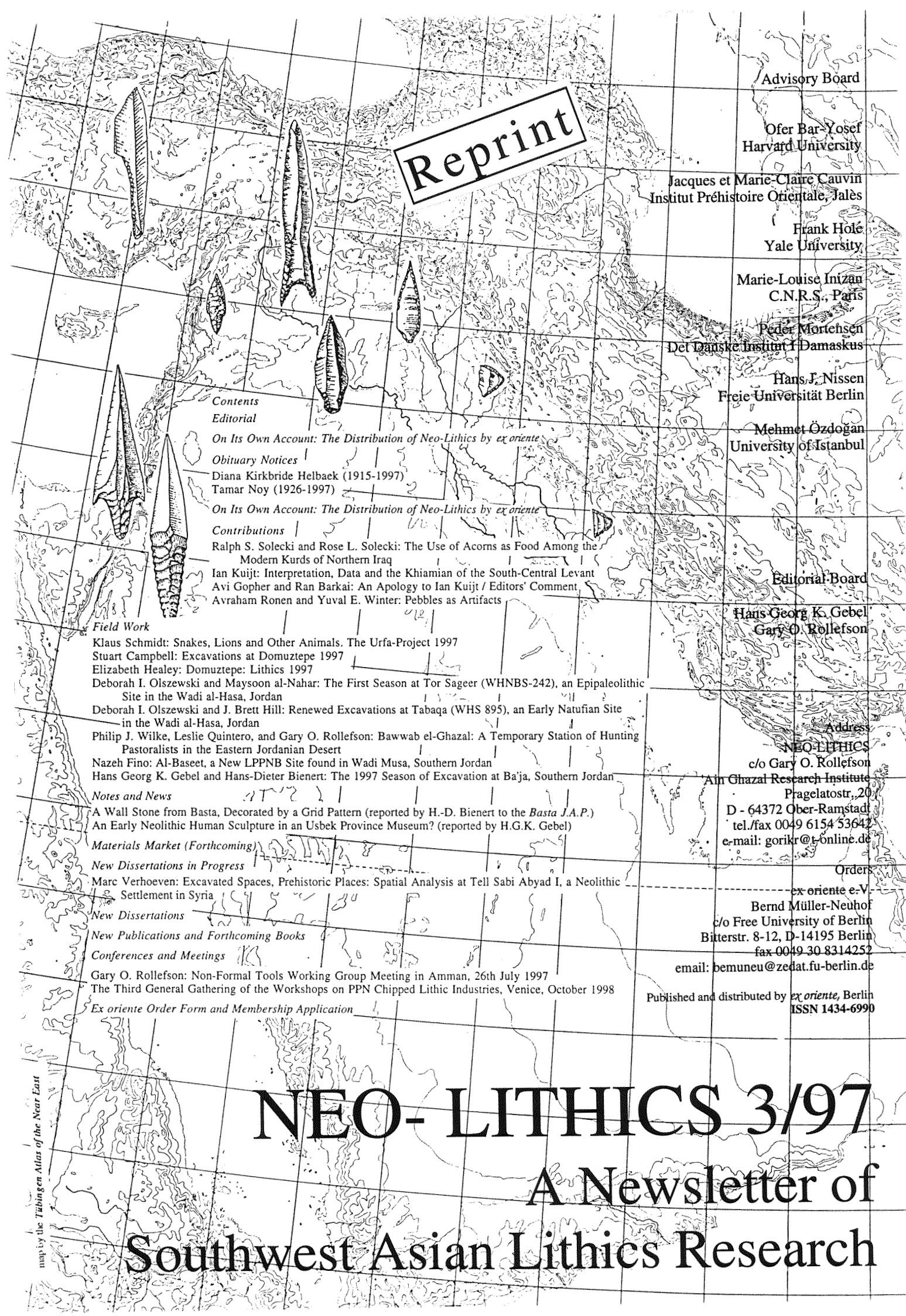

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(cf. *Neo-Lithics* 2/97), and some of the participants (H.G.K. Gebel, G.O. Rollefson and L. Quintero) dated it to LPPNB on the basis of recovered surface artifacts; the site was earlier shown to Gebel, with whom the surface evidences were discussed. The Department of Antiquities of Jordan decided to start excavations at the site on 6 August 1997.

Al-Baseet is a medium-sized village in a classical setting, covering between *c.* 5-10ha. It is located in Wadi Musa at UTM: 788413.53E; 3358020.85N - 738632.09E; 3357932.09N - 738765.70E; 3358165.70N - 738792.83E; 3357953.87N. Excavations were conducted in three squares and the preliminary evidence indicates many similarities to Basta and 'Ain Jammam as evidenced by arrowheads, naviform blades, axes, grinding stones and burnished plaster floors. The architecture at al-Baseet is not well preserved due to much destruction in later periods in the investigated areas. The excavations at al-Baseet are still in progress, and more details about the LPPNB settlement are forthcoming.

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The 1997 Season at Ba'ja, Southern Jordan[1]

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Between June 16 and July 20, 1997, the first season of large-scale excavations was conducted at the LPPNB settlement of Ba'ja in southern Jordan (for the project design cf. GEBEL and BIENERT 1997). It was carried out under the joint directorship of the authors for the German Protestant Institute for Archaeology, Amman Dept. in collaboration with ex oriente e.V., a research association at the Seminar für Vorderasiatische Altertumskunde of the Berlin Free University, and the Deutsches Archäologisches Institut, Orient-Abteilung in Berlin.

Project History and Field Operations

After the existence of a "flint site" in the remote rock formations north of Beidha was reported to H.G.K. Gebel in 1983 by M. Lindner and his team (*cf. Neo-Lithics* 1/97: 9), it was not easy for Gebel to relocate the site in 1984 in the framework of his project: *Palaeoenvironmental Investigations in the Greater Petra Area-Holocene Research* (GEBEL 1988, 1992; GEBEL and STARCK 1985). The location than was recorded properly, and three soundings were carried out, after the site was recognized as one of the major PPNB settlements in the Greater Petra Area, probably succeeding Beidha in the function as a regional center. In the following years, Ba'ja's protected setting, the difficult access and the magnificent scenery of its nature made it an attractive goal to reach for only a few insiders. In 1996 H.-D. Bienert approached H.G.K. Gebel for an infield cooperation. Since it had become imperative to contribute to the mega-site discussion by investigating also a smaller regional LPPNB center away from the corridors of that LPPNB large settlement expansion, Gebel proposed Ba'ja for this cooperation, provided that three field seasons will take place in order to the achieve the expected basic insights (cf. the goals discussed in GEBEL and BIENERT 1997: 10-11).

As expected, working at the site was a tough enterprise. The site, for example, demands climbing through the gorge (siq) with all the equipment, water and food to approach it, to have no possibilities for personal hygiene, and to have very reduced comfort with respect to shade, permanent stress on one's ankles because of the steepness of the slope, few flat areas to rest, thousands of flies, and the permanent danger of snakes.

The archaeological staff (Fig. 2) consisted of more than 22 persons from Germany, Jordan, United States, England, and Sweden; during the most intensive work periods up to 24 local workman from the al-Amarin, al-Bedul, and al-Sey'idin tribes worked at the excavation. Tasks between the two co-directors were devided: one (Bienert) mainly did the general administration and partly the registration, the other (Gebel) mainly directed the excavations.

Ca. 250 m² (10 5x5m squares; 5 digging teams) were opened in the terraced housing area where the steep slopes of Unit C (one of our topographical site divisions) climbed up to the flat Unit D, forming at this spot a spur-like summit. Two of the squares were found free of any architecture, which is the result of a lively discussed erosional event (see below). Two Test Units were opened, one at the lowermost fringes of Unit C in order to understand the Quaternary stratigraphy on which LPPNB layers rest (TU1, step trench), and one in "Snake Valley" (TU2). The latter was in a small wadi immediately north of the site: yielding LPPNB ashy trash layers preserved in a "sediment trap", it proved that the Neolithic settlers used this wadi and the *siq* as disposal areas (like e.g. Sounding I- area of 1984 and new evidence).

The archaeological surface reconnaissance, carried out by Bernd Müller-Neuhof, mapped all the Neolithic (and other) wall remains visible on surface, the dense distribution of ground stone materials, and other surface features. In the last days, he also surveyed the immediate vicinity of the site in order to look for possible outliers of the occupation (There seem to be none). This all was recorded in the topographical map (Fig. 3), which was accomplished for the *c.* 1.2-1.5ha of the site plus its bordering *siq*, wadi, and rock formations.

The goal of the excavation itself was to uncover the architectural remains down to the earliest floor of the upper occupation. Sieving was applied whenever *in situ* layers occurred in room fills.

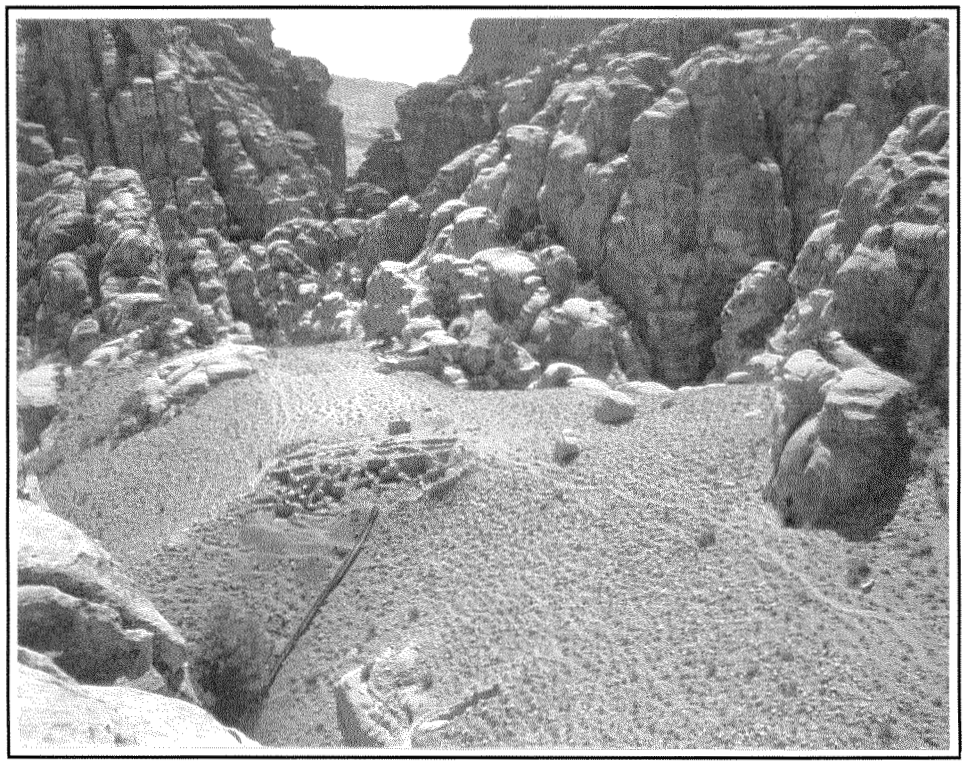

Fig. 1. Intramontane setting of the site with excavation in Topographical Unit C from southeast (photo: Schatz-Haerle) <Note the chutes for the excavated sediments leading down into the *siq*.>

Site Setting and Topography

(Figs. 1-3)

The LPPNB village of Ba'ja rests on an intramontane terrace some 10km north of Petra and 5km north of Beidha respectively. The location of Ba'ja, known

locally also as "al-Mehmad", is at 35° 27' 45" E / 30° 24' 55" N; the altitudes for the identified cultural layers on the site's area range from 1060 to 1095m according to the surveyors' work and are based on barometric readings. The mean annual precipitation is 200mm in the region. However, this figure does not explain much for the actual hydrology of the immediate site surrounding (GEBEL 1990, 1992).

The Neolithic layers rest on a terrace that can be described as the remaining part of an intramontane *playa*-like fill within a basin. The present-day topographical units (Areas A-I) of the site must have basically developed their shape after the resolution of this catchment (Upper Pleistocene, if compared with other spots in the Petra region), after this fill was partly transported out of the basin while forming a deeply incised *siq* by the coarse-grained material transported down from the limestone plateaus in the east.

The site's (bordered by Siq al-Ba'ja to the S and by vertical rock formation in the N) longitudinal axis is oriented SW-NE and measures *c.* 290m, its width varies from *c.* 20m at the western and eastern accesses to about 90 m in the central parts. The area potentially occupied in the LPPNB is 1.2-1.5ha, which means *c.* 5000m² larger than preserved Beidha.

Site Preservation and Site Survey (Fig. 3)

The walls of the dense terraced housing, probably comparable to that of traditional villages in the area (Tayiba, Dana, Basta, Rajif, etc.), appear well preserved in the excavated squares. Walls reach heights of at least 2.2m. The surface evidence of Neolithic walls concentrates in the upper two-thirds of the site, with highest densities NE and N of the excavated area (Areas D/C). While almost no such evidence comes from the steep areas right above the *siq* (Areas C and F) and the narrow steep western slope (Area A), LPPNB grinding slabs and manos cover all parts of the site in varying densities.

The good wall preservation is explained by the rapid intramural deposition of structures (*cf.* GEBEL *et al.* 1997) and the suceeding colluvially supported stone pavement, the missing walls in at least lower Area C are explained as the result of aquatic impacts by a post-occupationally blocked *siq*. Actually, we found in Squares C2 and C13 that the rooms were cut sharply at a particular height, and floors that were placed into the fine-grained virgin sediments suddenly stopped in this extreme slope setting (*c.* 40°). What sort of natural impacts can have caused such a situation? We exclude at present a "sliding-down" of complete rooms or even building parts, since we cannot identify a layer that might have acted as a sliding agent. But any major blocking of the *siq* below the site could have had an immediate influence on the site's morphology. Just below the area in question, the course of the gorge turns twice in right angles in front of rocky barriers; in addition, the *siq* is extremely narrow here. If a damming by fallen rocks happened here only once in post-PPNB times, it could well be that accumulated materials raised the bottom of the *siq* to elevations that were dangerous for the house ruins above, especially in the time of the tremendous winter floods typical for the area. In fact, the morphology of this amphitheater-shaped slope is very much that of a cutbank, suggesting that here the aquatic impact undercut the settlement (*cf.* also KRÄMER in: GEBEL *et al.* 1997).

Other aspects of site preservation include the interacting influences from field clearances etc. (stone piles, field terrace walls, wall alignments, terracing) in Nabatean times (*cf.* MÜLLER-NEUHOF in: GEBEL *et al.* 1997) and the densely distributed eroded wall stones that created a natural pavement for the cultural sediments underneath.

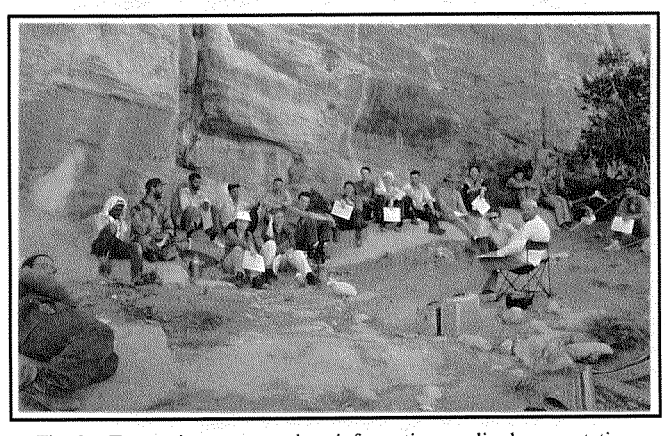

Fig. 2. Excavation team receives information on dig documentation and excavation methods.

Architecture and Stratigraphy (Fig. 5)

As said before, only Squares C1-2, C11-12, C21-22 and C31-32 contained well preserved architecture, of a terraced housing similar to a *pueblo*-type layout with some true two-storied structures (at least in the westernmost rooms of C21). The top of the wall ruins occurred just below the surface or were ex-posed on surface. The easternmost chain of small rooms in C2 and C12 represent rooms with no second story. Here, the floor plans of rooms tend to be polygonal, which must be an adaptation to the contour lines of the slope in order to establish some sort of structural stability. At least the westernmost rooms seem to have been dug into the sterile layers (near-top traces of carbonization) underneath, on which the floors were made of a cobble bed with superimposed whitish (lime?) plaster. At least at one spot it became clear that walls were (also or generally?) founded on such floors, without any further foundation! The principal rooms in the excavated area are between more or less rectangular and thus probably planned on even terraces. They are expected to have a deeper stratigraphy and be partly two storied. Terrace walls clearly exist (e.g. the one running NNW-ESE

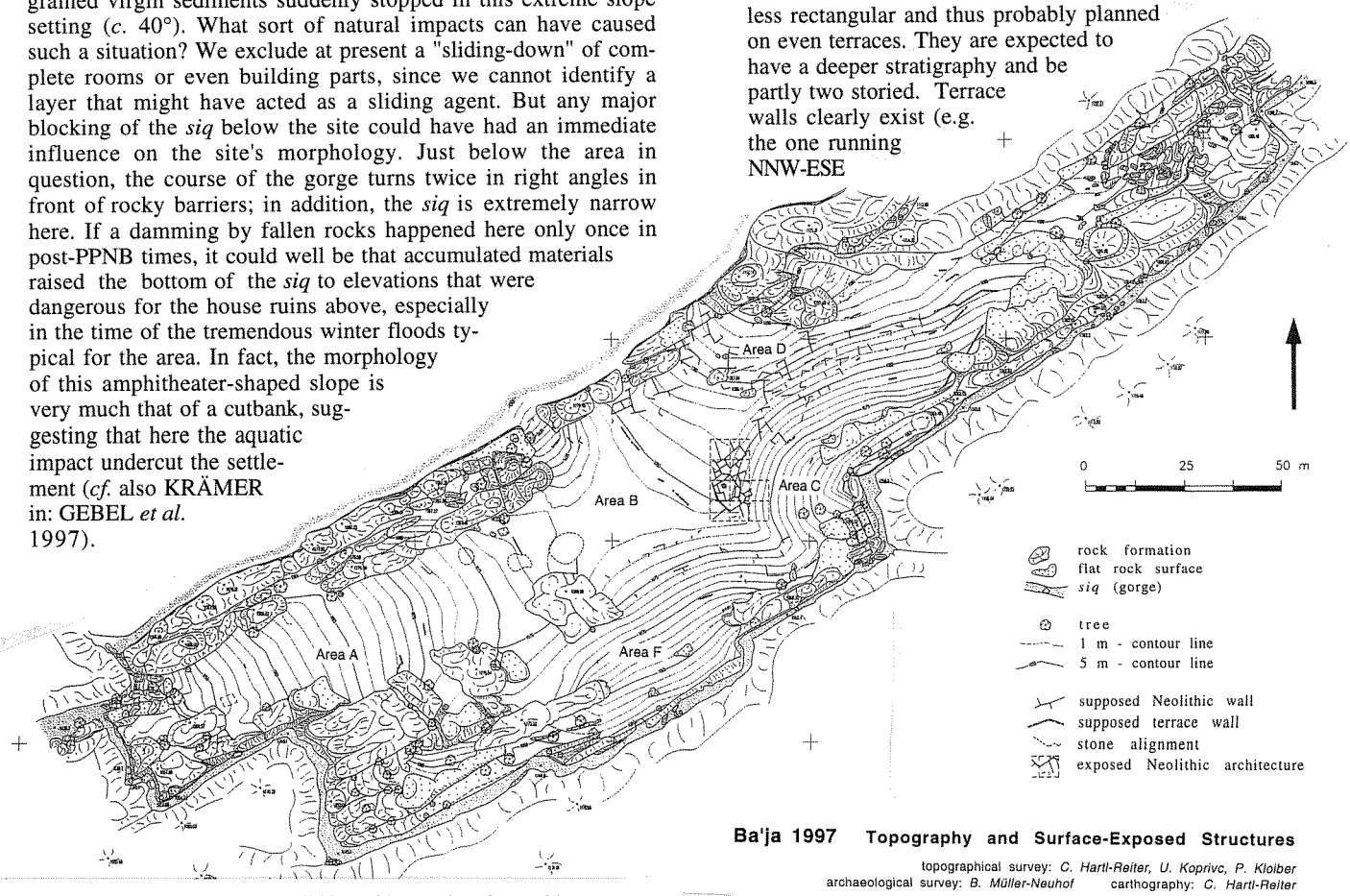

Fig. 3. Site topography and Neolithic architectural surface evidence.

in C11/C1, or the one N-S and somewhat bent in C12/C2). Their structural engineering did not differ much from ordinary walls, although they were somewhat thicker. This might have caused stability problems; for example, the terrace wall in C11/C1 was reinforced by a second wall to the west. Since that action did not seem to provide a reasonable stability for the terrace, two additional buttresses were added, partly built over the first reinforcement wall.

Fig. 4. Excavation in Area C seen from N (photo: Gebel).

The uppermost stratigraphy are room fills of colluvial origin, succeeded by mixed layers built up from collapsed roofs, plaster flows and wall stones that tumbled from the wall tops. Only below that (and sometimes still embedded) we found the first *in situ* layers, much of which represented the activities of dwellers using the ruins as shelters. Below this kind of deposit the first floors of the upper occupation occurred, but they were not reached in all the rooms/ squares this season.

As of yet, no detailed information can be given on the deeper stratigraphy in the excavated area. In general, we are dealing in the excavated area with one main building phase so far (Fig. 5), which shows alterations of an original groundplan by added walls and reinforcements, blockings and insertions of wall openings, and the possible adding of another story in C21. These subphases seem to represent locally restricted changes, possibly related to social reasons. The western rooms in C21 so far are a special case: an opening in a lower lying wall was blocked before the height was increased by a superimposed wall, leaving a step between both faces. This step possibly supported the beam of an uppermost floor; its height coincides with the top of a western partition wall, too. The room below had red-stained wall plaster and contained two fallen elongated stones, the possible lintels.

We cannot identify yet functional units. But – with reference to groundplans in Basta and 'Ain Jammam – there are reasons for the assumption that we have two building units in the excavation area that roughly follow the scheme of a central courtyard with adjacent small rooms. These courtyards are probably represented by the large spaces mostly covered by C11 and C21/C32. In C11 we found a sequence of fire places, a stone-lined structure with an inserted grinding slab, many manos (food-processing area), and a large amount of sandstone disks ready to be transformed into stone rings (production of this prestige good on a household-level). Another obvious zone of activities is represented with the chain of small rooms in the east of C2/ C13/ C23: here the sherds of many ovens were found, together with many animal bones and ashes. Most likely the ashes here were disposed downslope, a feature quite common for the *tabun* areas in the fringes of present-day traditional villages in the region. The large space in C21/C32 has not reached depths to identify the character of activities.

We did not find burials in the architecture yet, but most probably we have to expect them eventually. Human remains were encountered among the garbage deposits in Test Unit 2 in the "Snake Valley" north of the site (just 30-40m north of the excavated area).

Openings in the walls served as communication passages and possibly also played a role in climate control in the building. Some were found blocked again (functional changes). It should not be excluded that a lower room, such as in the west of C21, may have had a cellar-like character, protecting its inhabitants from heat, for example. Other communication may have occurred via the roofs of the terraced housing, which may have represented the "public" spaces of the settlement.

An pre-planned, intentional ground plan seems to be inherent in the architecture. Only topographical adaptation forced alteration of preconceived layout ideas, a feature which is also well attested with 'Ain Jammam's architecture, the closest parallel in that respect to Ba'ja. As suggested by the site survey, the directions of walls did not necessarily follow contour lines; most likely long-used major walls served as stable compound and terrace/ retaining walls for the terraced architecture, and this explains that both social *and* physical topography were elements of planning and spatial stability.

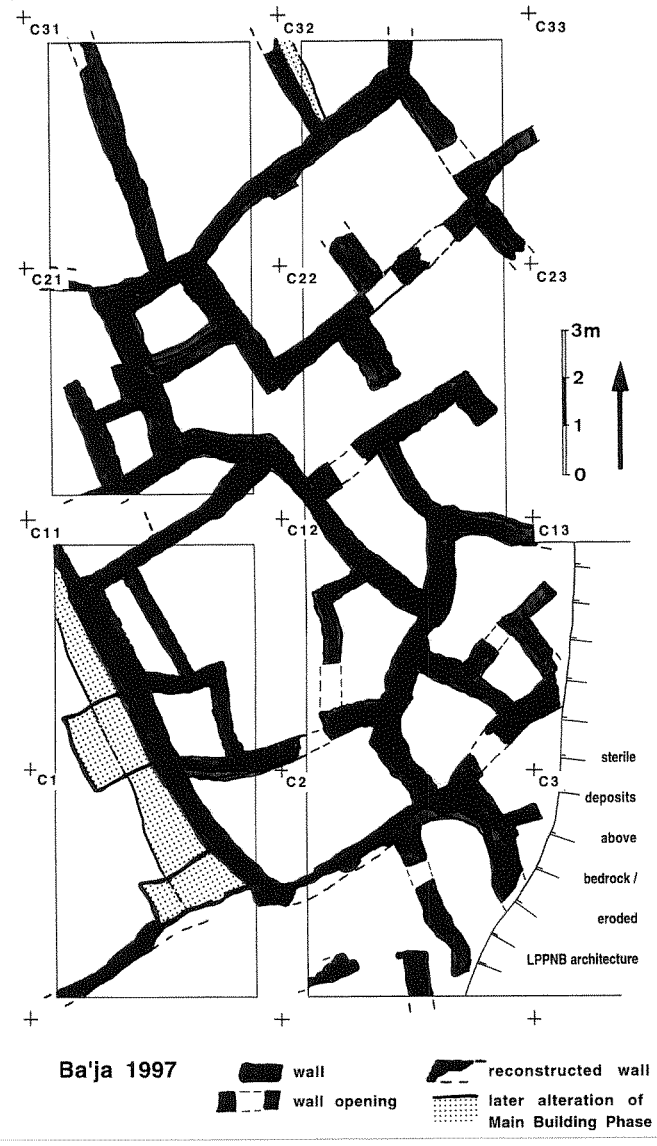

Fig. 5. Architecture of Main Building Phase excavated in Squares C1-3, C11-13, C21-22 and C31-32 (after the top plan of J. Timm).

The walls techniques are the same as attested with other LPPNB sites. Walls were double-faced and made of local tabular (sandstone) slabs that were dressed roughly "if necessary"; the courses were stabilized by "interwedged" smaller stones. The erection of walls and their wall faces was executed with great care, even in most cases to be very "aesthetic". On the other hand, they lacked bonding with joining walls and thus lacked stability, for example; also, they did not contain headers so that the two wall faces could easily fall apart. The latter clearly can be seen in Squares C1 and C2, where the southern walls are just preserved by one face. The "half" wall part in the southwestern corner of C2 gives evidence for walls sliding down the slope, a feature that might support the "sliding-down" option to explain for the site preservation in its lower thirds (see above). Functional reasons and changes, as well as the (non-) employment for specialists, might have been responsible for the variation in wall face quality. All stages of care are attested, "ending" with rough cobble-faced walls as the "poorest" quality.

Squares C3 and C13 had no preserved architecture. The sterile fine-grained layers where found immediately under the colluvial material (see above). A sharp erosional cut through both the sterile layers and the rooms dug into these layers indicates that here and for this level we should reconstruct just the appropriate room, but no more stone architecture existed further to the east/ downslope. If architecture existed further downslope at all, it must have been dug into lower levels. This discussion nicely illustrates the instability of architecture in the many slope settings of Ba'ja, and the resulting problems of intra-site extension of land property.

Ground, Chipped Stone and Bone Industries

The typical ground and chipped stone industries of the LPPNB large settlements are well represented in Ba'ja. However, compared with Basta, the tool classes and the stone vessels so far show a less varied inventory.

The primary production of the flint industry does not contain true naviform cores and their typical preparation waste. Instead we have bi-directional cores that recall the intention of the naviform technology, the efficient material- and effort-saving detachment of blades. However, they often show round striking platforms with detachments all around the core's edges. These cores were reduced to the utmost, and blades in Ba'ja on average are shorter than those from the workshop areas in Basta. A contributing factor might be the fact that the tabular flint exploited by the Basta workshops rarely is attested in Ba'ja, and that most of cores have the grayish flint from the wadi pebbles as raw material. Workshops have not been found yet in Ba'ja, as cores are quite rare, too. Aside from the non-naviform bidirectional cores at Ba'ja, there are also unidirectional blade cores in addition to many flake cores.

The tool kit seems somewhat restricted to (also denticulated) arrowheads, borers, adzes, celts, and hammerstones. The latter three classes are quite dominant. Retouched and *ad hoc*- tools are rare. As a preliminary observation, we would interpret the tool kit as representing activities on household levels rather than on an "industrial" surplus scale. Tools used for chiseling/ carving out the sandstone rings have not been identified yet among the chipped lithic implements.

The grinding tools and stone vessel fragments fall within the LPPNB range of types (WRIGHT in: GEBEL *et al.* 1997), which is true for the worked bone industry, too (almost exclusively piercers and spatulae).

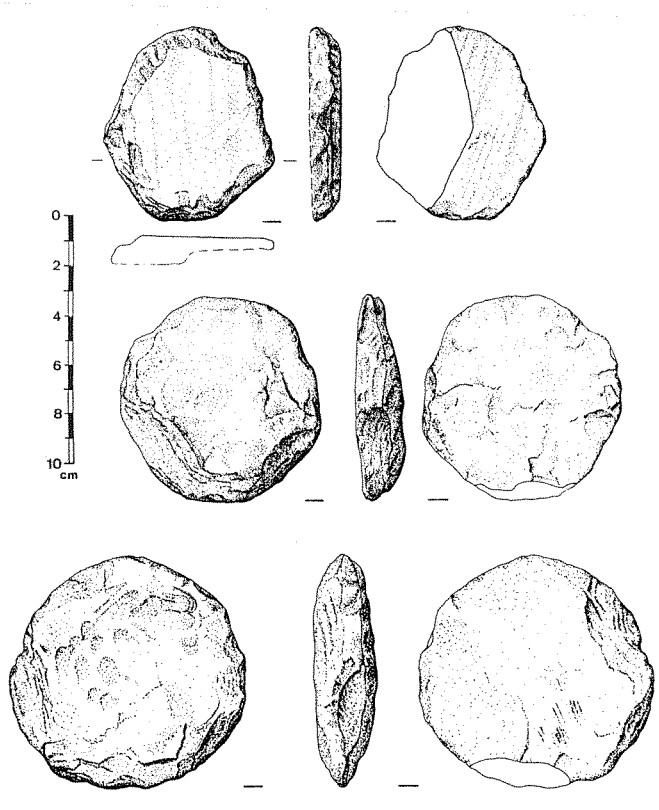

Fig. 6. Examples of flaked sandstone disks, used as blanks for carving and chiseling out the the sandstone rings (bangles?) (PIGPA collections 1984, H.G.K. Gebel)

Prestige Goods

Except for the attested sandstone ring production, ornaments were quite rare in 1997. This is explained by the fact that we mainly were digging room fills built up by fallen roofs and walls and had only limited contact to the *in situ* layers and their inventories. So far we have the sewn-on mother-of-pearl objects, tiny rings made of the same material, beads made from Red Sea mollusks, a very few "greenstone" objects, and (other) stone beads.

The most outstanding prestige good is attested by all manufacturing stages for sandstone rings, making it clear that Ba'ja was a production center on a household level or even industrial scale (*cf.* GEBEL and STARCK 1985). In Ba'ja for the first time all the elements of the sandstone ring (bangles?) production were found on a site, which allows us to reconstruct the complete *chaîne opératoire*: After selection of the locally abundant tabular material, it was flaked bifacially into a disk shape, varying in diameter from 5 to 16 cm (average: 8-9 cm). Then an interior disk was removed form this raw form. Work traces indicate a concentric carving and possibly low-pressure chiseling process from both sides until a raw ring could be removed. While the interior discs may have been transformed into another artifact type (as by-products, perforated and surface-smoothed stone discs of 4-5 cm in diameter were found), the raw torus for the intended sandstone ring underwent several stages of grinding until a final grinding brought it into the known shapes. Bicolor decoration is common and results from the later removal of a blackish stain by grinding it from interior or obverse surfaces.

Subsistence

Exploited animals were wild and domestic goat, domestic sheep, aurochs (*Bos primigenius*), an equid (*Equus africanus*?), wild boar, a small and a large type of gazelle, hedgehog, hyrax, hare, and a small carnivore (fox?) (SÖFFNER 1996 and C. BECKER, pers. comm.).

As for the botanical remains, Reinder Neef identified not much more than what was already known from the poor 1984 samples: Carbonized wild pistachio and fig were found in addition to juniper and pistachio wood; *Triticum dicoccum* is very rarely attested by two glume bases from the Gebels 1984 investigations and an imprint of a spiklet fork from a tabun sherd of 1997 (NEEF, pers. comm.).

Settlement System Questions

Different from the research situation for other LPPNB large settlements, more information is available on the possible LPPNB settlement pattern in the Greater Petra Area (through the surveys by Diana Kirkbride and H.G.K. Gebel). According to first (GEBEL 1988, 1990) and more recent results (surveys around Basta), we can't expect a hierarchical settlement pattern in the sense of that central place theory calls for, at least not in the southern extension of the mega-site episode in the second half of the 7th millennium bc (GEBEL n.d.). The hypothesis is that we are dealing with "anodal" systems, with fast-growing, isolated, and self-sufficient settlements being "central" in the sense of being the regional foci of land-use and for the distribution of exchanged goods. These "centers" may have developed a size and social complexity that deserve an interpretation beyond a village understanding (see contributions and discussions at the Symposium: *Central Settlements in Neolithic in Neolithic Jordan*, published in *Neo-Lithics* 2/97, especially the arguments of Rollefson and Gebel).

Ba'ja possibly came to exist after nearby Beidha was largely abandoned. Possibly two other MPPNB sites were deserted around this time. Occupation then might have concentrated in Ba'ja and possibly in the new site al- Baseet, encountered last summer in the Wadi Musa area (FINO, this issue). However, this at the moment is speculation only.

Summary

1) The occupation is by its architecture and associated material culture Late Pre-Pottery Neolithic B (2nd half of the 7th mill. bc); occupational layers within the room fills of fallen roof/ wall materials most likely are related to the end of the same culture, re-presenting the use of the ruins after sedentary habitation came to an end or shifted from the (excavated) area.

2) The type of architecture resembles in all respects what has been found in Basta, 'Ain Jammam, Ghwair 1, and as-Sifiya, partly 'Ain Ghazal; it is a multi-roomed association of rectangu-

lar and polygonal rooms without clear open spaces. Connections between the rooms existed through passages via wall-openings and most likely the public spaces of roof tops.
3) Architectural subphases exist that altered a ground plan within the framework of the major terrace walls. Whenever topography required it, the ground plan of the smaller rooms became curvilinear or polygonal. Room sizes may vary from 1.5-15m^2. Subphases can be distinguished by additions onto existing wall tops, blockings or insertions of wall openings as well as additions to the ground plan, e.g. reinforcement buttresses and walls stabilizing a terrace and the rooms behind.
4) The lower third and steepest part of the site – at least in Area C – has been eroded away in post-occupational periods. Currently the explanation is for an aquatic impact through a temporarily raised *siq* base level.
5) Contact zones of the cultural layers with the sterile deposits so far show that the palaeotopography on which the settlement rests was built up in its upper parts by water-laid sandy sediments (*playa*-like deposits) that may represent a once closed intramontane basin-like structure. At certain spots it was obvious that rooms were dug into these sterile layers.
6) Chipped lithic industry: it is striking that the site does not seem to have had specialized naviform workshops. Instead, a non-naviform bidirectional blade technology exists by cores with detachments from all around the (round) platform.
7) The ornament industry so far is not very rich. However, the site certainly was a fabrication center for sandstone rings on at least a household level: all stages of manufacturing this prestige good are attested, and we can expect that it played a major role for the wealth of the settlement (trade).
8) Subsistence elements were emmer wheat, wild pistachio and fig?, and the exploitation of juniper and pistachio as fuel; the diet of animal protein made use of the following species: wild and domestic goat, domestic sheep, aurochs (*Bos primigenius*), an equid (*Equus africanus*?), wild boar, a small and a large type of gazelle, hedgehog, hyrax, hare, and a small carnivore (fox?). Hunting played a major role in Ba'ja, aside from herding.

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With deep appreciation we thank our excavation team for the splendid work and good spirits under the very hard conditions: Christian Hartl-Reiter and Ute Koprivc (topographical surveyors); Bernd Müller-Neuhof (archaeological surveyor); Tobias Krämer (sedimentologist), Jan Timm (architect); Stephan Fengler and Nina Höffgen (photographers); Philip Rassmann (registrar); Abd al-Nassar Hussein al-Hindawi, Benjamin Jeffs, Muhammad Fadel Khatatbeh, Christiane Meckseper, Sandra Schatz-Härle (square supervisors); Salaheddin al-Abbasi, Annalisa Alvrus, Ulrika Andersson, Jessica Anderson, Brian Conn, and Lena Gebel (assistant square supervisors). In the latter third the project was joined by Reinder Neef, German Archaeological Institute - Eurasien-Abt. (palaeobotanical samplings). Considerable support came also from part-time participants: Patrick Kloiber (topographical surveyor), Johannes Meier and Julia Littmann (dig assistants), and Sonja Striegl (reporter). During the final works we received the well appreaciated help of Bo Dahl Hermansen and Ghattas Sayej.

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Notes and News

A Wall Stone from Basta, Decorated With a Grid Pattern

(reported by H.-D. Bienert to the *Basta Joint Archaeological Project*)

A displaced wall stone was exposed recently from LPPNB layers in Basta, Southern Jordan. It was found during a visit by H.-D. Bienert, and subsequently reported to the Department of Antiquities, Petra Section and to the *Basta Joint Archaeologial Project.* The piece shows a now well-known Early Neolithic grid pattern (see e.g. *Neo-Lithics* 2/96: 2: Fig. 2d, 11: Fig. 1) all over one face: parallel short lines are crossed centrally and at right angles by a longer line. (H.G.K.G.)

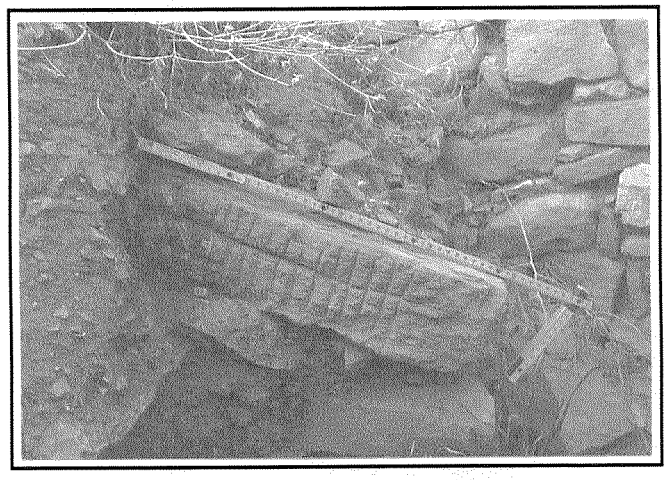

Fig. 1. Wall stone from Basta, southern Jordan, with an engraved grid pattern.