE ARCHAEOLOGICAL MISSIONS OF THE ITALIAN POST-EARTHQUAKE COOPERATION PROJECT AT ARG-E BAM, UNESCO WORLD HERITAGE SITE, IN COLLABORATION WITH ICHTO SINCE 2004

Michael JUNG[1] ✉ and Vincenzo TORRIERI[2]

[1] Museo d'Arte Orientale 'Giuseppe Tucci', Museo delle Civiltà, Roma, Italy, (Corresponding author: michael.jung@beniculturali.it).
[2] Soprintendenza Archeologia, Belli Arti e Paesaggio dell'Abruzzo, sede di Teramo, Italy.

Received: 22 October 2021 Accepted: 03 December 2021 Available online: 20 December 2021

Abstract: Immediately after the disastrous earthquake in 2003, ICHTO, together with UNESCO, ICOMOS, and ICCROM, set about planning for the recovery of Bam's cultural heritage. Italy was involved in the project from the very outset. The Italian Ministry of Cultural Heritage selected as project seismic improvement measures and restoration of the imposing tower n. 1 of its city walls. The assistance of archeologists during the work was of paramount importance to ascertain the very nature of the tower, in order to contribute to a correct methodology for consolidation and restoration. The sondage revealed a complex stratification of the monument, with at least five major building phases and numerous secondary phases due to secondary restoration and routine maintenance works consequent upon earthquakes and wars. Once the restoration was concluded, a new project was inaugurated in 2017, involving the excavation of Shator Galu/ or Tower n° 46. We supposed that the ruins of one ancient city gate were to be found beneath the debris of the fortifications that had collapsed during the earthquake. The preliminary findings of the new excavation and the stratigraphic analysis undertaken in collaboration with the Iranian team under the direction of Joodaki Azizi and Leila Fazel identified some important architectural elements of the ancient settlement. Starting from our supposition, the discovery of the northern and southern wing of the city gate in its last phase constitutes definitive proof of its existence. Other important discoveries include the partial excavation of a conduit, possibly part of the Shotor Galu mentioned in written sources. The resumption of the interrupted excavation, much to be desired, could shed new light on the ancient history of Arg-e Bam.
Keywords: Bam Post-Earthquake restoration, Italian-Iranian mission, excavation, tower n° 1, western bastion, city gate.

چکیده: بلافاصله پس از زلزلهٔ فاجعه‌بار سال ۱۳۸۲، سازمان میراث فرهنگی، صنایع دستی و گردشگری به همراه یونسکو، ایکوموس و ایکروم جهت مرمت میراث فرهنگی بم برنامه‌ریزی کرد. کشور ایتالیا از همان ابتدا با این پروژه همکاری داشت. وزارت میراث فرهنگی ایتالیا پروژهٔ اقدامات بهسازی لرزه‌ای و مرمت برج شمارهٔ ۱ حصار شهر را انتخاب کرد. کمک باستان‌شناسان در طول پروژه برای تعیین ماهیت برج بسیار مهم بود، تا با روش‌شناسی صحیح به تحکیم و مرمت بنا کمک کند. گمانه‌ها، لایه‌نگاری پیچیدهٔ بنا را آشکار کردند. در طول این پروژه حداقل پنج فاز ساختمانی اصلی و تعداد فراوانی فاز ثانویه شناسایی شد که این بازسازی‌های ثانویه و کارهای معمول مربوط به نگهداری بنا به خاطر زلزله‌ها و جنگ‌ها بوده است. پس از اتمام مرمت، پروژهٔ جدیدی در سال ۱۳۹۶ آغاز شد که شامل کاوش شتر گلو یا برج شمارهٔ ۴۶ بود. گمان ما بر این بود که خرابه‌های یک دروازه شهر باستانی در زیر آوار استحکاماتی که در اثر زلزله فرو ریخته بود، پیدا شود. نتایج اولیه کاوش جدید و تحلیل لایه‌نگاری با همکاری گروه ایرانی و به سرپرستی جودکی عزیزی و لیلا فاضلی انجام شد، که برخی از عناصر مهم معماری مربوط به استقراری باستانی را شناسایی کردند. یافتن بال شمالی و جنوبی دروازهٔ شهر در فاز آخر آن با فرض ما آغاز شد و در نهایت دلیل قطعی وجود آن اثبات شد. دیگر یافته‌های مهم شامل کاوش بخشی از یک کانال یا مجرای آب بود که احتمالاً قسمتی از یک شترگلو است که در منابع نوشتاری به آن اشاره شده است. از سرگیری کاوش‌های منقطع که مد نظر ما است، می تواند تاریخ باستانی ارگ بم را روشن کند.
کلمات کلیدی: مرمت بم پس از زلزله، هیئت ایتالیایی– ایرانی، کاوش، برج شمارهٔ ۱، استحکامات غربی، دروازهٔ شهر.

I. Introduction

On 26 December 2003, early in the morning, a devastating earthquake of 6.5 on the Richter scale shook a large area of the Kerman province. Half of the population of Bam died, New Bam was destroyed, and Old Bam (Arg-e Bam) was reduced to a mere heap of rubble (Fig. 1)[1].

The international community responded quickly, not only to address the human tragedy but also to take steps for the endangered cultural heritage. Arg-e Bam is not only a tourist destination, but also an essential part of the Iranian past with a role in the present, and so a symbol of its history, a landmark of the local and national sense of identity, and indeed a source of interest and pride. Therefore, together with the Iranian Cultural Heritage Organization (ICHTO), *UNESCO* set about planning for the recovery of Bam's cultural heritage. In 2004, Bam and its landscape were entered into *UNESCO*'s World Heritage List[2].

Italy was involved in the recovery project from the very outset. The first Italian mission visited the ruined site only six days after the disaster[3].

[1] Documentation…2004, Vatandoust and Mokhtari, 2004.
[2] Bam Citadel (Iran) n° 1208, ICOMOS Evaluations, Addendum, WHC-04/28. COM/Inf. 14A ADD, 2004, 27-38. https://whc.unesco.org/uploads/nominations/1208bis.
[3] Bosi, Naso, and Lai, 2003.

The Iranian authorities asked for help and proposed different structures to be studied and recovered. Restoration of tower n° 1 of the city wall and seismic improvement measures were selected as the basis of the Italian post-earthquake cooperation project (Figs. 2 - 4)[4].

Figure 1. Arg-e Bam after the earthquake.

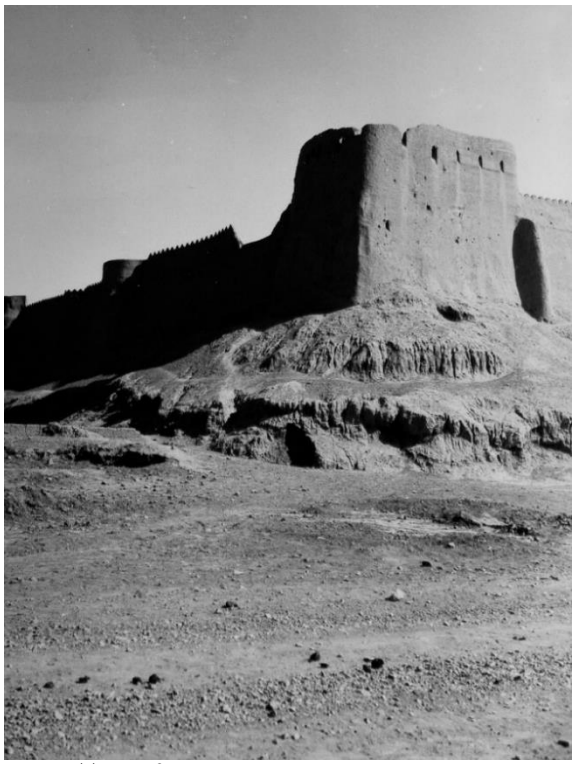


Figure 2. Tower n° 1 before the disaster, photographed in 1965 (Graziani, archive IsIAO, MAO, n° 4608 11).

Figure 3. The tower after the calamity.

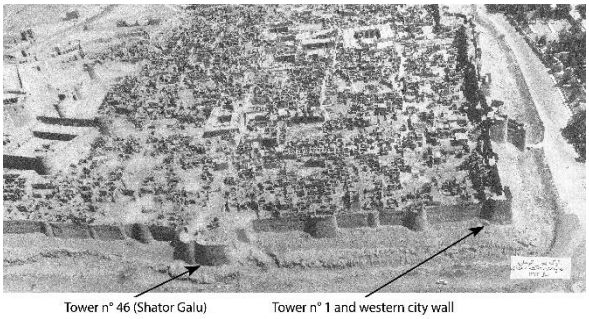


Figure 4. Aerial photo of Arg-e-Bam (archives Bam, ICHTO).

[4] On the restoration project, see Lolli Ghetti, 2005; *La cittadella* … 2005; Proietti, 2007; Tavan, 2010; Prosperi Porta, 2012; Proietti *et. al.*, 2013, 73.

The *Tower n° 1 project* was organized by the *Italian Ministry for Cultural Heritage/Department of Research, innovation and organization*. The planning and implementation of the work was entrusted to the *Istituto Centrale di Restauro* (ICR), coordinated by Gisella Capponi and Mario Lolli Ghetti in collaboration with Eskandar Mokhtari, then Director of the *Iranian Cultural Heritage & Tourism Organization/ Bam*. On 5th October 2011, the Italian Mission was able to formally hand over the finished project of restoration to the Iranian authorities (Figs. 5-7).

Figure 5. The tower was during restoration work in 2007.

Figure 6. The restored tower, west side.

Figure 7. Commemorative plaque recording the restoration project.

II. Research background of the first project: Tower n° 1

Here, on the occasion of the Zabol Conference, only the archaeological research of the Italian project is discussed.[5] The results of the archaeological studies were used to verify the presence and nature of discontinuities in the tower structure to draw up a plan for coherent consolidation and seismic improvement works.

During the site investigations, it was found that Tower No. 1 (following the numbering assigned by the Iranian authorities to each of the towers around the city wall) was the result of a complex stratification, having been built over a number of phases, with varying degrees of importance. The modifications were carried out given functional changes or destruction caused by natural or man-made events. Each of these transformations modified not merely the shape and external appearance of the tower, but also its internal structure. As well as contributing towards a correct methodology for the consolidation and restoration works, the investigations were geared towards a more detailed understanding of the structure, to place it correctly within its historical context.

In addition to a form of preliminary reconnaissance, the aim of the first three brief archaeological missions (2004-2005) was to outline an initial stratigraphy of the wall structures of the tower that could be identified without excavation[6]. Based on the wall structures that could be observed on the surface, it was assumed that the tower, in the form it took before the earthquake, was the result of several construction phases, as well as numerous repairs which progressively increased the size of the original core of the structure. The reconstructions appear as a series of juxtapositions or enlargements, with the aim of containing and stabilizing the pre-existing structures around the internal core, towards the outside.

The first result of our studies was a hypothetical model of the monument during its various phases (of which at least five major phases have been identified, in addition to secondary restoration and routine maintenance works).

In order to verify the development model we had arrived at, in collaboration with Narges Ahmadi and Mehdi Keramatfar of the Bam ICHTO organization, we carried out various investigations in 2006-2007 to bring light to bear on certain specific problems. Even though our excavation was limited in extent, it was found to be useful not only for a clearer picture of the monument but also for planning and conservation works.

III. Survey and excavation

As proposed during the 2005 mission, the trial pits (Fig. 8) effectively enabled the identification of the elements of the earliest construction phases.

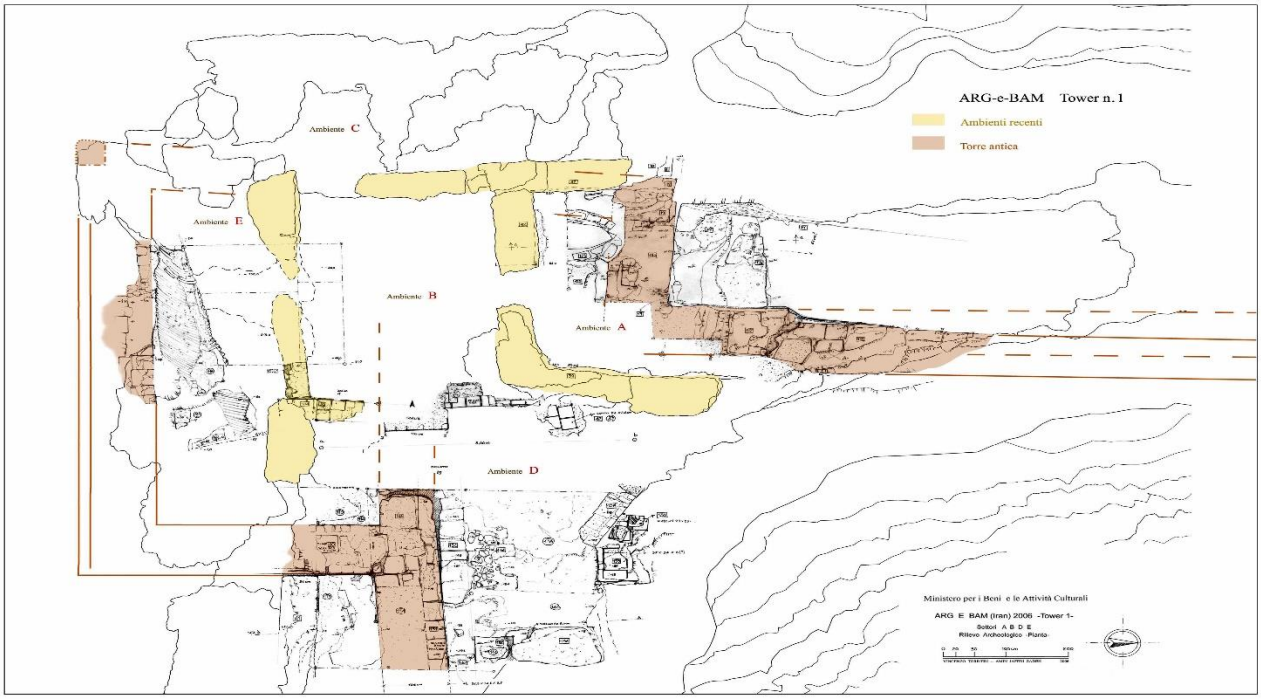


Figure 8. Plan of tower n° 1. In brown, tracing of the ancient tower and adjoining city walls (plan Vincenzo Torrieri).

[5] See our previous publications: Callieri *et al.* 2005; Jung, Torrieri, Ahmadi, 2008; Jung, Torrieri, 2010; Jung, Torrieri, Ahmadi, 2010; Jung, Torrieri, 2013.

[6] Pierfrancesco Callieri, Gianfranco Conti (in 2004), Anna Filigenzi and Danilo Rosati (in 2005) also participated in the research of the Mission of the Italian Ministry of Cultural Heritage.

The discovery of the southwest corner of the oldest tower (previously missing from our evidence) enabled the definition of a complete layout. (Figs. 9-11) It was also possible to discover a short section of the city wall connected to the ancient tower, and it was seen that the original defensive system had been moved backward with a slight modification to the alignment. (Fig. 12).

The oldest tower is rectangular in plan; it was built with regular layers of mud bricks, protruding approx. 3.80 m concerning the relative city wall. However, even older wall structures may exist. Note that the trial excavations have reached an average depth of no more than 70 cm, but this is still sufficient to understand the extreme complexity of the construction history of the tower, which had mostly remained buried under the rubble, and is now hidden by the restoration work.

Figure 9. Southwest corner of the ancient tower (US 97) highlighted in brown.

Figure 10. Southeast corner of the tower (US 40)Figure 11 – North wall of the tower (US 19).

Figure 11. North wall of the tower (US 19).

Figure 12. Section of southern city wall adjoining the ancient tower (US 131).

The archaeological trial excavations have also enabled documentation of historical traces of earthquakes at various points in the tower. A negative stratigraphic phase, characterized by the collapse of structures during an earthquake before that of 2003, was discovered at various points. (Fig. 13) It is also possible that the collapse of the vault in room E to the south, and possibly also the collapse of the western walls during the earliest phase so far identified within the tower n° 1 site, were caused by the same event, the disastrous consequences of which called for consolidation of the foundation base and complete reconstruction of the upper parts of the tower. Even though, as far as has been seen to date, there is only one reference to earthquakes in the historical and documentary sources[7], the archaeological evidence

[7] As serious doubts have often been raised about the occurrence of earthquakes in Bam in historic times, it is worth quoting the source. Under the date of 22nd, 23rd 1866 of his diary Goldsmith (1867, 284) writes: *The old city, now the fort, is a mass of ruins, but the walls are in a good state of preservation…Pottinger observes that until the expulsion of the Afghans, this was held to be the frontier town of Persia on the south-east. His description is now sixty years old…Since he wrote, it has been the scene of an international struggle, which added to an* ***earthquake****, resulted in the almost utter destruction of the town within the walls. Nearly thirty years ago the Commander of the Shah's army besieged there, the well-known Agha Khan Mehlati, then a rebellious Governor of Kirman….*

seems to suggest that earthquakes have occurred several times in the history of Bam. The new seismological and technical studies of the structures brought to light could confirm this evidence.

Figure 13. Negative interface (US 106) from pre-2003 seismic event documented near the southern walls standing on the eastern side of the ancient tower.

Another interesting feature was the vaulted roof unearthed in the buried room in the south of the tower. The construction technique shown by the vault complies with the Iranian cultural model: with sloping layers of mud bricks, and with a parabolic curve inclined at approximately 20°, to provide support during the construction phase (Figs 14-17)[8].

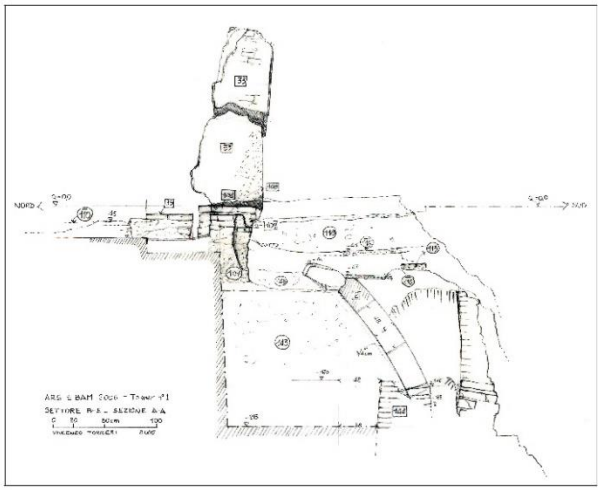


Figure 14. Cross-section of vault of south room E in II phase of restructuring of the ancient tower (US 2, design Vincenzo Torrieri).

Figures 15. Vault of south room.

Figures 16. Vault of south room.

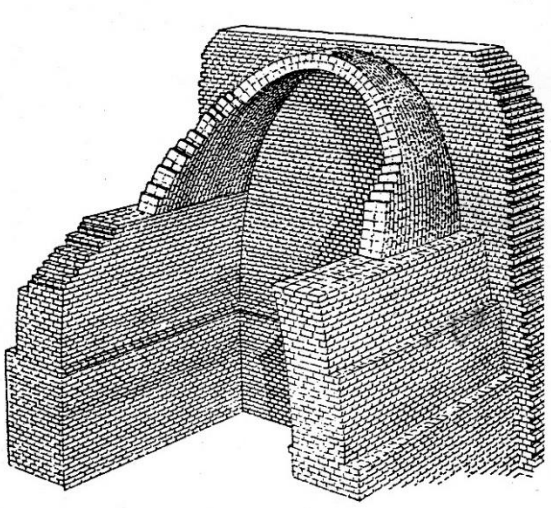


Figure 17. The "Iranian" or "Egyptian" vault (after Galdieri 1982: fg. 39).

Pottinger's report was published in 1816. The siege of Āqā Khan Maḥallātī took place in 1840-41 (or, rather, 1837-8 according to Adle, 2006, 61). A part of Bam had been damaged and was reconstructed or (restored) by Abasqoli Khan Kort in 1843 (or some years earlier). Thus, we can deduce that a strong seismic event took place between the siege and 1866, the year of Goldsmid's visit.

[8] Cf. Van Beek, 1987.

The techniques applied in construction of the tower, which have been observed and documented, are as used for mudbrick structures and a particular type of pisé: walls with regular layers of bricks bound with a colloidal mortar, supported on large overlying base segments, made from progressive casting of mud, and raised without the use of formwork or wooden scaffolding.

The external extensions of the tower consist of a system of parallel walls with filling between them (the *muro a sacco* technique) resting on the pre-existing structures. The oldest bricks are larger (36.5 x 36.5 x 9.5 cm), whilst the more recent ones are smaller (22 x 22 x 4.5 cm).

A section of the western wall, on the north-west side of the tower, represents a major departure from the construction techniques generally used at Bam (Fig. 18). It is a wall, now further out and exposed during the last earthquake, made on a row of roughly worked reclaimed stones, one of which, showing a chiseled finish, appears to be a discoidal millstone with a conically shaped central hole (although the thickness of the piece and the cross-section of the hole may justify some doubt about this use). The row of stones constituted the impost wall of a third mudbrick vault found within the western city wall. To our present knowledge, the technique shown by this wall represents an exception at Bam.

Figure 18. Section of west city wall with vault impost made with reused building materials.

The investigation carried out on the rampart of the city wall (*agger*), over a length of 20.0 m at a short distance from the tower (at approx. 2.5 m), brought to light the phases of growth of the external embankment, formed with a slope with the aim of reinforcing the fortification towards the trench downstream (Fig. 19). The phases in the cladding of the outer surfaces have also been documented; it was performed to even out and consolidate the outer profile, following collapses and slipping of the rampart. The need for these reinforcements probably arose after a violent earthquake before the 2003 tremor.

Figure 19. Excavation of the city wall rampart.

The investigations carried out on the trench of the city wall revealed a stratigraphy of scour in a northern direction (Fig. 20). The layers with a sterile silty-sandy matrix failed to show the remains of organic and human activities we had hoped to find.

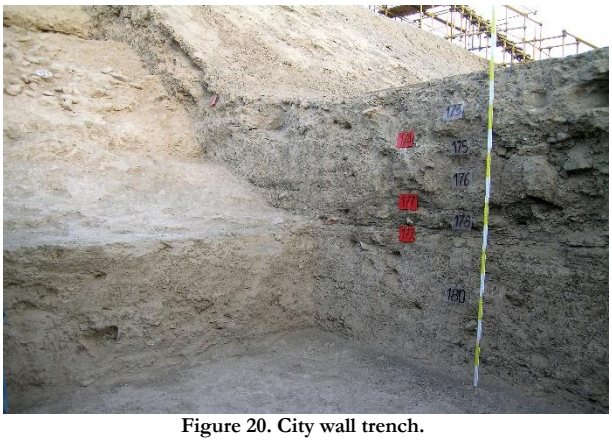


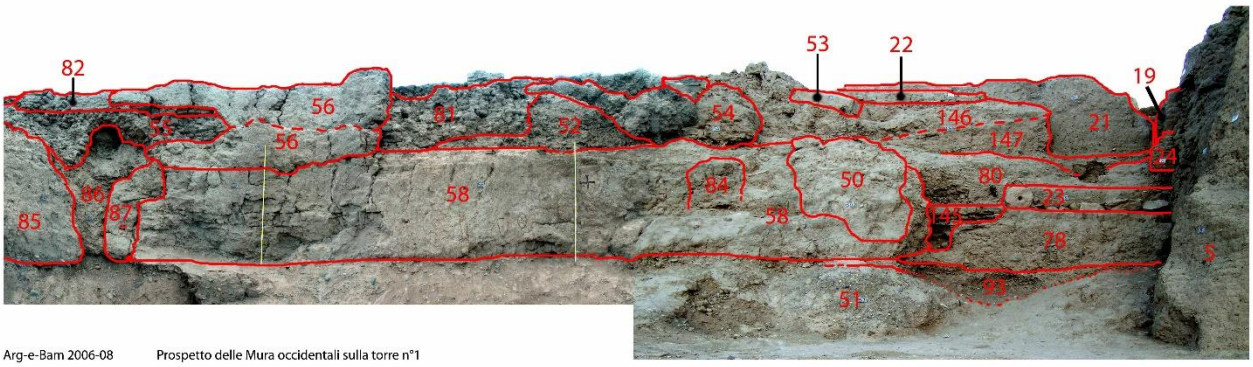
Figure 20. City wall trench.

A most interesting discovery was made in the form of a cross imprinted on the outer kaghel cladding of the Western Wall, not far from the Tower (Figs. 21-22). It is a – probably Nestorian – cross with four arms of equal length (about 24 cm each), imprinted on a wooden or metal matrix. The location and chronology of the find are important for the history of the City of Bam and this territory.

Figures 21. West city wall with cross symbol incised in mud brick to the right of the folding ruler.

The section of the wall on which it was found belongs to a relatively early phase in the life of the wall, which was later incorporated into the last phases of expansion and consolidation of the entire fortification.

The cross, together with a small portion of the wall, was removed[9] to protect it and keep it safe; it is now stored in the restoration workshops (Fig. 23).



Figures 22. West city wall with cross symbol incised in mud brick to the right of the folding ruler.

[9] On the removal and consolidation of this find, see Mohseni, Bagheri Zadeh, Zarghani, 2008.

Figure 23. Removal of the cross motif by the Iranian restorers.

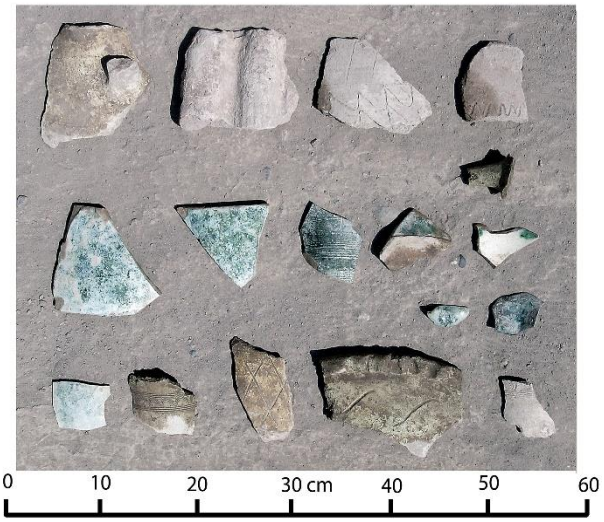
The symbol of the Nestorian cross was also identified on several ceramic fragments discovered later during surveys within the city walls; as far as we know, these finds represent the first evidence of a Christian presence in Bam and the entire region (Figs. 24-25).

Figures 24. Shards with Nestorian cross pattern.

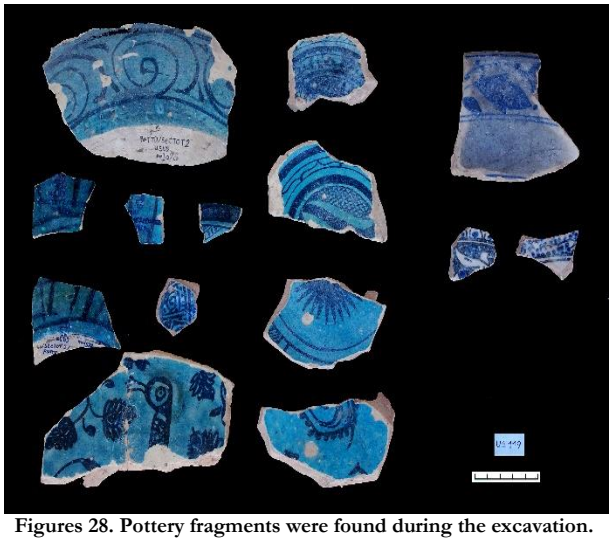
Figures 25. Shards with Nestorian cross pattern.

Amongst the finds and materials discovered during the investigations, there were iron arrow tips, one of which in particular, given its size and weight, would appear to be the tip of a crossbow arrow (?) (Fig. 26). The ceramic fragments, glazed and un-glazed, may be placed within a broad chronological range, starting from the late Achaemenid period (Figs. 27-28).

Figure 26. Arrowheads, the left one probably from a crossbow.



Figures 27. Pottery fragments found during the excavation.



Figures 28. Pottery fragments were found during the excavation.

IV. Research background of the second project: Tower n° 46 (*Shotor Galu*)

As our archaeological work was largely limited in favor of the main goal of the Italian Mission, i.e. restoration of the tower, it proved impossible to extend the excavation and to determine a chronology for the various documented construction phases of the tower. It was therefore proposed, in agreement with the Iranian authorities, to carry out a new archaeological project which should also yield further data for a better understanding of the tower n° 1 building phases.

The area of the huge tower 46 (*Shotor Galu*) was chosen together with the late Charyar Adle as the new site to be excavated (Figs. 29-30).

Figure 29. West side of tower n° 46 (Shotor Galu) before excavation.

Figure 30. East side of the tower seen from the inner city before excavation.

With Adle, we supposed that the ruins of a former ancient city gate must lie beneath the remains and debris of the collapsed fortifications left by the 2003 earthquake. This site constitutes a focal point within the city walls. It is aligned with one of the major road axes of the settlement, exactly in line with the East-West direction (Fig. 4).

At this point it will be useful to take a general look at the map of Bam[10] (Fig. 31). We can easily distinguish three main parts, also in the light of the descriptions by Arabian and Iranian geographers like al-Iṣṭakhrī, al-Muqadassī, Ibn Ḥawqal, Yāqūt or Ḥamdallāh Mustawfī.[11] We have a citadel (*arg* or *ḥiṣn*) on a natural hill, the seat of the Government Quarters and center of the administration, a circumvallated inner city (*qal'a, medina* or *sharistān*) with the bazaars and the better living quarters in which are also integrated the Friday Mosque, and an outer city (*rabaḍ*) with the modest dwellings, craftsman's establishments, and orchards. A third additional wall also protected this part of Bam.

10 On the history of Bam, see the following publications: Lockhart, 1960; Nurbakhsh *et al.*, 1355/1974; Bastani Parizi, 1989; De Planhol, 1989; Jung, Torrieri, 2010; Tayari, (n.d.). The best and most comprehensive study on the history of Bam is still Adle, 2006.

11 On the sources in Arabian and in Persian, see Adle, 2006 and Jung, Torrieri, 2010.

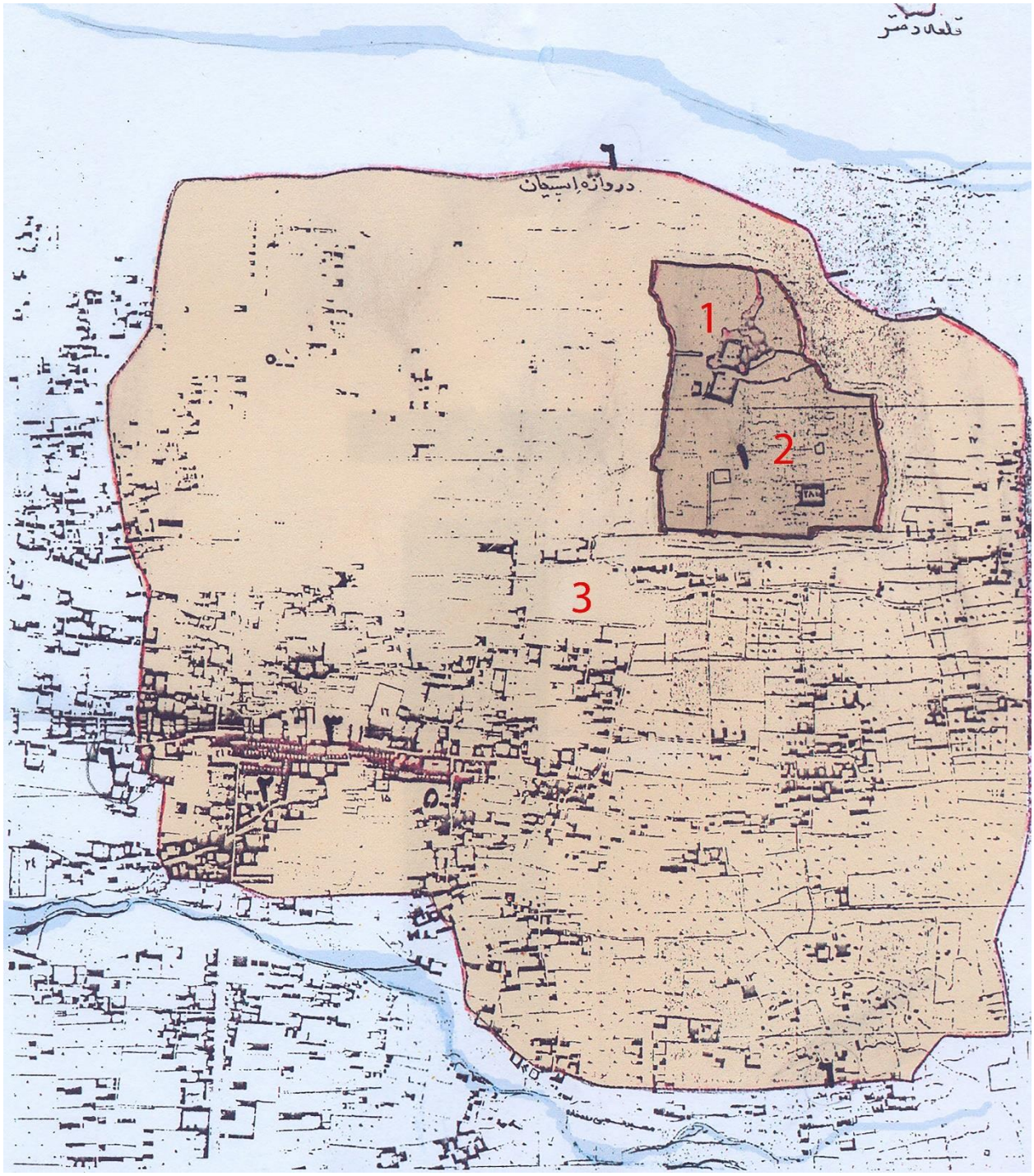


Figure 31. Plan of ancient Bam, with arg (1), sharistān (2), surrounded by internal walls, and rabaḍ (3) enclosed by the external walls (sharbast) (plan after Tayari 2006).

Thus we can identify in Bam the typical tripartite division of the ancient and medieval towns of Central Asia, going back to the most ancient traditions of Khorāsān and Khwārazm[12] (Figs. 32-33). This partition of a town in three separate parts is thought by some researchers to reflect a social order based on the economic-productive organization of a feudal system.

[12] There is ample literature on the urbanism of Central Asia; see, e.g., Jakubiak, 2006; Rante, 2008, Leriche, 2009.

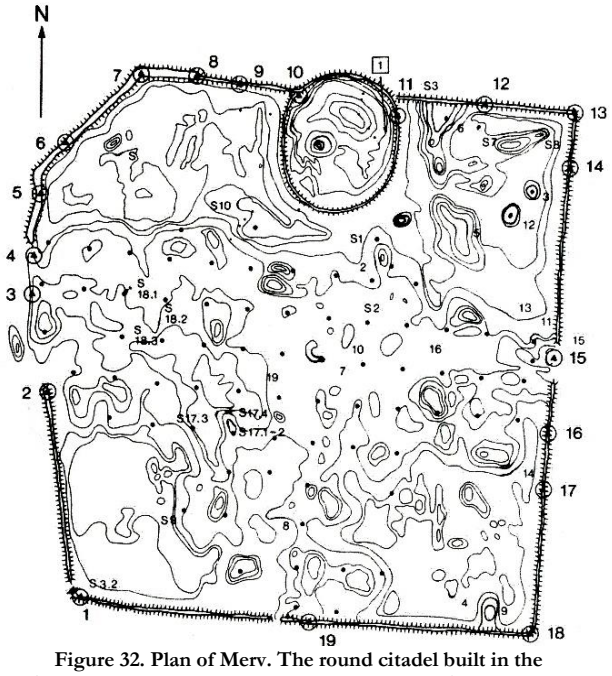


Figure 32. Plan of Merv. The round citadel built in the Achaemenid period, the rectangular layout of Gyaur Kala of Hellenistic design (after Rante 2008: 197, fig. 9).

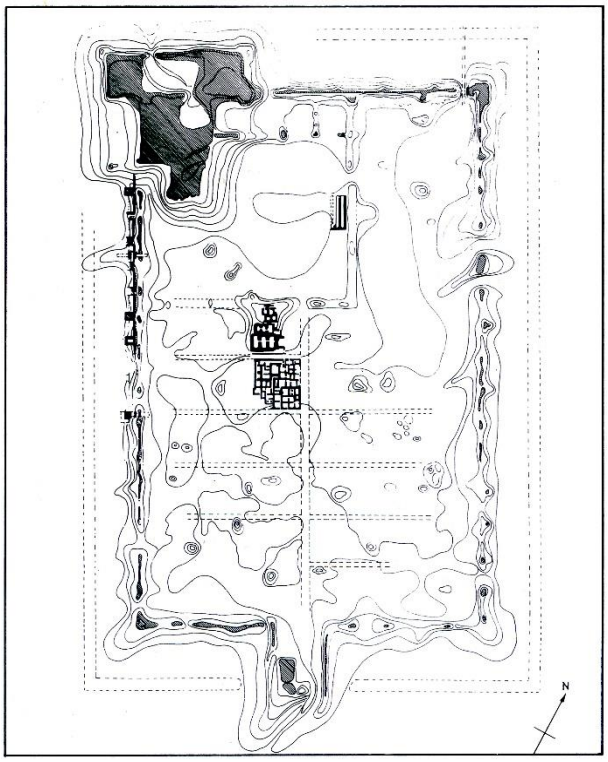


Figure 33. Plan of Toprak Kala, built by Artabanos, ruler of Khwarezm, in the second half of the 2nd century AD (after Cuneo 1986: fig. 111, p. 70).

The circumvallated inner town measures about 425 x 300m and is rectangular in form. Its city wall follows the cardinal points (Fig. 34). The walls are very tall and massive, reinforced by 52 sturdy towers.

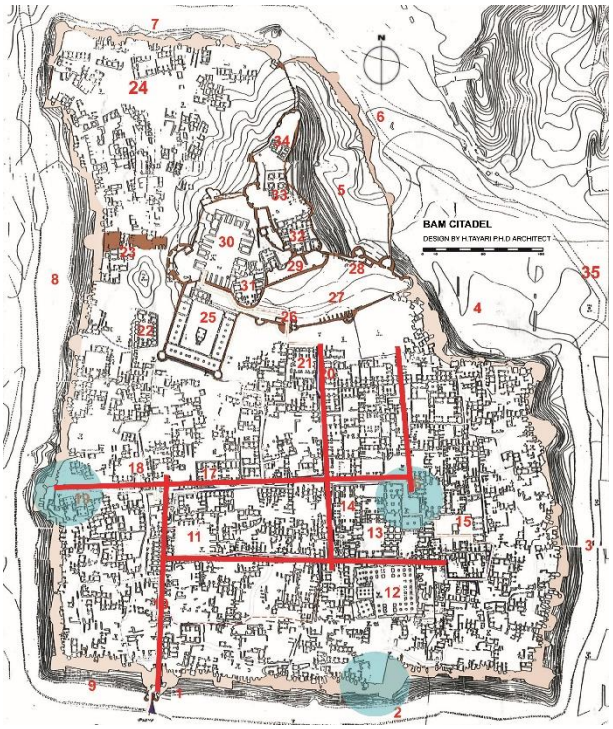


Figure 34. Plan of Arg-e Bam. In red is the main street axis, and the two upper circles in light blue corresponding to the west city gate and the presumed east city gate. The lower circle indicates the position of the supposed ancient southeast tower (modified plan after Tayeri 2006).

Nowadays there are only two city gates in the south wall. The main SN axis of the *sharistān* departs from the main gate set in the SW section of the wall. However, Heinz Gaube had already conjectured the existence of two further city gates in the past, positioned in the West and East walls, indicated on his plan with a question mark. About this conjecture, he mentioned the author al-Muqaddasī (who wrote around 985). This author recorded that Bam had four city gates:

… The fortress (ḥiṣn) has four gates: Bāb Narmāsīr, Bāb Kūskān, Bāb Asbīkān, Bāb Kurgīn. In the center, the citadel (qal'a) rises …[13]

The late Paolo Cuneo[14] discussed Arg-e Bam briefly in his handbook of Islamic urbanism published in the 1980s. He suggests possible identification of an urban installation of Alexandrine-Seleucid type in the approximately regular road network of Bam, with city quarters (of the *insulae* type) subdivided by streets and paths arranged in axial alignment. The main road axis started from the main city gate of Bam. We may recall here – about a possible Hellenistic settlement at Bam – the recent find of shards of common pottery with Greek inscriptions in the southern part of the Bam fault.[15] These shards testify to the activity of Greek potters in the Bam area (Fig. 35).

[13] al-Muqaddasī, 465.

[14] Cuneo, 1986, 67, note 14, 279-282, figs. 376-379.

[15] Zare, 2007.

Figure 35. Shards with Greek inscriptions were found in the Afrāz fault, ca. 25km south of Arg-e Bam giving the names of Dionysios and […]nois (after Sharam Zare 2007: 119).

In 2006 Chahryar Adle[16] dedicated a chapter to the early history of the citadel in his essay on the *Qanats of Bam*. He, too, defines its general plan as a Central Asian one inspired by Hellenistic forms, with its rectangular layout in contrast to the circular or irregular plans of the neighboring provinces. As a comparison to Bam, he cites a number of cities such as Delverzin Tepe, Kerk Tepe, or Herāt, the Alexandria in Aria (Fig. 36).

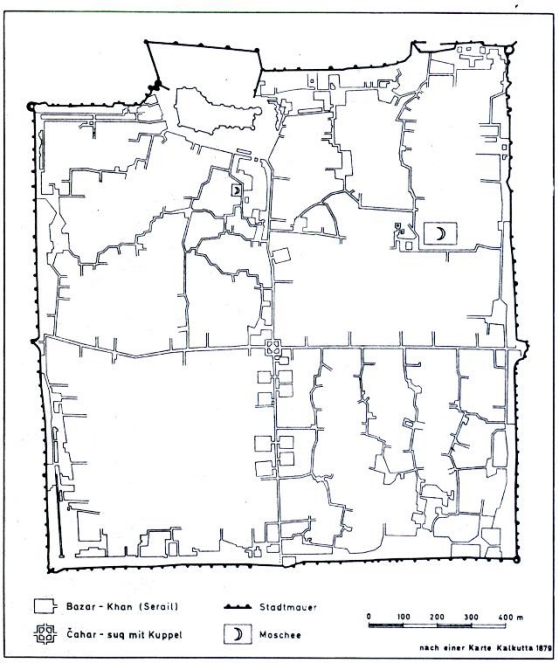


Figure 36. Plan of Herat. The city plan probably goes back to a Greek-Bactrian foundation (after Cuneo 1986: fig. 396, p. 290).

To his mind, the lower city of Bam below the Arg had originally a square plan (Fig. 34). The eastern part of the settlement would have been only a secondary addition to the original core. The hook in the S wall would mark the probable SE tower, from where the East city wall departed, running up to the Ḥiṣn. The main WE axis started from Tower n° 46 /Shator Galu, probably in fact once a city gate, which may have found a counterpart – another city gate, and more specifically the East Gate – in the presumed former E wall at approximately the NE corner of the Mirzā Naʿim complex. These were the premises of our second project started in 2017, in collaboration with the Iranian team under the direction of Joodaki Azizi and Leila Fazel.

V. Survey and excavation

Some important architectural elements of the ancient and/or medieval settlement were already identified with the excavation and the stratigraphic analysis of the first campaign.[17] Excavation and surface cleaning were carried out in the areas selected for our research: i.e. in the external (DE 19-20) and internal (DE 20-21, B 20) sectors (Fig. 37). Here we will briefly draw attention to the most significant discoveries:

In the external sector, on top of the bastion and the embankment of the city walls, we were able to discover the northern and southern wings (Figs. 38-40) of the city gate in its last phase (US 36 e US 42). The northern wing is made of mud bricks and is positioned orthogonally concerning the west walls of the town. It is linked to a pre-existing tower (US 37) which was curved in form (Fig. 41). This discovery constitutes evidence bearing out our conjecture of a city gate on the west of the walls. Because the excavated structures stand high at the level of the bastion, we expect to find even earlier phases of the city gate and the corresponding towers in the lower layers remaining to be excavated. The large dimensions of the adobe (30 x 30 x 5.5cm) are almost the same as those applied in the initial shell of the towers on either side of the entrance to the southern bastion. The stratigraphic-structural elements and the ceramic materials found in this first phase of the excavations describe a dynamic sequence of growth of the walls with added layers at the top.

16 Adle, 2006, 55-60.

17 See, now, the short paper by Joodaki *et al.*, 2019.

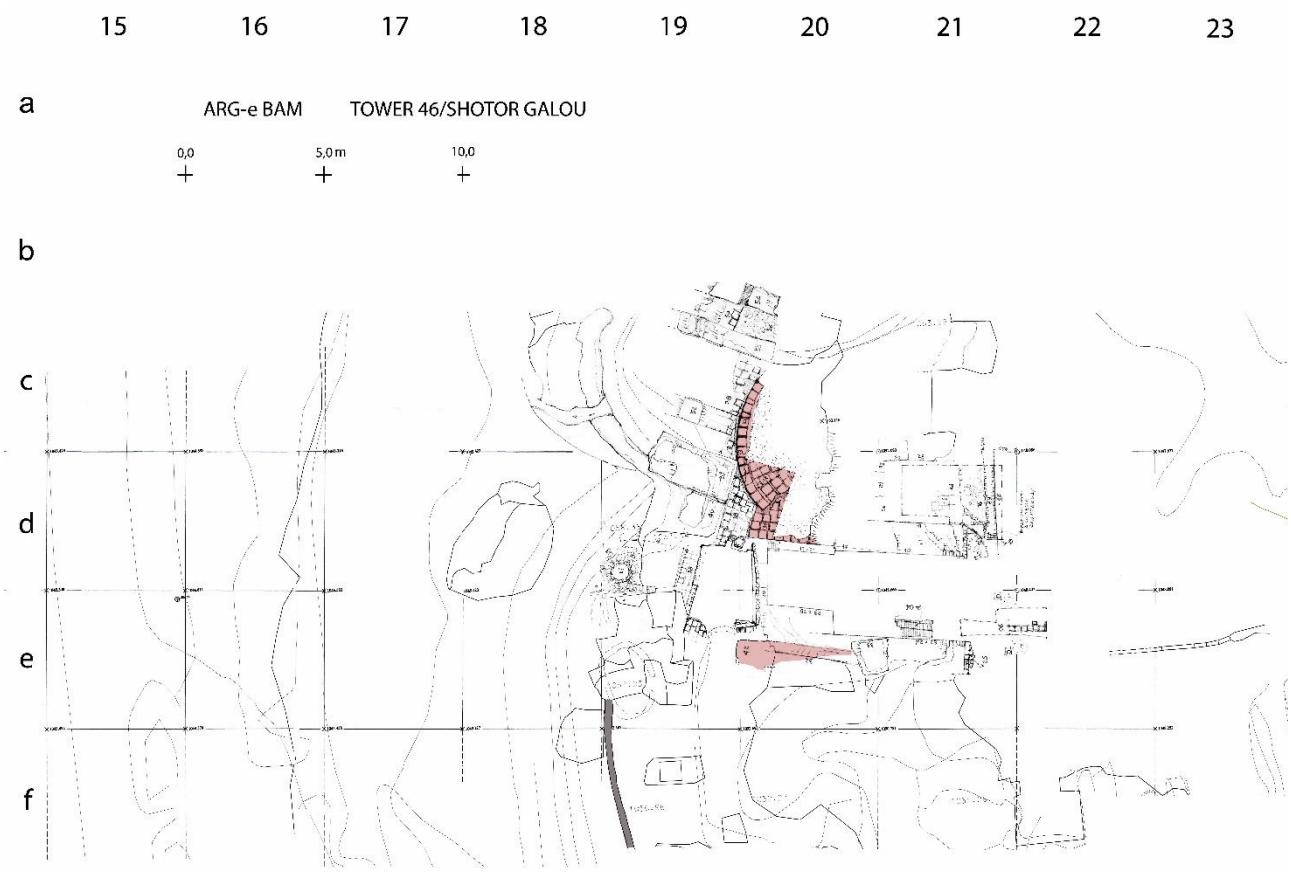


Figure 37. Plan of west city gate and adjacent tower indicated in light brown (plan Vincenzo Torrieri).

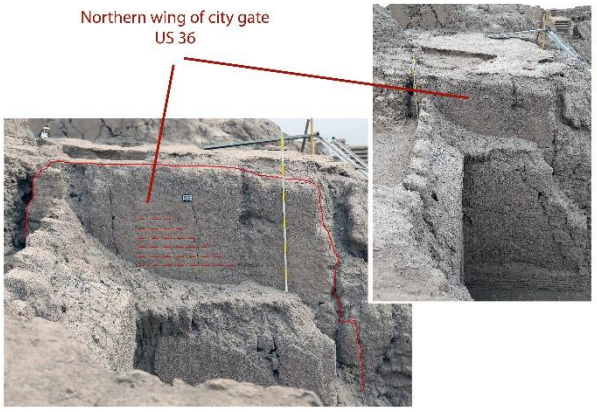


Figure 38. Northern wing of city gate (US 36).

Figure 39. Southern wing (US 42).

Figure 40. The city gate ensemble (in light brown).

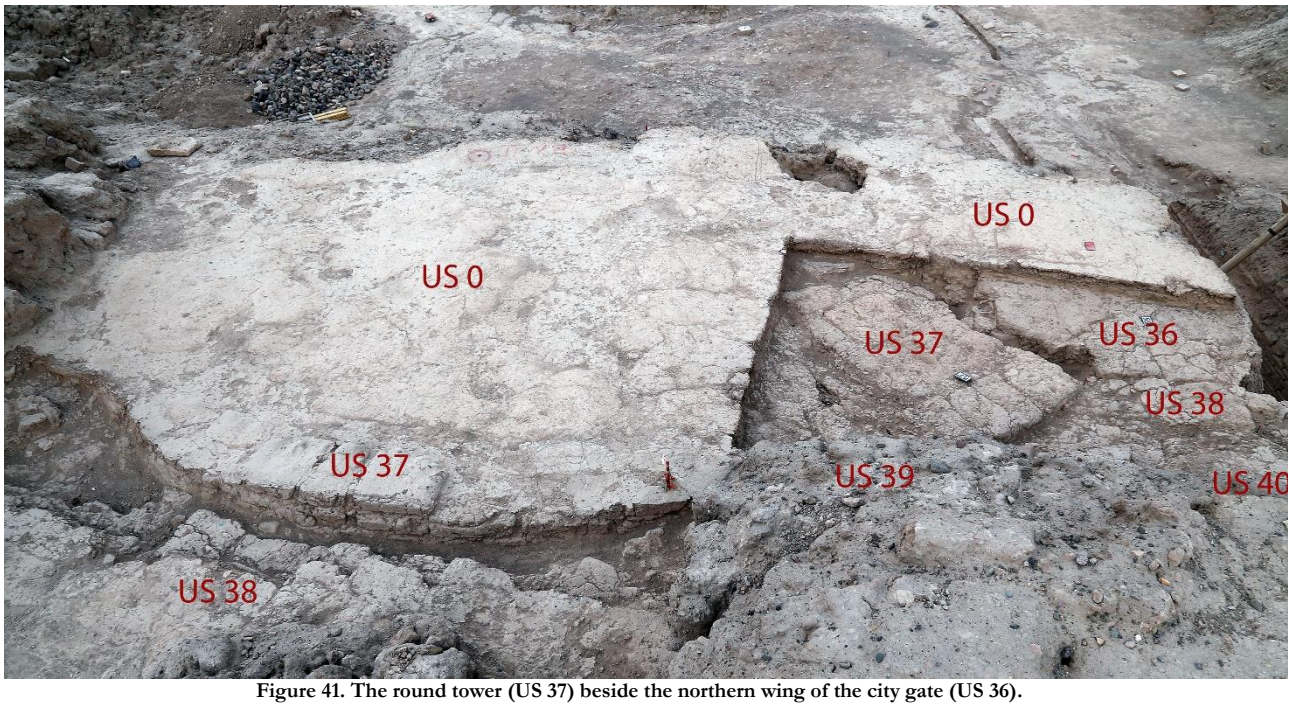


Figure 41. The round tower (US 37) beside the northern wing of the city gate (US 36).

The growth of external additions, providing lateral support ("onion" growth), amply documented in previous research on Tower No. 1, is associated with phases of elevation of the defensive structures, progressively obliterating the earlier structures. Based on this documented dynamic, the structures of the Western Gate of Bam, found in this first excavation campaign, must have been very early, having been obliterated in the innermost core of the multi-layered complex of the city walls.

The study of the ceramic material found in the various stratigraphic units lends support to this thesis, which will certainly have to be verified in the next campaign. The ceramic materials discovered in the obliteration phases of the city gate are attributable to the filling and overlapping added in the Islamic period. The earliest ceramic materials, Achaemenid and possibly Seleucid, that can be related to the structures found, occur sporadically in the internal surface areas of the city, in a well-silo sealed within the walls and in the rubble from the collapse of the walls filling the room that closes the inner side of the ancient Gate.

It is clear that the walls have grown, both in plan and in elevation, with construction materials and various recovered or reused materials. The current surface area of Bam is the result of continuous levelling and decortication which resulted, in relatively recent historical phases, from scavenging for suitable materials to consolidate and reinforce the walls. The ground levels of the city were lowered and the earliest levels emerged from time to time, while the walls rose and grew outwards with spoliation materials from the interior. The dynamics of the documented material lead us to believe that the structures of the Gate that have been found, sealed within phases related to Islamic culture, are indeed very ancient. The next research campaign will be fundamental to complete and verify our assumption, substantially supported by the data already in our possession, that we are dealing with the Western Gate of the Hellenistic City of Bam.

Further discoveries (Figs. 42-43). include a vaulted room (called room B) on the West side, on the embankment of the walls. Within the room is a small well or silo (US 44). The well is rich in pottery shards and anthropic material, including burnt animal bones, seeds, ashes, carbons, and a child's shoe.

In the internal sector we were able to find and partly excavate a conduit (US 6- 7) (Fig. 44). The surveyed part starts below the dromos of the gate and leads to the Hammām (dating to the Seljuk, or rather Safavide, period?) east of the city wall. This conduit is probably part (a branch) of the Shotor Galu mentioned in the written sources, an important component of the water supply system situated below the huge tower n° 46, which replaced the West gate. The system consists of a longitudinal row of clay gutters covered with bricks in their original surface structure. A significant portion of these bricks and parts of the gutter body was destroyed, but the structure can be estimated to be approximately ten meters in length. The western length of this hydraulic structure is buried beneath the adobe structure of the tower.

We were also able to find a section of a huge wall (US 15) of mud bricks (30 x 30cm), running in a south-north direction, situated within the settlement east of the present city walls (Fig. 45). These walls are certainly to be attributed to earlier phases of Arg-e Bam, and are still to be chronologically defined.

The finds made during our work include pottery, a few glasses, organic material, but also very recent materials such as plastic. The pottery includes shards, probably from the Achaemenid, Parthian, and Sassanid periods, and the first Islamic period (‘Abbāsid), through the middle Islamic period (Būyid, Seljuk, Ilkhānid, Timūrid) to the late Islamic period (Safavīd). Of very rare occurrence are the shards of the Qājār period (1779-1924), but this reflects the fact that Arg-e Bam had been abandoned after the siege of the town defended by Āgā Khān Mahāllatī in 1840-1.

Since the excavated and documented levels were somewhat disturbed by recent pre- and post-earthquake contamination (including plastic fragments), the relative chronologies of the various phases of the rampart and the walls are yet to be verified and defined. Therefore, any definitive chronological attribution must be postponed to the next archaeological seasons.

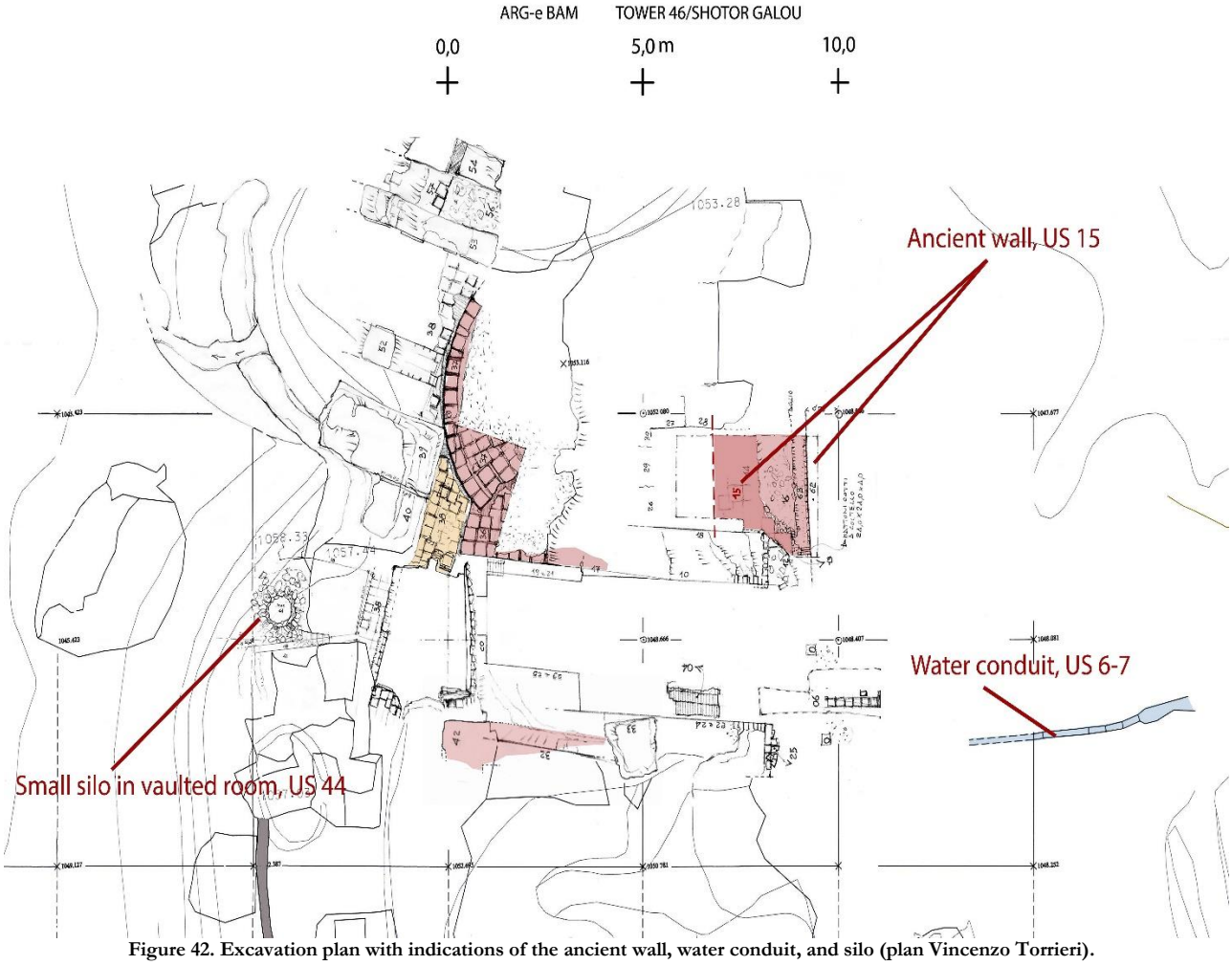


Figure 42. Excavation plan with indications of the ancient wall, water conduit, and silo (plan Vincenzo Torrieri).

Figure 43. Vaulted room B with silo (US 44).

Figure 44. Water conduit of Shotor Galu (US 6).

Figure 45. Wall running in the South-North direction now inside the city parallel to the present city wall.

VI. Conclusions

Since 2004, the Italian Mission of the Ministry of Culture has collaborated with ICHTO in the framework of international post-earthquake projects in Bam. Initially set up to support the restoration project of Tower No. 1, the mission's archaeological team had the opportunity to conduct several campaigns. Our work allowed us to define the different phases of construction of part of the city walls. They reflect the rich and often dramatic history of Arg-e Bam. The discovery of the western gate, which is still largely buried under tower No. 46 (Shotor Galu), can demonstrate the Hellenistic roots of the urban layout of the inner circumvallate city (sharistān).

The project was to have seen three campaigns, but for various reasons, only one has as yet been undertaken. We would gladly welcome the continuation of our promising work, possibly conducted by Iranian experts, and with the possibility of shedding light on the early beginnings of Arg-e Bam. A second excavation was also suggested by Adle, to be carried out at the end of the west-east axis near the site of Mir Ali's house, where he expected to locate the corresponding east gate.

Acknowledgments

We would like to thank here the former Directors of the *Bam Cultural Heritage Base and its Cultural Landscape*, Eskandar Mokhtari and Afshin Ebrahimi. We wish to express our deep gratitude to the late Chahryar Adle, Foreign Relations delegate of *ICOMOS-Iran*, mentor and a real friend of our mission, to the ever-kind and generous Hossein Tayeri, director of the *Bam Cultural Heritage Base* before the earthquake. We are pleased to take the opportunity to thank the former Local Managers of the Arg-e Bam site, Mahmoud Nejati and Nima Naderi, and the engineer Ali Pandidan.

Our archaeological colleagues Narges Ahmadi, Mehdi Keramatfar, Joodaki Azizi, Leila Fazel, and Nazanin Khojasteh Behzai were great companions and collaborators. In Italy, we wish to express our warm thanks to Giuseppe Proietti, former *General Secretary of the Ministry of Cultural Heritage*, to Mario Lolli Ghetti, *Director General for Architecture, Fine Arts, Landscape and Contemporary Art and Architecture*, to Gisella Capponi, former director of the *Istituto Centrale per il Restauro* and the architects and engineers Pia Pietrangeli, Walter Santoro, Alberto Torsello, Claudio Prosperi Porta, all of them playing key roles in the restoration project.

The archaeologists Pierfrancesco Callieri, Anna Filigenzi, and Danilo Rosati gave precious support at the beginning of our mission.

The commitment, help, and enthusiasm of Felicetta Ferraro, former cultural attaché at the Italian Embassy in Tehran, will long be remembered. The members of this mission also wish to express their gratitude to all the workers and assistants in Arg-e Bam for their hospitality, support, kindness, availability, and assistance provided during the mission.

References

Adle, C. (2006) *Qanats of Bam: An Archaeological Perspective: Irrigation system in Bam, its birth and evolution from the Prehistoric Period up to Modern Times*. In: Honari, M. et al. (Eds.), Qanats of Bam. A Multidisciplinary Approach, UNESCO Tehran Cluster Office.
Tehran, 33-85.

Bam Citadel (Iran) n° 1208, ICOMOS Evaluations, Addendum, WHC-04/28. COM/Inf. 14A ADD, 2004, 27-38. https://whc.unesco.org/uploads/nominations/1208bis. [Accessed 1 November 2021]

Bastani Parizi, M. E. (1989) Bam, Ruins of the old town. *Encyclopaedia Iranica*, III, 651-654.

Bosi, V., Naso, G. and Lai, G. (2005) *Relazione sismotettonica sul terremoto di Bam (Iran) del 26 December 2003,* lecture given at the *International Technical Meeting on the Rehabilitation of the Cultural Heritage of Bam and its Cultural Landscape*, Roma, 10-11 May 2005. Complesso di San Michele a Ripa (unpublished).

Callieri, P.-F., Filigenzi, A., Jung, M. & Rosati, D. (2005) *The Historical City of Arg-e Bam. Iran. Archaeological Survey Report September 2005,* Ministry of Cultural Heritage and Activities Research, Innovation and Organization Department.

Cuneo P. (1986) *Storia dell'urbanistica. Il mondo islamico.* Bari.

De Planhol, X. (1989) Bam, History and modern town. *Encyclopaedia Iranica*, III, 650-651.

*Documentation… (*2004) *Graphic and photographic documentation on the city of Bam before and after the earthquake of 2004,* Iranian Cultural Heritage Organization (ICHO), Teheran.

Galdieri, E. (1982) *Le meraviglie dell'architettura in terra cruda*, Bari.

Gaube, H. (1979) *Iranian Cities, New York* [on Bam, 99-132].

Goldsmid, F.J. (1867) Notes on Eastern Persia and Western Beluchistan. *Journal of the Royal Geographical Society*, XXXVII, 269-297.

Jakubiak, K. (2006) The origin and development of military architecture in the province of Parthava in the Arsacid period. *Iranica Antiqua*, XLI, 127-150.

Joodaki Azizi, A., Jung, M., Fazel, L., Torrieri, V. (2019) Archaeological excavation of Tower 46/Shotor Galou in the Western Rampart /Citadel of the Arg-e Bam Complex. 16th *Annual Symposium on the Iranian Archaeology*, 5-7 March 2019 (in Persian).

Jung, M., Torrieri, V., Ahmadi, N. (2008) Objectives and Activities of the Iranian-Italian Archaeological Team at Bam (Report February 2008). In: *Arg Annual Report of Arg*-e *Bam Research Foundation*, 2, 8-11.

Jung, M., Torrieri, V., Ahmadi, N. **(**2010) Apporti italiani alle problematiche di conservazione promosse dall'UNESCO in conseguenza di calamità naturali. Arg-e Bam. Archaeological Research of joint Iranian-Italian Mission. Italian post-earthquake cooperation project of MiBAC. I-The archaeological research (2005-2010). *Bollettino d'Arte,* 6, 145-152.

Jung, M., Torrieri, V. (2010) II - Fortificazioni, sistemi difensivi ed eventi bellici a Bam. Fonti storiche e archeologia, *Bollettino d'Arte,* 6, 153-165.

Jung, M., Torrieri, V. (2013) Ritorno nel deserto dei Tartari. Le ricerche archeologiche italiane a Bam. *Archeo* 343, 30-41.

La cittadella … (2005) La cittadella fortificata di Bam. In: Proietti, G. (ed.) *L'eccellenza del restauro italiano nel mondo*. Ministero per I Beni e le Attività Culturali. Roma, 147-155.

Leriche, P. (2009) Das Baktrien der 1.000 Städte. In: *Alexander der Grosse und die Öffnung der Welt. Asiens Kulturen im Wandel.* Publikationen der Reiss-Engelhorn-Museen, 36. Regensburg, 155-167.

Lockhart, L. (1960) Bam. *The Encyclopaedia of Islam*, I, 1008.

Lolli Ghetti, M. (2005). *Iran, Arg-e-Bam. Italian cooperation proposal on the post-seismic phase. Action plan on the southwest tower*, lecture given at the *International Technical Meeting on the Rehabilitation of the Cultural Heritage of Bam and its Cultural Landscape*, Roma, 10-11 May 2005. Complesso di San Michele a Ripa (unpublished).

Mohseni, F., Bagheri Zadeh, F., Zarghani, L. (2008) Introduce & opening part of restoration (in Persian). In: *Arg Annual Report of Arg*-e *Bam Research Foundation*, 2, 155-158.

al-Muqaddasī = *Kitāb aḥsan al-taqāsīm fi ma'rifat al-aqalim/ Descriptio Imperii Moslemici, Bibl. Geographorum Arabicorum*, III, ed. M. J. de Goeje, 2. edit. Leiden 1906.

Nurbakhsh, H. *et al.* (1976) *Arg-e-Bam along with a short introduction about urban and urban-like development in Iran*, Tehran, (in Persian).

Pottinger, H. (1816) *Travels in Baloochistan and Sinde accompanied by a geographical and historical account of those countries with a map*. London.

Proietti, G. (2007) Bam: la rinascita di una città. *Il Quirinale*, 3, 5, 57-88.

Proietti, G. *et al.* (2013) Bam, Iran: progetto di cooperazione italo-iraniana per il restauro e il miglioramento sismico della Torre 1. *Bollettino ICR*, 27, luglio/dicembre, 73.

Prosperi Porta, Cl. (2012) Ritorno a Bam. Il restauro della torre 1 di Arg-e-Bam, *BioArchitettura*, 75, 30-9.

Rante, R. (2008) The Iranian City of Rayy: Urban model and military architecture. *Iran*, XLVI, 189-211.

Zare S. (2007) An introduction to some Greek pottery inscriptions, new findings from Bam, *Bāstānpazhuhī. Persian Journal of Iranian Studies (Archaeology),* 2,3, 118-119, (in Persian).

Tavan, G. (2010) Ritorno a Bam. Restauri Bam la Rinascita. *Archeo*, XXVI, 4 (302), 50-57.

Tayari, H. (without date and title) but: typewritten English version of Introduction to General plan of Arg-e Bam, in *Third Congress of the History of Iranian Architecture and Urbanism, Bam Citadel, Kerman-Iran*, April 14-19, 2006, 35-57 (in Persian)

Van Beek G. W. (1987) Archi e volte nell'antico vicino Oriente. *Le Scienze*, 229, 82–90.

Vatandoust, R., Mokhtari, E., (2004) Die Erdbebenkatastrophe in Bam. Iran - Strategien für eine aus Lehm gebaute zerstörte Stadt, in *Lehm 2004, Tagungsbeiträge der 4. Internationalen Fachtagung für Lehmbau, Weimar*, 220-233.