NEO-LITHICS 1/07

The Newsletter of Southwest Asian Neolithic Research

Contents

Editorial

The cancellation of the 6th Conference of PPN Chipped and Ground Stone Industries, originally scheduled for March this year, reminds us not to forget the reality of our research conditions and the direct links between research agendas and political issues. Is the Neolithic Family well beyond political situations when it wants to gather with all its members in the countries we are excavating the Neolithic? We are. And this should lead us to try it again, even if the 6th Conference has had to shift to Manchester (March 2008, *cf.* this issue). We thank Elisabeth Healey for taking up the momentum, and we express our gratitude to all the Jordanian colleagues who did so well in preparing the conference.

Neo-Lithics is planning to have two future dialogue/forum issues on the topics organized by guest editors. The first is "The Domestication of Water" and the second is "Landslides in the Eastern Mediterranean Neolithic", for which preparations have started. Invitations will be circulated in the near future.

At this time we would like to thank all authors who have contributed to *Neo-Lithics:* our newsletter is flourishing, and the editor-author feedback is developing amazingly well. Neolithic research in the Near East is doing splendidly, despite all the clamour and distraction.

Hans Georg K. Gebel and Gary O. Rollefson

Ba'ja 2007: Crawl Spaces, Rich Room Dumps, and High Energy Events. Results of the 7th Season of Excavations

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Introduction

The seventh season of field work of the Ba'ja Neolithic Project at the Late Pre-Pottery Neolithic site of Ba'ja near Wadi Musa, southern Jordan, was carried out between March 25-April 19, 2007, under the directorship of Hans Georg K. Gebel (assistant director: Moritz Kinzel) in cooperation with the Department of Antiquities of Jordan, and under the auspices of ex oriente e.V. at Free University of Berlin. Information concerning earlier research at the site and additional references are provided in Gebel 2001a-b; 2004a-b; 2006; Gebel, Hermansen and Kinzel 2006; Gebel and Hermansen 2004; and Bienert and Gebel 2004.

Aside from the excavation and aims described below, in the seventh season backfilling with sifted material was carried out for rooms in Squares C10, C11, and C21. Based on the understanding as a community-embedded project, work was also devoted to various measures to help sustainable developments in the transformation of the local tribal environment, the continued documentation of its socio-economic changes (Jürgen Baumgarten), modest direct support of local individuals, and the joint preparation for a Neolithic Heritage Trail reaching from Wadi Araba to Basta (a cooperative effort of the Basta, Ba'ja, Beidha, Ghwair, Shkârat Msaied, Wadi Faynan projects and the Department of Antiquities, Amman).

Fallen Ceilings in Room Dumps, Crawl Spaces in Ground Floors

The operations in B-North in 2007 were aimed to uncover the basements of "Central Rooms" 17 (domestic unit in B22/23/32/33), 22/23 (domestic unit in B12/13/22/23), and the "central room" above basement Rooms 2, 4-6, 37-38 (domestic unit in B21/22) (Fig. 2). In addition, the nature and the stratigraphical positions of the twin strengthening buttresses had to be examined, together with the architectural and contextual relations of the "central rooms" and their neighbouring spaces. The aim to reach the floors of the lowermost storeys was achieved for Room 17.1, 17.3, 22 and 23 (southern parts), 27.1, and 39.

The storey discussion of the split-level rising-floor architecture at LPPNB Ba'ja (Gebel 2006; Gebel, Hermansen and Kinzel 2006; for the specific architectural terminology used here, see Gebel 2006: 66) became increasingly complex with the 2007 results. It is obvious that in addition to basements ("created from upper storeys by building a new storey on top of them …"), we have in Ba'ja ground floors ("neutral term for a lowermost storey …") with crawl spaces of various heights beneath an upper storey. They may even have a pit-like appearance in substructure-type ground floors if they were established to create an even building level on the sloping bedrock (especially below Room 17). Again our terms: ground floors, basements, raised floors, and others were found to "idealize" what often has an architecturally intermediate appearance. However, the "central rooms" of Area B-North with their twin buttresses, "supporting structure grid"1 ground floors (Gebel 2006: 71), adjacent stairwells, room fills, and other elements of the LPPNB architectural and sedimentary morphodynamics, remain to be the principal evidence of the terraced two-storeyed architecture in Ba'ja. Its domestic units consisted of smaller rooms in the basements that supported a larger "central room" with smaller rooms around in the upper storey.

Area B-North, Rooms 17 and 2 (Figs. 2-3)

Room 17 (BNR17) measures approximately 3x3 m and is characterized by two interior opposed (twin) buttresses on its northern and southern walls. The earlier excavations of Room 17 were carried out in 2000 and 2001 (Gebel and Hermansen 2001; Bienert and Gebel 2004), and reached a level of some 40 cm below the preserved upper edge of the walls. The cultural layers in Room 17 were cut crosswise in order to gain two sections through the room fill. Room 17 was excavated completely, as well as the Rooms/Spaces 17.1 and 17.3 underneath (reaching bedrock); Room/Space 17.2 remained unexcavated.

Room 17 represents an upper "central room" whose floor and both twin buttresses rested directly on the solidly built "supporting structure grid" of the ground floor. The architectural appearance and plan of this ground floor resembles a substructure system creating rooms or spaces. This ground floor revealed three unconnected smaller room-like spaces (17.1-3) that are only accessible from above through the "central room's" floor, and

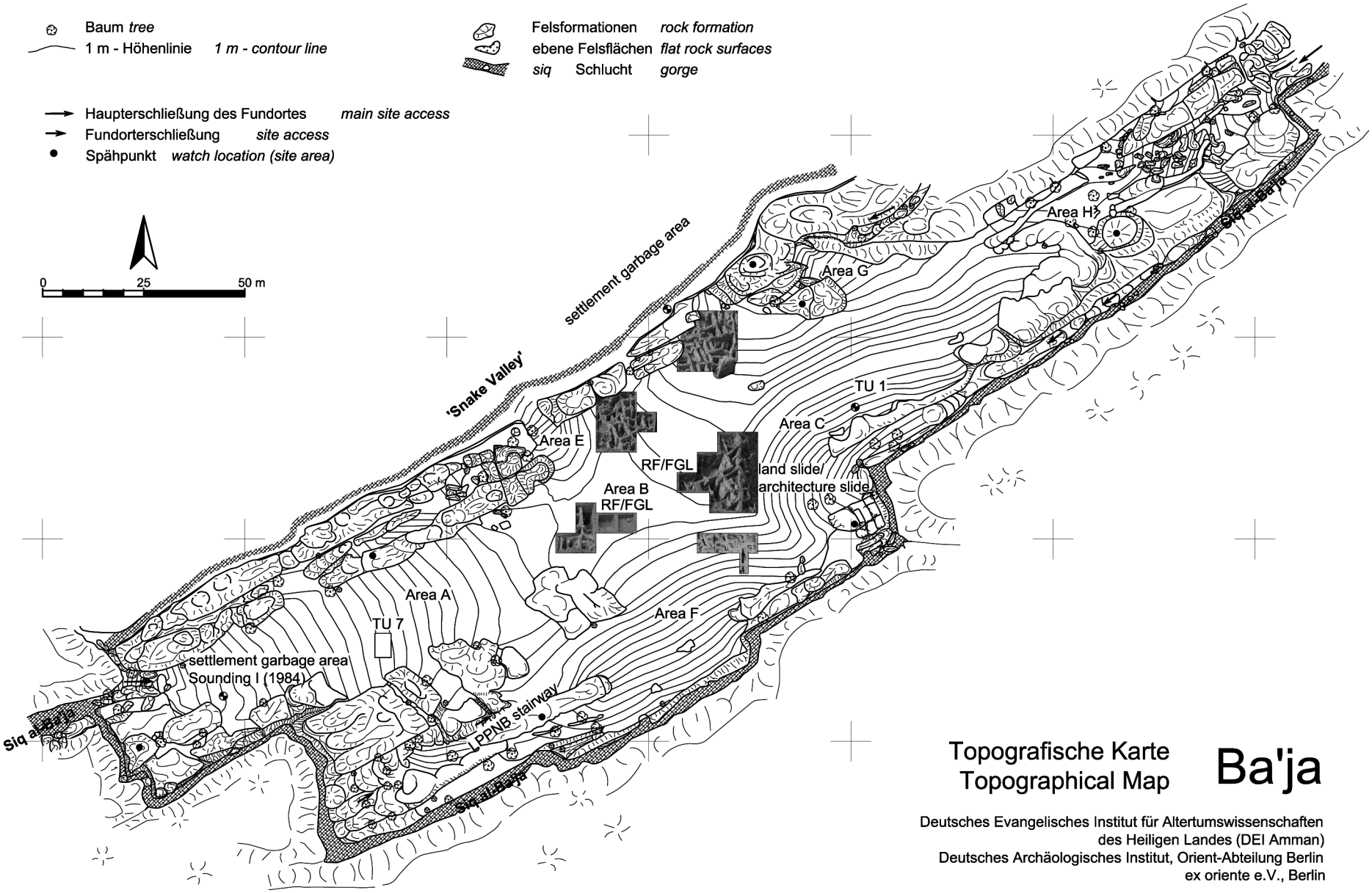

Fig. 1 Ba'ja site topography: excavation areas and test units in 2007 and site functional aspects. (topogr. map: Hartl-Reiter et al., photos/contents: Ba'ja N.P.)

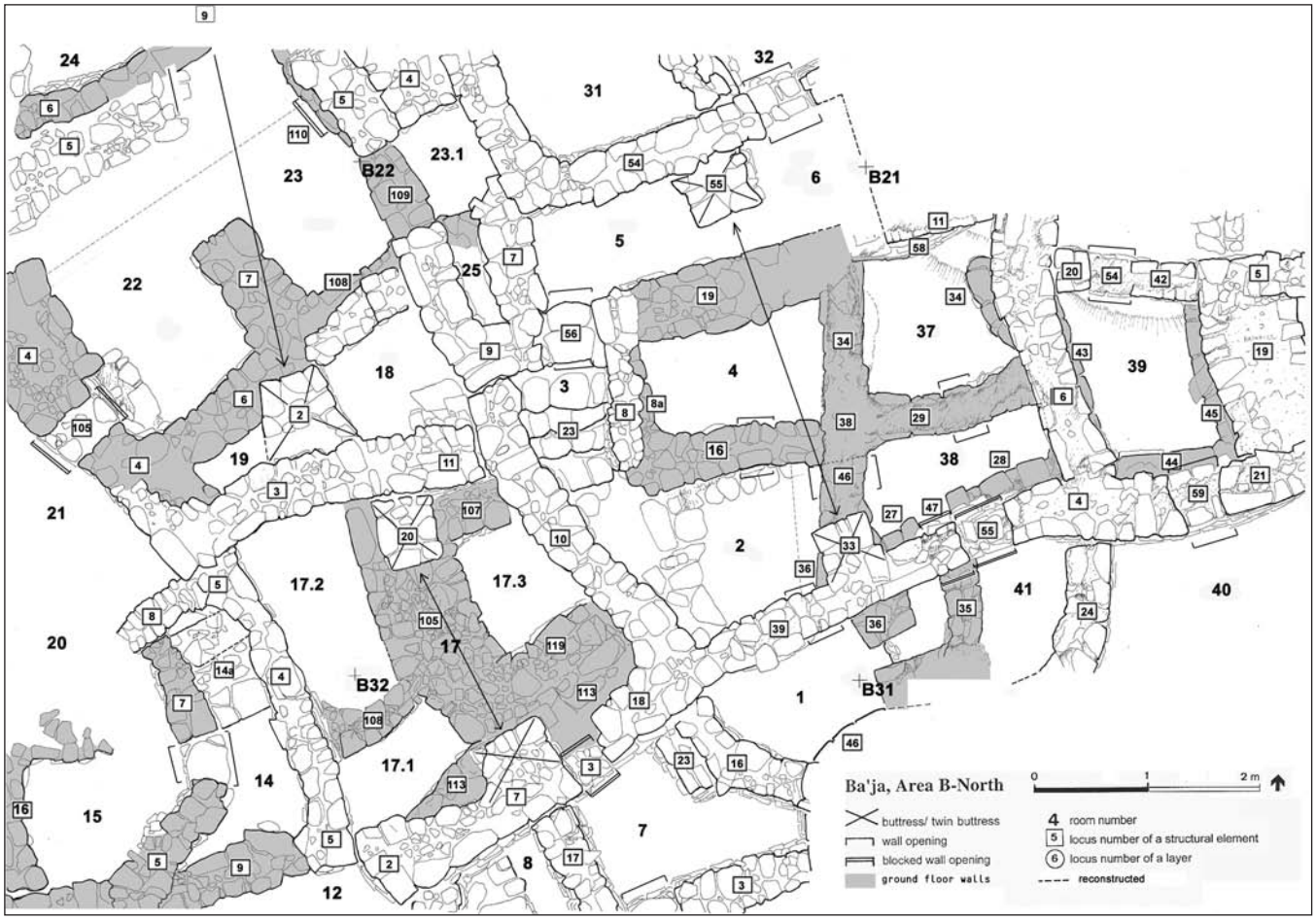

Fig. 2 Ba'ja, Area B-North: "Central Rooms" 17, 22/23, and "central room" above basement Rooms 2, 4-6, 37-38 with adjacent rooms (hatched: walls of basement/ground floors). (drawing.: Moritz Kinzel)

they are separated by an astonishingly thick wall (*ca.* 1 m, Loc. 105). The excavated Rooms/Spaces 17.1 and 17.3 revealed a maximum height of only 75 cm between their floor level and the ground floor's upper edge. Both rooms had a red plaster floor (17.3 including a renewed one). It is interesting that the plaster floors are stratigraphically earlier than all the (interior) ground floor walls, and later than their outer walls. This means that the lower parts of the Room 17 walls were built earlier (except Loc. B32,7) than the erection of the interior "supporting structure grid" (*cf.* Fig 2: shaded walls between 17.1-3). Originally, most of the outer walls belonged to the surrounding rooms, which left the later area of Room 17 as an open space.

Parts of the ceiling material (Loci 104 and 117) were preserved in situ on the ground floor walls. Its non-organic components consist of an extremely hard and patchy layered mortar-like material of *ca.* 15 cm thickness (Loc. 104) upon which a 10 cm thick bed with fine gravel was preserved (Loc. 117). The room fills are characterized by a high content of loam and lime. The stratigraphy of both spaces (17.1 and 17.3) shows a similar pattern. Above the plaster floors were special find associations, some of which still reflect their primary contexts; these finds (articulated animal bone midden, flint artefacts) in Room/Space 17.3 rested 3 cm above the floor, separated from it by a sediment layer. Above, it was followed by ceiling material (Loci 111 and 114). Artefacts such as grinding tools were embedded particularly in its lower part, with some tendency of concentration close to the room/space corners. The ceiling material itself was sealed by several layers, mainly consisting of compact loamy material mixed with lime and wall stones. These probably represent the collapsed roof material intermixing with the material of dilapidating walls. However, the *in situ* find of an entire and articulated bone necklace (Loc. 118) suggests a fast collapse of the roof after the terminated use of Room 17, and its use as a dump. Furthermore, large quantities of ash mixed with roof and wall materials – particularly in the W half of Room 17 (Loci 106=110=112) – indicate that the burning of parts of the roof caused the end of the room use (or occurring after its abandonment). The findings of Rooms 17, 17.1, 17.3, 22/23 will be subject of a separate publication (Gebel, Kinzel and Purschwitz, in prep.).

The excavation of "Central Room" 17 confirmed further the two-storeyed nature of the housing in Area B-North. Its lower fills represent intermixed deposition of roof/ wall collapse with the material used on the roof (dilapidation and eroded original use contexts) and dis-

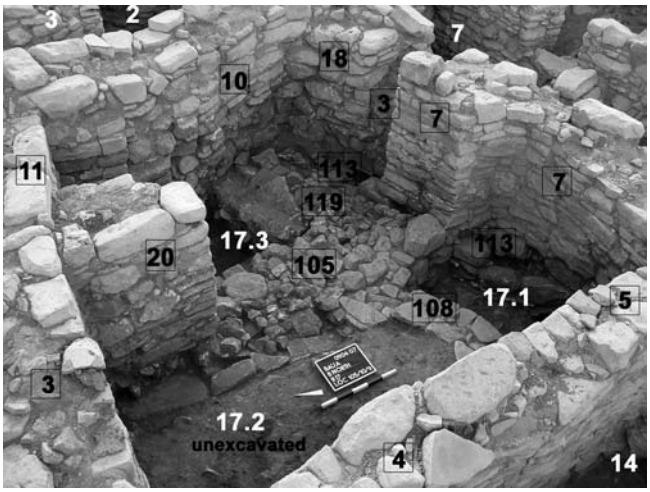

Fig. 3 Ba'ja, Area B-North, "Central Room" 17: Twin Buttresses 7 and 20 of upper storey "Central Room" 17 and exposed ground floor Rooms/Spaces 17.1 and 17.3. (photo: Ba'ja N.P.)

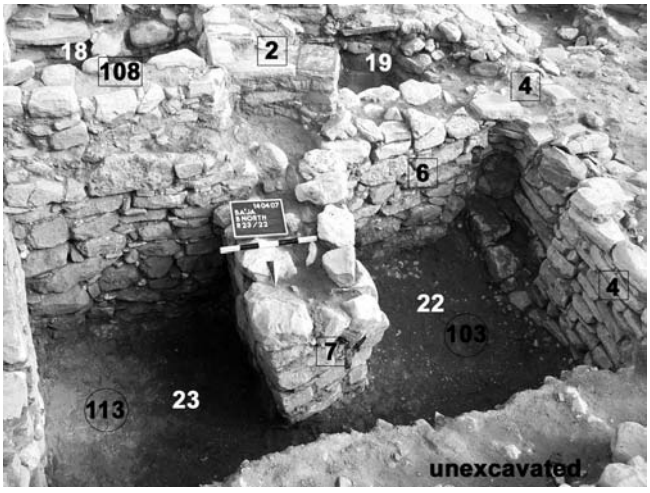

Fig. 4 Ba'ja, Area B-North, below "Central Room" 22/23: early floor exposed in ground floor Rooms 22 and 23. (photo: Ba'ja N.P.)

carded cultural material (use as dump after abandonment). The cause for the abandonment of Room 17 might have been a fire by which part of the roof collapsed. During the process of dilapidation these materials sank further down into the ground floor spaces, mixing here with the materials of the ground floor ceiling/floor of the first storey: The upper parts of the ground floor fills show roof collapse materials, followed by the ground floor ceiling material mixed with grinders underneath. Room 17 represents the core element of a domestic unit in Ba'ja: a "central room" with a ground floor/basement. The artefact assemblages suggest a short re-use of the room as dump area; the associated objects still reflect their original contexts representing food preparation, sandstone ring workshops, household garbage, and discarded personal items.

The excavation of Room 2 resulted in the exposure of a red-stained plaster floor, which was already exposed in the 2005 season. As in Rooms/Spaces 17.1 and 17.3, the "supporting structure grid" was partly erected directly on the previously established plaster floor. The "supporting structure grid" walls themselves are characterized as small juts on which ceiling material was preserved *in situ.* These juts and a small wall created another pit-like space of some 30 cm depth, upon which the Crawl Space/Room 2 gave access to the adjacent Rooms 1, 4 and 38. Ring workshop remains were embedded in the ceiling/ roof material, indicating a ring workshop on the roof.

Area B-North, Rooms 22 and 23, 23.1, 27 and 27.1 (Figs. 2 and 4)

The excavation of the ground floor Rooms 22 and 23 below the northernmost "Central Room" 22/23 in Area B-North (BNR22/23), located between a system of buttresses (Gebel 2006; Gebel *et al.* 2006)[2] was continued in 2007 in its southern half. It exposed the base of the room dividing Wall 7, the top of a small wall or a stone row or step (?) below the east of Wall Opening 105, and the room fill stratigraphy. While it is rather clear that the Twin Buttresses 2 and 9 relate to the establishment of the "central room" of the upper storey, the architectural stratigraphy of Loci 4 in B23 and 4 (with its abutting Loc. 5) in B12-13 remained unclear. Do the latter indicate another twin buttress situation for Room 22/23?

Like the operation in Room 17, the ground floor room fills of Rooms 22 and 23 showed an extraordinary high density of finds, representing various depositional processes and events, as well as very different primary, secondary, and tertiary contexts and activities. Excavation in 2007 ended with the exposure of Floor 113 in Room 23 and 103 in Room 22; both loci represent one floor at one level. Its plaster extended onto wall base Locus 7, which continues below Locus 113/103. The room was left clean (free of *in situ* finds) before the deposition of the room fills started. The character of the deposits in Rooms 22 and 23 is quite different. After a deposit containing a high amount of charcoal (on the floor of Room 22), a layer of ceiling material was deposited over the Floor 113/103. This ceiling material contained quite a number of animal bones, especially concentrating in Room 23. In Room 23 also were the remains of a celt workshop, and some eight grinder fragments and other objects were intentionally deposited; another concentration of some 13 complete and fragmentary grinding tools were found in later room fills of Room 23 (Loc. 111). The other finds of the lowermost Room Fill 112 in Room 23 show a high concentration of bone tools, worked stone, bracelets and ornaments, representing a mixture of settlement debris either deriving from upper storeys or being dumped here. The lowermost Room Fill 102 in Room 22 had a high concentration of animal bones and waste collected from a ring workshop. Above this locus

another concentration of ring workshop waste was deposited, followed by a concentration of animal bones.

The remaining parts of the room fills in Rooms 22 and 23 also produced a sequence of find-rich deposits mixed with stone rubble, grinding tool fragments and pestles, numerous but isolated mother-of-peal objects, worked bone, shell ornaments, various classes of personal objects (paillettes, pendants), a few grooved stones, a "statue-shaped" pestle, and odd-shaped natural stones. Especially interesting are the small sling ball assemblages found in Loci 101, 103, 104, 111, and 112 (Gebel in prep.): representing preserved secondary contexts, they testify to the repeated intentional dumping of primary contexts in the ground floor rooms.

We think that the ground floor room fills in 22 and 23 represent a sequence of intermingled depositional events. During intramural decay (collapse of first floor ceiling and roof material, eroding wall plaster, wall rubble) intentional dumping took place, including secondary contexts of material originating from individual primary contexts: food preparation by grinding tools, celt and sandstone ring workshop waste, mixed household garbage, and various other primary contexts; tertiary contexts included materials from surrounding deposits that were washed in. It cannot be excluded that material once used on the roof are in these deposits. Contrary to Room 17 the finds in the ground floor room stratigraphy of 22 and 23 are more fragmentary. While dumped secondary contexts dominate in the lower room fills, tertiary contexts characterize the upper room fills. Together with Room 17, this sequence again argues for the concentration of sealed early Neolithic deposits in the lowermost room fills.

The baulk that remained from earlier excavations in Room 27 was removed. Three events of wall rubble deposition were traced. The lowermost part of the room did not show a preserved floor, but exposed instead a bench-like substructure (Loci 103 and 104) to the south, east and west. The "bench" rests on the bedrock (Loc. 102) and forms with the cut bedrock in the north a pit-like space (Loc. 101, called Room/Space 27.1, 65 cm in depth) under Room 27. The bedrock was clearly cut out to extend this space created by the "substructure" walls to level the bedrock for the first storey. The pit seems – in its latest stage of use – to have been intentionally filled with an almost sterile sandy and loose material. The original use of the pit is unknown (collective burial?, storage?).

Area B-North, Square B21 (Figs. 2, 5-6)

The opening of B21 extended Area B-North towards the east. The expansion aimed to understand the eastern extension of the two-storied ground plan of the domestic unit in B21-22 that has a "central room" between Buttresses 55 and 33 above the ground floor or basement Rooms 2, 4-6, and 37-38 (Gebel 2006; Gebel, Hermansen and Kinzel 2006).

B21 was found divided E-W by the long Wall 4/21; Wall 6 runs northwards at a right angle from Wall 4/21. The western border of B21 is occupied by Wall 38 (= B22,34 of 2005), the top of which is covered with thick remains of ceiling/floor material. This material was also found on top of Wall 29, located between Walls 6 and 38 and separating Rooms 37 and 38. Close to the east baulk another wall, Locus 19, runs N-S, contacting Wall 4/21. It seems to be a massive wall (1 m wide), with its east face running into the baulk.

Wall 6 turned out to be the east wall of the "central room" in B21-22 that used the Twin Buttresses 33 and 55. The room rested above a "supporting structure grid" formed by the walls of Rooms 2, 4, and 37-38 that were reduced in their heights before establishing the new upper storey with the "central room" (Gebel 2006).

South of Wall 4/21 a curvilinear wall (Loc. 24 of B21; Loc. 46 in B32) bends from N-S to E-W directions, separating Rooms 40 and 41. In Room 41, low walls of a channel-like structure (Loci 35 and 36) are attested, coming out of wall opening in Wall 4/21.

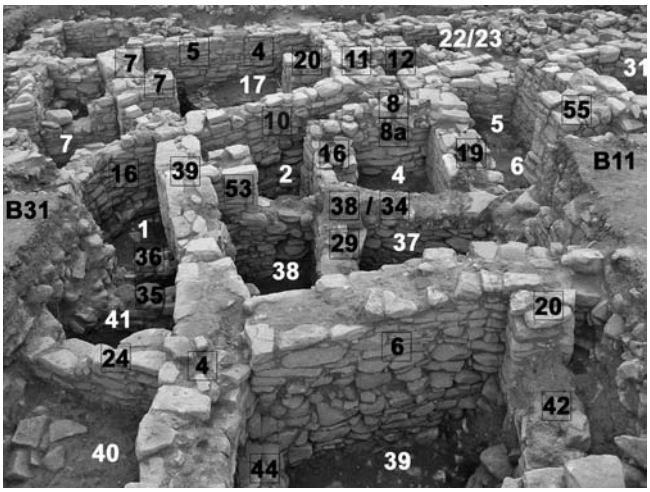

Fig. 5 Ba'ja, Area B-North, B 21: view of B21 (foreground) with western parts of Area B-North. (photo: Ba'ja N.P.)

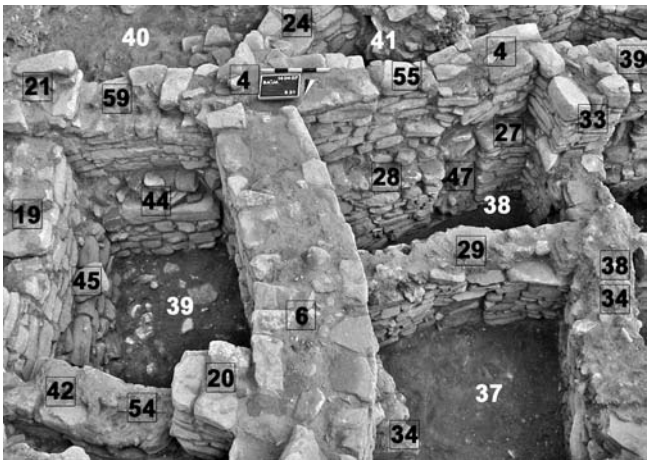

Fig. 6 Ba'ja, Area B-North, B 21: Rooms 37-39 with ground floor walls and *in situ* ceiling material on wall tops. (photo: Ba'ja N.P.)

The building stratigraphy of B21 revealed that the roughly set cobble-faced Walls 44, 45, 43, and 54 of Room 39 and Locus 43 of Rooms 37 and 38 form the first structural remains in the square. They created the foundation level of the first storey's walls (*e.g.* Walls 6, 21, 19, 42 of Room 39). These rough walls are in contact with the bedrock at the northern sides of Rooms 39 and 37, and probably remained unplastered. B21 shows that basement/ground floor walls close to bedrock tend to be wider, possibly also seen in Test Unit 7 (*cf.* below), and they were erected with the intention to support an upper storey. The construction of both the ground floor and the upper storey in one building process seems to be in evidence with the B21 results for building plots near bedrock.

Entrance/access to the rooms west of Locus 6 was most likely possible through an opening (Loc. 46) in Wall 38 leading to the narrow Room 38 with openings to the neighbouring Rooms 37 and 41. There are no openings in Wall 6 leading to the rooms east of this wall. This may indicate that Locus 6 separated two different housing units. However, the heights of the coarse basal walls of both houses are similar, suggesting that their first floors rested on similar levels. The room fill in Rooms 39, 38, and 37 showed remains of fallen ceilings with the material still accumulating along the walls and in the corners of the rooms. More layers with patches of floor and ceiling material followed in the room stratigraphy downwards. It is probable that these room fills in the basement/ ground floor rooms have been partly built up by intentional filling before the Floor 33 (equivalent in height with the ceiling/floor remains of Loci 12 and 13) was laid. Above Locus 33 in Room 39 the remains of a ring workshop were deposited from a floor/roof above, found between a sequence of secondary and tertiary deposited wall and ceiling/roof materials. In the ceiling material (Loc. 33) a lintel stone (60 x 20 x 15 cm) and a threshold (30 x 30 x 41 cm) with a depression in the corner of one face were found lying upright. Probably they fell from one of the wall openings related to Loci 20 and 42.

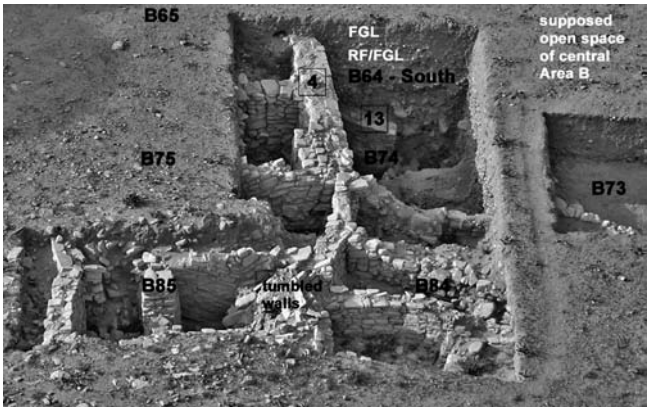

Fig. 7 Ba'ja, Area B-South, southern B64: RF/FGL evidence and tumbled walls in B84/85. (photo: Ba'ja N.P.)

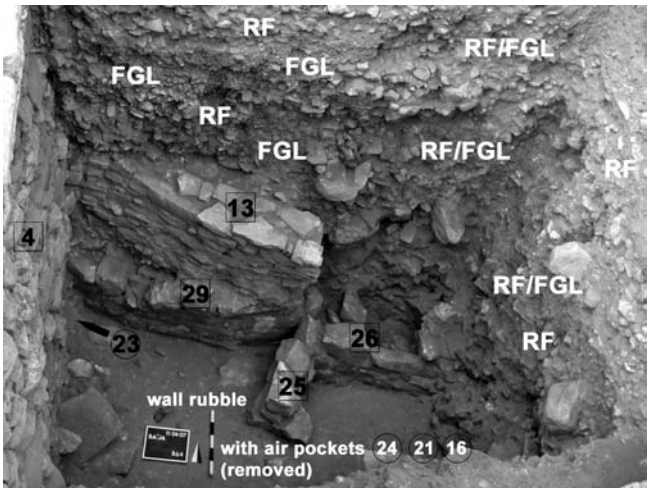

Fig. 8 Ba'ja, Area B-South, southern B64: earliest architectural remains with partly removed wall rubble loci and RF/FGL deposits above earliest architecture. (photo: Ba'ja N.P.)

Huge Rubble and Fine Gravel Flows, Wall Rubble and Air Pockets

Area B-South, B72 and B73 (Fig. 7)

The northern halves of both squares located close to the flat central part of Area B were opened in order to trace evidence of the supposed open space in central Area B. After the fine-grained layers (FGM) characteristic for the site's sub-topsoil stratigraphy were removed, excavation was suspended on top of greyish cultural debris layers containing redeposited smaller stones, disintegrated charcoal, and artefacts (at *ca.* 50 cm below the surface). Only in the north half of B73 was excavation continued for about 40 cm deeper into these cultural debris layers. The relationship between the thick fluvial flow of fist-sized stone rubble containing fine gravel lenses (RF/FGL) of B64 and B74 and the greyish cultural debris layers in B73 could not be clarified. It was astonishing to recognize here different layers at similar heights and in close vicinity (Baulk B73/74), which probably do not have the same origins, interact with each other.

Area B-South, Lower B64 (Figs. 7-8)

Excavation continued in the southern half of B64 to gain more insights into the huge intrasite rubble and gravel flows (RF/FGL) resting against high walls and on the large wall rubble accumulations, features that presumably result from high energy events like flash floods and earthquakes. The same features are reported from Area C (see below) at a distance of some 20-30 m. Observations and more evidence from this season allow us now to raise the topic of catastrophic impacts on settled life in Ba'ja.

The oldest wall remains exposed so far in southern B64 run roughly E-W (Loc. 26 in the east, Loc. 29 in

the west under Wall 13). To the south of these walls extends a huge accumulation of wall rubble and loose sediment with air pockets (Loc. 24) that evince an episode of rapid destruction and/or deconstruction, at any rate representing high energy events or its consequences. It could be the result of a major earthquake followed by the intentional burial of material from deconstructed walls. Above Locus 24, Locus 21 was found to be of similar origin but with quite a number of air pockets between the stones, mixed also with a higher amount of loose, redeposited material including mortar/ plaster/ceiling debris containing charcoal. Locus 21 reaches heights of the basal parts of Wall 13; Locus 21 especially looks like freshly deposited debris of a disastrous event. Above Locus 21 rests Locus 16, again with much wall rubble and air spaces, reaching heights of the central preserved part of Locus 13 wall. Wall Locus 13 runs into the lower cobble-faced phase of Wall 4 that rests on a layer of pure and densely packed ceiling/ mortar/plaster material (Loc. 23). The stratigraphic relation of Layer 23 to Wall 29 is that it is a later fill than Wall 29. Layer 23 must have been deposited while the wall rubble Layers 24, 21, and 16 were accumulated. Only after this rapid deposition of wall rubble Wall 13 was built. It used Wall 29 as a foundation, which still bore patches of red plaster (*e.g.* Loc. 19 in 2007). Wall 13 seems to have been reduced in height, probably during the erection of the upper phase of Wall 4 (= coarse-faced upper part of Wall 4). On top of Wall 13 rests the moraine-type flow of fist-sized rubble/gravel with embedded fine gravel lenses (RF/FGL) that is also attested in the east sections of B64 and B74.

In an interpretation of the events in Area B-South we may identify three major high-energy impacts. The first is related to the wall rubble accumulation with air spaces that has a minimum thickness of 1.5 m (not fully excavated yet) in lowermost B64, which seems to be the result of an earthquake destruction of the lowermost architecture in the area and of subsequent intramural space filling. The second relates to the huge fluvial rubble/gravel flow (RF/FGL) resting against the walls of the next building phase (*cf.* also the fine gravel deposits inside the "gate" in B74), which must have filled also empty spaces in central Area B. The thickness of the flow reaches 1.5 m in spots, and it might represent more than a single event (*e.g.* embedded fire places). The third is represented by the twisted walls in upper B83 and B84 (Fig. 7): The energy made walls lean in all directions and did not follow a specific vector or pattern, which also leads us to conclude that this resulted from an earthquake.

Area C, Square C-10, Baulks C-20/20 and C-10/10 (Fig. 9)

The operation in C-10 and the baulk removals in C-20/20 and C-10/10 were aimed to clear a stairwell location in C-20/20 that connected two occupational levels in C-10/10/-20/20/21 in order to understand a later building phase resting on the fist-sized rubble/ gravel flow with embedded fine gravel lenses (RF/FGL), as well as to link the C-10 architecture with that of C10 and C20. Like B64 and B74, western Area C reflects two major impact events: an extensive earlier wall rubble pile with air pockets in C20 (incompletely excavated) in a rather large open space, a huge rubble and gravel flow resting against high standing walls, *e.g.* Walls 10/11 of C-20/20, before the reorganization of space and architecture of the upper architectural phase took place. After six seasons in Ba'ja, we could distinct a separate and later architectural phase, which is not part of the overall architectural and morphodynamic complexity of succeeding modifications that prevent the identification of clear and general sub-phases.

The operations in western Area C allowed us to connect the building stratigraphy around the open space in C20 with the remains in C-10. After the removal of the baulks it became clear that Wall 5 of C-10 continues in C10; together with Buttress 114 of C10 and Wall 6 of C-10, this E-W running wall represents the latest architectural phase in the area. It runs against the big and reinforced buttressed terrace Wall in C1 and C10-11 (Bienert and Gebel 2004: 125). It is erected on the RF/FGL flow with layers of small fluvially sorted and laid gravel (8-15 mm), and this is also the case for Buttress 114, Wall 6, and Buttress 26 in C-10. These water-laid fine gravels are also found in the north section of C20, where they accumulated against the eastern face of Wall 10 (former Baulk C-20/20). Here these fine gravels appear as lenses and layers inside the upper parts of a rubble/gravel flow, consisting of fist-sized stones, that forms the upper fill of the rooms in C-10 and Baulk C-20/C20.

In the corner east of Walls 6 and 5 a dense and hard greyish layer (Loc. 25) of mainly fist-sized stones was

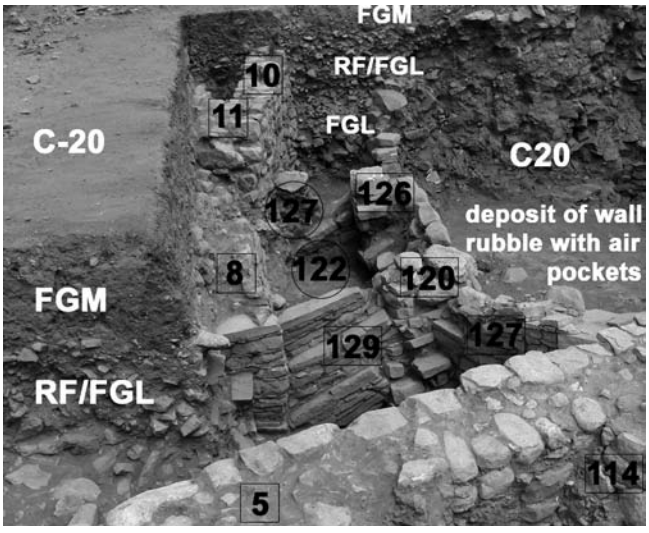

Fig. 9 Ba'ja, Area C, C10 and C20: tumbled stairwell, open space with wall rubble, RF/FGL and FGM deposits, and latest architectural phase remains. (photo: Ba'ja N.P.)

found in which a stone-lined box (Loc. 19) was inserted. All the aforementioned wall remains were covered by the light brownish fine-grained material (FGM) forming the sub-topsoil layer in all Areas A and C; its thickness reaches 60 cm.

The RF/FGL rubble/gravel seems to have terminated the earlier architectural occupation in western Area C, causing the reorganization of its space. This earlier occupation is represented in C20 by Walls 120 (with two blocked window-like wall openings = Loc. 127, earlier plastered in red inside), 128 (in the north baulk), 133 (with Wall Opening 134), Staircase 129, and Walls 10 and 11, 7 and 8 in Baulk C-20/20. The destruction of this phase seems to be evidenced by the deposition of the huge wall rubble in the open space of C20 and in the space between the Walls 120 in C20 and 5, 26 and 8 in C-10 (where also many lintel stones were found). The orientations of this wall rubble are mixed; the deposits have a lot of air pockets, revealing a rapid and probably intentional filling of the space. It is assumed that this action relates to the deconstruction of walls that followed a high-energy event like an earthquake. This must also have twisted the complete Stairwell 129, simultaneously leaning it down by the height of one step.

This high-energy event may not be related to the destructive event represented by the rubble and gravel flows described above. It is rather clear that the destruction of architecture ("earthquake") and subsequent intramural filling with its wall rubble preceded the rubble/small gravel flows entering, for example, the second room to the north of the stairwell. Water appears to be the agent of transport and movement in this destruction phase before the latest walls in western Area C were erected. This combined evidence of earthquake or earthquake-like destruction[3] and rubble/fine gravel flow is also attested in B-South, especially B64, where similar fine gravel layers inside a major sequence of rubble/gravel flows (*ca.* 1.5 m) rest against Wall 4, also entering inside the "gate" in that wall in B74.

Concerning Eroded Architecture and Other Doubts

Area A, Test Unit 7 (Fig. 10)

The excavation in Test Unit 7 (TU7) was aimed to understand the occupations and function of Area A, the main access area to the site from the gorge leading up to the site (Fig. 1). In 2005, the corner of a building/structure occurred in the southern part of the trench, as well as a contracted burial in the ashy cultural slope rubble, most likely belonging to the Final LPPNB (Gebel, Hermansen and Kinzel 2006: 18-19).

In 2007, TU7 was extended further to the west by another 2 x 6 m. This extension revealed the same upper slope stratigraphy as found in 2005, with again no structures but charcoal- and ash-rich layers mixed with cultural debris and many fractured animal bones below the upper slope rubble. In order to clarify further the structural remains in the southern part of TU7, a 3 x 4 m sounding, later reduced again to 1.5 x 4 m, was taken down to virgin soil and bedrock near the southern section; no further architecture appeared here.

Walls 7 and 8 of 2005 were exposed down to their foundations, which may also be single-course cobble lining along the wall base (Loci 29 and 30, including stone packing). All structural remains in TU7 used mostly cobble-shaped limestone and sandstone pieces chosen from the *wadi.* This is very reminiscent of the picture presented by the near-bedrock walls in Area B-North: Also here the newly found pattern of cobble-faced rough walls forming the bottom of the architectural occupations is attested.

The situation exposed by TU7 suggests that central Area A may have had structures that, while they may have been eroded in the middle parts of Area A, are only preserved at its vertical rock-lined sides. Here they later experienced the deposition of the aforementioned ashy cultural slope debris deposits (blackish-greyish-brownish patches containing charcoal, bones, flint and sandstone ring artefacts). These patchy layers are roughly horizontally bedded, and they most likely represent slightly redeposited open-air dumps mixed with some gravel and eroded wall materials, using the still terraced nature of (central) Area A, a characteristic of the area observed earlier.

Below the wall foundations/stone linings, Loci 29 and 30 (sandy loamy layers with charcoal, flints, bones, other artefacts, and fist-sized stones) occurred over the sandy loamy virgin soil resting over the unweathered and sharp-edged bedrock. It can be concluded that the walls and the foundations were built here on structural debris layers since they did not touch virgin soil and bedrock.

Fig. 10 Ba'ja, Area A, Test Unit 7. (photo: Ba'ja N.P.)

Areas A-C (Fig. 1)

A long-standing argument for Ba'ja was the axiom of a long duration for the use of the site, as it was concluded on from a deep architectural stratigraphy and the intensive use of horizontal and vertical space. Evidence after seven seasons of excavations now nourishes doubts. More and more bedrock or virgin soil was reached after exposing more short architectural sequences, and Area A might not have been densely occupied. Area B-North only shows one domestic phase, consisting of ground floors/basements and one upper floor. Area B-South may soon touch bedrock after a sequence of a maximum of two phases, as can also be expected for Area C. It will be the aim of future seasons to concentrate on duration studies of all kinds in order to evaluate how long Ba'ja was likely to have been occupied. However, the understanding that all space, including exposed bedrock and extreme slope settings, was used in Ba'ja is repeatedly confirmed.

Major Results of the 2007 Season

After seven seasons of excavations, the site of Ba'ja still surprises us with substantial new insights that trigger new questions and hypotheses. Before reconsiderations are presented, we summarize the main results of 2007:

1) Increasing evidence of extreme high energy events that destroyed the settlement's architecture: In addition to the (fluvial?) destruction of eastern Area C by a slope subsidence (Gebel and Bienert *et al.* 1997), there is evidence of (a) massive wall destruction – and deconstruction of walls – in basal Area B-South (B64) and in Area C (C20), followed by (b) thick flows of rubble/gravel (RF, up to 1.5 m in height) with embedded waterlaid fine gravel deposits (FGL) that rest against tall standing walls or were found under a later architectural phase in C-10/10.
   Most likely the wall rubble layers result from at least one earthquake (and subsequent instabilities of houses) in the earlier settlement. Another earthquake could be attested by the twisted walls in upper B84-85 (Fig. 7). It is necessary to consider the possibility that the RF/FGL flows result from flash floods reaching the central upper parts of the settlement from the gorge (Siq al-Ba'ja), and that the floor of the *siq* was much higher than today (Fig. 1).
2) Lower storeys near bedrock at Ba'ja must not be true ground floors or basements. Often they are crawl or pit-like spaces established by substructure-type walls that helped to level the sloping bedrock and supported the first floor. The transformation of first floors into basements, described elsewhere (Gebel 2006), is a feature of a later architectural development of a building. Unplastered cobble-faced walls characterize near-bedrock ground floors and are rarely found in the upper architectural stratigraphy.
3) Find-rich intra-mural middens can appear in and below "central rooms", witnessing here a superb sequence of interacting primary, secondary and tertiary deposits/contexts. They provide the best chance to trace the storey use in a house, and they contain ceiling material and roof use evidence. They also may represent the evidence of a spatial reorganization of a building subsequent to a destructive impact: Secondary contexts in the fills may reflect indirectly catastrophic events or severe impacts in neighbouring parts of the settlement.
4) The question of water access in Ba'ja needs to be reconsidered, and the ideas of Gebel 2004b have to be followed further. It is quite likely that the *siq* of Ba'ja was much less incised, allowing the catchment of water by simple installations or that natural basins existed storing water, as discussions with hydrologists visiting the site (H. Fahlbusch, Lübeck and others) have suggested.
5) Initial pedological investigations by Bernhard Lucke, Cottbus Technical University, revealed – among other results – that the site rests on a well-developed palaeosol. This as well as the less-developed current sandy soils in the vicinity were suitable for mortar and plaster production. A simple test proved that the soils harden without further additives, pointing to a high clay content (estimated to ~25%, texture classified as strongly sandy loam (Ls4) according to the German soil mapping guidelines). (B. Lucke, pers. comm.)

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Notes

[1] Our problematic term "girder grillage" used in earlier publications (Gebel 2006; Gebel, Hermansen and Kinzel 2006), meaning in LPPNB contexts a loadbearing grid of walls inserted into a larger space to support the floor of an upper storey, is now replaced by the term "supporting structure grid".
[2] Herein, by mistake the ground floor dividing Wall 7 was considered the twin of Buttress 9. In fact, it is the Buttress 2 between Rooms 18 and 19 which is the counterpart of Buttress 9, *cf*. Fig. 2.
[3] Of course, other impacts or scenarios can be imagined for Ba'ja, *e.g.* the collapse of two-storeyed buildings due to neglected maintenance, construction and material deficits, wet walls and ceilings/roofs or slopes after heavy rains/snow etc. (which could have also affected more stable neighbouring buildings in a densely built village). Scenarios of mixed/interacting causes (melting snow/heavy rains, structural instability on steep slopes, earthquake, landslide) have to be assumed, too.

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