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Ba'ja 2003: Summary on the 5th Season of Excavation

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Introduction

From 30th of Aug. – 15th of Sept., 2003 the fifth season of excavation took place at the Early Neolithic site of Ba'ja – al-Mehmad, Wadi Musa district, Governorate of Ma'an. The Ba'ja Neolithic Project is directed by Hans Georg K. Gebel, Free University of Berlin, and Bo Dahl Hermansen, Copenhagen University (deputy director) in cooperation with the Department of Antiquities, Amman. The representative of the Jordanian Government at the dig was Hussein Jerah, Deir Alla (archaeologist). Members of the team in addition to the directors included Mareike Andresen (student, archaeology), Jürgen Baumgarten (assistant archaeologist), Christian Hannß (geomorphologist), Rasmus Kehlet (archaeologist), Moritz Kinzel (architect), Anne Moenster (student, archaeology), Saif Talal al-Quran (archaeologist), Muhammad Barakat Tarawneh (archaeologist), Klaus Traulsen (dig technician). The project is supported by *ex oriente*, a research association at Free University of Berlin, and cooperates with the Carsten Niebuhr Institute at Copenhagen University.

The site of Ba'ja, located in an extreme mountain setting and difficult to reach through a narrow gorge (*Siq al-Ba'ja*) (Gebel & Hermansen 1999, 2000, 2001; Gebel 2001, 2004), lies some 10 km north of Petra/Wadi Musa. This small Late Pre-Pottery Neolithic B village (2nd half of the 8th millennium BC, *c.* 1.2-1.5 ha) is part of a local settlement system in which the mega-sites of al-Baseet (Wadi Musa) and Basta (near Ail) also flourished. Ba'ja is characterized by pueblo-type dense domestic areas, where sandstone rings of bracelet-size were fabricated for export. Recent considerations have emphasized that the extreme location also might be related to topographically favored chances for water harvesting in the gorge passing the site (Gebel in press).

Major Results of the 5th Campaign

The 2003 season aimed to resolve open questions from previous seasons in preparation of an interim monograph and to enable a new period of large-scale excavations by new questions. The 2003 excavations took place in the following squares: C10 and B64-South were newly opened; baulk removals took place at B64/74, B64/65 and B74/84. Excavations were continued in Squares C0, C10, and C20, while in B85 minor excavation and cleaning took place (Fig. 1). The major results of the 2003 season are:

Fig. 1 Ba'ja: bird's-eye view of Early Neolithic Ba'ja from the southwest (photo: K. Traulsen / M. Kinzel).

Collective Burials

The locations of two more intra-mural family burials were found in Area C. They were placed in two tiny (each < 1 m^2) neighboring rooms that had no access by floor-related passages. In the one case, the burial pit was deepened through a plaster floor into the virgin sandy-silty soil on which the walls of the surrounding rooms were also erected. From the burial's cover, only one broken large sandstone stone slab remained, together with a sandstone grinding slab bearing red pigment. The upper burial of an adult was articulated and had a crouched position. Above the sandstone slab, the room fill consisted of collapsed roof / ceiling material and water-laid deposits.

In the other case, the upper layer of the burial consisted of disturbed human and animal bones, among which skull fragments of infants were also attested. Red pigment seems to be attached to the bones.

Thus it would now seem that the collective burial found earlier in Area D is by no means unique. Rather, it has to be expected that each house unit has at least one small,

chamber-like room in the basement containing a collective / the family burial. The 2003 evidence indicates that this house had at least two burial rooms.

Much work was invested in the occupational and post-occupational morphodynamics of the architecture. It became evident that comparisons with similar, even identical, features in sub-recent local architecture are possible and can be a valuable source of explanation.

Occupational Morphodynamics

Occupational morphodynamics appear based on the following principles:

- Intramural floors (of the basement) were raised during habitation and caused a vertical extension of the walls, either room-wise or of entire room-groups (Fig. 2). This could create several (basement) levels in a house, with ceilings moving upwards and ceiling materials deposited on floors. Different levels were connected by inserted stairs / stairwells.
- This also affected existing upper storeys, for which roofs must have been gradually raised, too.
- At some spots, complete rooms or parts of basements were filled with rubble (or, in cases of ground plan alterations, with the material of demolished walls). In such cases, traces were found that a former upper storey was transferred into a basement. This shift was accompanied by an overall re-arrangement of the ground plan, namely the insertion of small rooms often requiring the blockage of former doors and wall openings.
- Intra- and extra-mural spaces in Ba'ja may have served as dumping areas for wall rubble from which dressed wall stones had been removed. Raised levels of open spaces in the settlement seem to have resulted in reduced or blocked doors.
- These processes are co-responsible for the good preservation of the walls' heights in the settlement (up to *c.* 4.50 m) (Fig. 2).

Postoccupational Morphodynamics

Postoccupational morphodynamics were also found responsible for the excellent wall preservation, and can be characterized as follows:

- Several locations in the settlement witnessed sequences of considerable single or multiple event fluvial depositions of sorted material (*e.g.* of fist-sized angular stones, lenses of fine-grained material, coin-sized pebble layers, all potentially mixed with settlement debris) (Fig. 3). These layers indicate the presence of a considerable amount of rubble in the settlement, possibly also of temporarily abandoned ruined areas or areas with accumulations of building debris. Such deposits between the houses could have been transported by water into deserted rooms through wall openings and doors, or tipped over the tops of eroding walls. Final PPNB squatters may have influenced the postoccupational morphodynamics, too.
- The ruins of Ba'ja were rapidly filled by the large volume of material deriving from two-storeyed houses, the raising of thick re-plastered roofs and ceilings. The cellular ground plan provided much material per m^2, and the terraced morphology of the settlement helped to transport the architectural rubble downwards.
- The flat topography of Area B allowed deposition of fine-grained (sandy-silty) layers (Fig. 3) through the millennia that followed the end of occupation. This material experienced low transport energy (sheet floods) and originated from the weathering of the nearby sandstone formations.
- The steeper parts of the settlement show deflation features and a pavement that developed from eroding wall materials, which also facilitated architectural preservation. Spots with architecture preserved up to 3.50 m at slopes of 40° occur.

Fig. 2 Ba'ja, Area C, Sqs. 0-10: example of wall heights growing with the rise of floor levels/storeys (photo: H.G.K. Gebel).

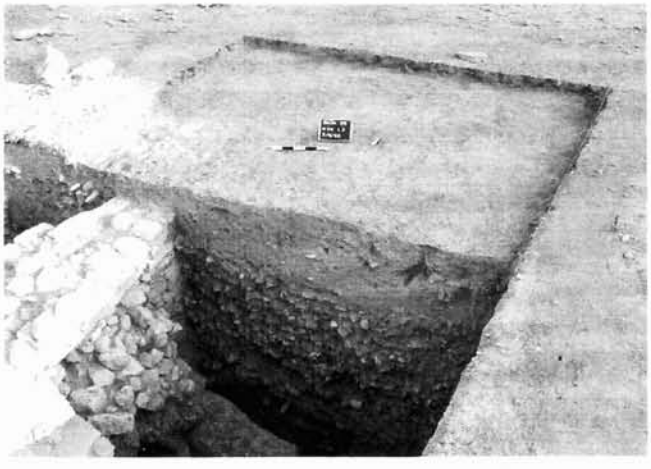

Fig. 3 Ba'ja, Area B-South, Sq. 64: example of the huge intra-site multiple deposits resting against a major terrace wall, including sandy deposits going across the top of ruined walls (photo: H.G.K. Gebel).

Area B, Open Space

Investigations of a possible open space below Area B produced more complex evidence: in short, it appears that open spaces in this area existed in some periods, while there was a tendency to occupy this space by domestic architecture. The narrowed and later blocked gate in B74 (Fig. 4) seems to testify to such changing spatial concepts.

Intra-mural Floor Raising at Ba'ja

A striking example of intra-mural floor-raising and related blockings of wall openings / doors is the evidence from Wall 120 in C10. Here, the door Locus 126 and Wall Openings 127A and 127B (east side, respectively 131A and 131B on the west side) had been reached by succeeding floors in the large room of C10. This room obviously had a special function, not only because of its extraordinary size, but also because its floors and walls were red-stained (re-plastered in places up to three times at the level reached in 2001 and 2003). The sills of the wall openings and the threshold of the door were buried by the new floor, and the remaining openings were blocked (Fig. 5) with stones on both the east and west, helping to create smooth wall faces. In addition, the eastern side of the northern opening was closed by using floor material, indicating that closing wall openings and creating a new floor could be part of one single work event. Especially the latter action is a fine example for a building ethology common to any builders of permanent structures: the *ad hoc* use of leftover material from another building project in a context for which it was not prepared (soil bed material used to close a wall opening). A hitherto – to our knowledge – unobserved feature of LPPNB wall openings was preserved by the blocking of the Windows 127 A and B: there was red-stained plaster on their interior faces, too. Thus, the red-stained wall plaster extended into the wall openings. To the west, and situated in its central part, Wall 120 had a (partially) excavated stairwell with 3-4 steps.

Ceiling / Roof Evidence

Among the special findings of the season were imprints of ceiling / roof matting (interlaced, most probably of reed) in a homogenous light brownish mortar (Fig. 6). Above this material a stone layer was found, interpreted as part of the layered ceiling or roof "stratigraphy". A powdery dark brown layer rested between the plastered floor and the aforementioned brownish mortar. Most likely this substance derived from the decayed matting.

Lower Area C Stratigraphy

More evidence was found that the lower stratigraphy of Area C is alike throughout the spur on which the architecture rests: the sandy-silty virgin soil was leveled and

Fig. 6 Ba'ja, Area C: imprints of ceiling or roof matting (photo: H.G.K. Gebel).

Fig. 4 Ba'ja, Area B-South, Sqs. 64-74-84: architecture with blocked "gate" (foreground) and tumbling walls (background) (photo: H.G.K. Gebel).

Fig. 5 Ba'ja, Area C, Sqs. 10-20: blocked windows as a result of a raised floor (photo: H.G.K. Gebel).

covered by a layer of fist-sized stones. The walls were founded on this layer. Inside the rooms a lime plaster bed was laid out on the fist-sized stones, which could have received a finishing coat.

Ethnoarchaeological Research in Local Architecture

Part of the campaign was devoted to a study of topographic space management and use as well as decay processes in the traditional villages of Rajif and Basta. Many insights had already been derived (*cf.* also Kinzel, this issue) from these studies, which allowed for more reliable explanations of some features in Early Neolithic Ba'ja.

Future Research

The first five seasons of excavation provided an extraordinary basis for the development of hypotheses to guide a second period of large-scale excavations in Ba'ja. The small size of Ba'ja allows us to excavate an extensive part of an early sedentary community in order to study its social organization in more detail than usual. The past research in Ba'ja has also led to an understanding of our archaeological research as part of environmental and social responsibilities and conservation. Thus, we will continue the excavations in a framework of regional sustainability, much related to and supporting the developing local tribal infrastructure. However, the immediate excavation work will include:

- specialists' exposure of collective burials and a wall painting,
- excavation of Area A, where we expect a *c.* 80 m long ramp or staircase to the site flanked in its upper parts by architecture
- geophysical investigations into the subsurface ground plans, particularly in Area B
- investigations in dumping areas in the lower parts of Area A
- future large scale excavations in Areas B, C, D, and possibly E
- conservation work at walls and constant refilling

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