# REPORT ON THE EXCAVATIONS AT BASṬA 1988

by
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with contributions by
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## General Remarks

As in previous years, the excavation was jointly undertaken, staffed and financed by the Department of Antiquities of the Hashemite Kingdom of Jordan, the Institute of Archaeology and Anthropology of Yarmouk University and the Institute of Near Eastern Archaeology of the Free University of Berlin. The financial support for the German cooperation came from the German Research Association. Operations were again jointly directed by Dr. Mujahed Muheisen of Yarmouk University and Professor Dr. Hans J. Nissen of the Free University of Berlin. We would like to express our warmest thanks to all institutions and people who provided the necessary support and encouragement for our work. We are confident that, as in the past, the results of our season will prove that the money and effort has been spent on a worthy cause.

Work began on August 1, 1988 and continued until September 18, 1988. Over most of the work period, the crew numbered from 18 to 20 scientific staff, including the directors. A physical anthropologist, a palaeo-zoologist and, for a shorter period of time, two geomorphologists were on the excavation site along with the usual crew of site supervisers, registrars, photographer and architect.[1]

This season's work concentrated on enlarging Area B. Nevertheless, we put a crew to work on Area A, taking advantage of the fact that it had not yet been built over. Later in the season, we decided to open a trench in Area C. This enabled us to get some side control for the results of the drilling operation conducted there by the geomorphologists.

## The Architecture

The goal in Area A was to solve the question of the temporal relation between two floors at different heights, which, in Square A 18, were possibly connected by a flight of stairs. In order to get a meaningful area of exposure, work concentrated on parts of A 13, A 14 and A 18 (for a detailed plan of Area A with Square designations and room numbers, see our previous report in *ADAJ* 1987).

As mentioned in our previous report, we came across a network of channels beneath a floor of one of the larger rooms in Area A (rooms 10/16), which had been covered by lines of stone slabs. These, in turn, formed the foundation for a gravel and mud floor. This season we removed the mud floors in rooms 31 and 32. In these rooms we found the same rows of stone slabs and network of channels.

There was a difference, however, in

1. Hans George Gebel, M.A. - deputy director; Nickolaus Schluter - field technician; Nabil Qadi - excavation manager and site supervisor; Bo Dahl Hermansen, Dr. Sevil Gulcur, Wajeeh Karasneh, Hisahiko Wada and Christiana Wittsack - site supervisors; Elisabeth Stephan - sieve supervisor and responsible for samples; Henning Hassmann - registrar; Zaydoon Zaid - architect; Gerald Sperling and Margret Nissen - photographers; Michaela Peter - draftswoman; Andreas Scherer - physical anthropologist; Dr. Cornelia Becker - palaeo-zoologist. In addition, we had the privilege of having the support of several volunteers, including two students of geomorphology, for various periods of time: Medi Becher, Ulrike Ebeling, Martin Engeldinger, Andreas Mackler, Abdullah Nabulsi and the geomorphology students Ulrich Kamp and Markus Nusser.

these rooms from what we discovered in rooms 10/16. The walls creating the "channels" were built of huge undressed boulders with spaces of 35-40 cm width. The grid was much less neatly formed. Again, the system consisted of roughly parallel lines interesected by a central spine. While the "channels" under room 32 showed a clearance of 20 cm between floor and cap-stones, the "channel" (63) (Pl. I,3) nearest the wall separating rooms 31 and 32, which served as a retaining wall, showed a clearance of 120 cm. This discovery came as a total surprise. Furthermore, excavating the other "channels" beneath the same floor towards the north exposed a considerable slope of the ground on which this system was erected. While the cap-stones remained at the same level throughout, the increasing slope of the ground beneath resulted in a clearance of only 65 cm at the northernmost channels (rooms 25/20).

Although of no immediate significance for the present argument, it should be noted that wherever uncovered, the floor of these "channels" represented virgin soil. That is, it consisted of the same yellowish material we discovered overlying bedrock in the northernmost corner of Area A during our first year of excavation, proving to be only a decayed layer of that bedrock. Thus, it became clear that the walls of that lower network of "channels" represented the first building activity in this area, and that the original ground was sloped. Furthermore, since at the line between rooms 16 and 18, the lower system was obviously succeeded in clear stratigraphic sequence by the system we had found earlier, there was no doubt that we were dealing with two separate building layers, of which the earlier one rested on virgin soil.

During the previous season, we had only a vague notion that these "channels" served to keep the floors off the damp underground. Now, we feel certain that that was the purpose for them, due to the building technique connected with the supporting walls of the sub-floor.

Our observation of the varied heights of the "channels" on both sides of the retaining wall between rooms 31 and 32 leads us to believe that the situation south of the retaining wall is the beginning of an artificial terrace, which, further out on the slope, needed supporting walls as high as those north of the retaining wall. The area further south was off limits for investigation. However, a closer look at the area north of room 20 confirmed our assumption. It can be demonstrated that a wall with an opening that provides access to a pair of steps or landings of considerable width and length was the counterpart of the lower retaining wall. It marks the northern limit of the room. The first line of stone slabs appears directly below the lowest step, covering a "channel" 15 cm high. Evidently, the terraces upon which the buildings were erected had been created artificially, indicating that any contact with the original foundation was purposely avoided.

There is a second argument in support of our explanation. It rests on the observation that while the use of lime mortar was normal with all raised walls, there was no trace of mortar in the supporting walls. This difference can be explained by the fact that underground moisture would have easily found its way to the floor by way of capillary action if mortar had been employed. Therefore, we can only conclude that the use of mortar was intentionally avoided.

The "channels" have not exhausted their analytical potential beyond the evidence they provide regarding complicated building techniques. It should be noted that the "channels", with dimensions of 40 cm width and 60 to 120 cm height, were accessible, if only by crawling. The importance of this observation becomes apparent when connected to the observation that cap-stones and mud floor were totally intact above burials discovered in parts of those "channels". Sub-floor burials were customary in the Neolithic period. It is reasonable, therefore, to assess our evidence within that context and to assume that the "channels" were accepted as a ready-made possibility for disposal of the dead. As for the actual procedure of disposal, we may assume that the removal of part of the floor and two or three cap-stones at some point served as an

entrance which gave access to the entire system of underground spaces. In fact, in the case of "channel" 25/20 we found evidence for intended burials. In the area between a fully preserved burial in the center of the long space and the end of that "channel", we found an array of human bones with three human skulls in front of them.

Although limited in scope, work in Area A yielded important results. Unfortunately, the evidence of two distinct building phases in the substructures, or terracing, could not be extended to include the architecture on the surface. The sub-floor architecture did show an obvious difference. The older supporting walls consisted of large uncut stones and boulders, while the newer walls were constructed of smaller, thinner stones, which had been cut into rectangles of varied sizes. This difference, however, could not be traced as easily in the walls above the floor. There were two reasons for this: one, because most of the uncovered area exhibited walls connected with the newer terracing; the other because bulldozing had destroyed much of the context. Nevertheless, we do believe that parts of the older walls were incorporated into the newer ones. To demonstrate this by trying to separate them, however, would have required putting effort into something which has been seriously affected by recent disturbance.

In Area B (Pl. II), progress consisted mainly of enlarging the area previously uncovered. The result was that more evidence for what is already understood was found, rather than discovering evidence which might provide new insights. With nine new squares opened, the area currently exposed in Area B adds up to 350 square meters. This area will be the main target for next season's excavations. Hopefully, we will then gain better insight in regard to the architectural complex. Therefore, we have concluded that it will suffice here to list the main results of this year's work without going into detail.

There are four main points to be addressed: 1) that work is near completion on the previously discovered building unit; 2) that, based on additional hints, this unit may be some kind of central building; 3) that a common building principle was at work; and, 4) that the terraces represent the foundation for the building units.

As the plan indicates (Fig. 1), only two minor parts of building B I remain unexcavated. They can easily be deduced until the excavation work is completed. Unfortunately, however, one of the most important parts of the building is lost forever. The presence of an old, deep pit in the area southwest of building B I destroyed part of what must have been the entrance to the unit. There is enough left of rooms I,20 and I,4, however, to point to an open space between them.

The additional work in 1988, completing the western part of the building, led to an unexpected discovery. While still shaped symmetrically, this wing consisted of a double row of rooms larger than any uncovered earlier. Along with the difference in the overall dimensions, the rooms contrast with the other rooms by virtue of their wider openings to the central space and the presence of grinding utensils *in situ* on the floor of I,20. Thus, they raise the possibility of an internal functional difference within the building.

There was little else found either within the rooms or within the central space. It may be recalled, however, that a large fireplace was excavated last year in front of the wall between I,2 and I,3. A fire must have gone out of control at one time; the entire western part of the central space (I,1) and the presumed entrance area showed unmistakable signs of fire, a layer of mixed ash and brick-red burnt soil.

What had been previously observed as the relation between the much-damaged remains of unit B II to unit B I emerges, now, as a general feature: all surrounding units and their walls abut onto the outer walls of unit B I. This construction feature should not, however, be interpreted as a sign that the other units represent the remains of a later building phase; rather, it points to the possibility that B I was a unit of central importance to which the other units were added. This contrast may also be reflected in the apparent adherence to a common building principle, wherein a larger space would be joined by a row of tiny rooms on at least one side. The

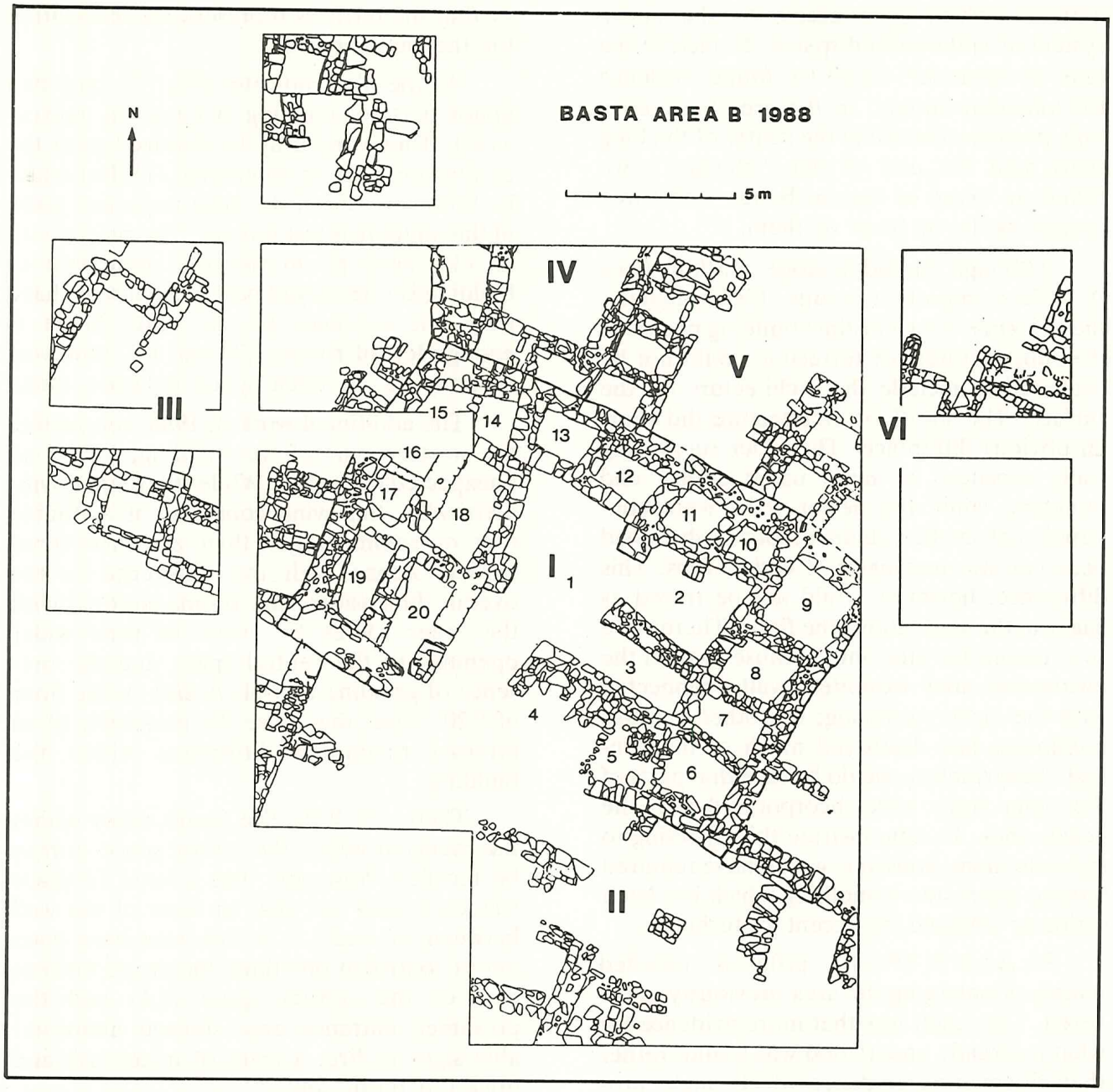


Fig. 1. Architecture of Area B.

application of this principle can be recognized in the B II, IV and V units, though they are not yet completed. Enough is known, however, to observe that the arrangement and sizes are different from B I. The situation is still unclear for unit III. It is too early to discuss internal differentiation within the settlement. Nevertheless, it has become obvious that we are not dealing with a general lay-out, wherein the various buildings represent a repetition of units according to the same plan and size.

Although not enough work has been done, we can be certain that another building principle, known from Area A, is at work here: the floors of B I and IV, if not others, rest on sub-floor "channel" structures. This feature would not have been identified if we had proceeded as planned. It was our aim in Area B to uncover only the uppermost floors and, then, to move on to the next square. However, there were traces of a "channel" in the southwestern section of B I, on the edge of the destruction pit, while in the main space of unit B IV, the floor was of such inconspicious consistency that we found ourselves on rows of stones. These turned out to be the lines of the supporting walls with the capstones already removed. The slabs had re-

mained *in situ* under the southwestern wall of that space, which was erected only after an entire platform had been constructed, using sub-floor "channels".

The observation that various units were positioned at different heights is the last point to mention. Three levels can be distinguished: the lowest is occupied by unit II; unit I sits on a terrace 50-60 cm higher; and, above them, units III, IV and V rest on a common level 110-120 cm higher than unit I. The outer walls of unit B I stand out as the retaining walls for the terrace, with the exception of its southeastern wall, for which a context has not yet been determined.

Nothing as yet can be said about the accessibility of the various units or of any "public" space. It should be clear from the present plan, however, that continued effort will undoubtedly uncover an interesting general lay-out.

**Trial Trench and Drillings in Area C**

The few drillings made in 1987 did not contribute reliable information on either the presence or kind of Neolithic remains in Area C. Nevertheless, a surface survey made us confident that such remains existed. Therefore, we decided to begin our search again, this time with more systematic drillings in the vicinity of a trial trench which had supported the evidence of the surface survey.

The drilling program that had been planned encountered technical difficulties. Consequently, conclusive statements about Neolithic finds could not be made. The program will be repeated in the near future and the results will be included in our next summary report. Moreover, work on the trench could only be scheduled as extra work; consequently, the time and effort spent on it was limited. Nevertheless, there are remarkable results to be reported.

A 2×4 m trench was opened in square 545N/540E and dug down from 2.50 meters at its southern edge to 3.40 meters below the surface at its western edge, covering an area of 4 $m^2$. According to the surface survey, the upper slope of the Neolithic site appeared to be close to the edge of the alleged settlement. The goal of this effort was to determine within a limited area within this upper slope the possible inclination of earlier layers as well as their kind, number, depths and thicknesses.

There were neither architectural remains nor stone settings found. However, we encountered a long series of different surfaces and lenses of slightly different colors, sometimes only 10 cm thick, with very few traces of carbonized material, below the surface soil and adjacent sandy layers. At times the surfaces consisted of a mortar-like substance also used for plaster floors. There were ashy layers interlaced within the sequence in a few cases. The total absence of the thick layer of rubble stones which overlay the architectural remains in both Areas A and B is one of the most conspicuous aspects of the stratigraphy.

All surfaces had two things in common: 1) the non-transported, carbonized remains of plants and wood found on the surfaces were in abundance and well-preserved; and, 2) there was also homogeneous, correlated flint debitage. In one case, the pieces represented the debitage from a bipolar core and parts of the original lump of flint could be restored from them. In two other cases, raw blades were found together with numerous broken borers and burins.

The finds in the selection of raw materials, knapping techniques and types of arrowhead from the trench in Area C correlate with those of the lower building phase in Area A; and, they are clearly different from those of Area B.

**Burials and Skull Deposits**

No burials and almost no scattered human bones were found in Area B, although, as mentioned earlier, burials were found in Area A. Our contention of last year was confirmed, therefore, that there would not be many, if any, burials to be found in Area B.

Five undisturbed burials and five skull deposits were found in Area A. The variation in posture here also confirmed an observation made last year, that in Neolithic Baṣta no one type of burial posture was practised. There was one exception to last year's observation, however. The undisturbed burials all had

skeletons with flexed arm and leg extremities, sometimes even distorted from their original burial position. In some cases, the flection was so extreme as to suggest that the bodies had been tied. The skulls were in place and well-preserved.

In room 29, there were two burials and two skull deposits discovered. This is an interesting find because we cannot, otherwise, make any sense of the room within the architectural context. We can only surmise that it belongs to the earlier building phase and that it appears to be a dividing corridor between the sub-floor construction system of rooms 18, 20 and 13, as described above and another system beginning to the west of room 29. This corridor seems to have been used as a burial ground. One skull deposit was found at the northern end of the corridor, close to the east wall (burials 32 and 34); the other was found in the middle and to the north (burials 33 and 35). The body, in all cases, is laid on its side. In burial 33, the lower extremities appear bent towards the head with hands placed close to the hips.

Undisturbed burials in "channels" 25/20, 24/19 and 61 were found with the heads pointing east. The burial locations in those parts of the "channels" were just off the central spine of the system. We were able to excavate a "channel" all the way to its eastern end in only one case. Here, between the beginning and the end of the channel, we found a large number of disarticulated human bones with three skulls positioned in front of them (burial 39), in addition to undisturbed burials (burial 37). Clearly, the remains of earlier burials had been laid aside to make way for the burial of a new corpse.

**Human Skeletal Remains** (contributions by Michael Schultz and Andreas Scherer)

There were 11 burials discovered with a total of at least 17 individuals. As found in previous seasons, the preserved state of the human bones is good.

Children comprise nine (i.e. 52.9%) of the individuals. This number, which is similar to that reported in 1987 (Schultz 1987), falls within the range of typical statistics reported on infant mortality rates in Neolithic times (*cf.* Schultz 1989a). The age distribution of the infant and juvenile individuals excavated is as follows:

- One baby (between three and nine months).
- Two individuals of infans I (at least two years old at death).
- Two individuals of transitional age between infans I and II.
- Three individuals of infans II.
- One individual of transitional age between infans II and juvenis.

Among the adults, five males and two females have been identified. The sex of one individual has yet to be established. Here, too, consistent with the evidence from the previous year, the skull morphology of the excavated individuals is typical for early farming populations of the Near East (Schultz 1987). The Basta population appears to have been of a relatively gracile typus. The age distribution of the adult individuals excavated is as follows:

- Two individuals of adultus.
- Three individuals of transitional age, adultus/maturus.
- Two individuals of maturus (including one of late maturity).
- One individual of transitional age, maturus/senilis.

The two oldest representatives of the group are males. The skeletons of several individuals were found in each of a few of the burial locations. For example, there were two children in the age group of infans II; one early and one late mature male; and one female in the transitional age group of late adult/mature together in burial 39.

Eleven of the excavated skeletons (five adults, six children) include jaws and teeth from which related diseases have been diagnosed for this preliminary report. A high degree of dental attrition and a severe arthrosis of the jaw joints demonstrate a dietary consequence among typical agriculturalist populations. Dentine abrasion in the infant teeth is so pronounced that the dentine could have been seriously affected. The presence of caries, interestingly, has not been detected (!), whereas periodontal diseases were found in six of the eleven individuals. There are

remnants of dental calculus in eight individuals. One monstrous formation was discovered on a lower right third (burial 38: late mature/senile male). Evidence of dental calculus was not observed in very young children, that is, those probably less than three years old. This would indicate a relatively long weaning period (Schultz 1989a).

In the Basța population malnutrition is indicated only by transversal enamel hypoplasia. Of nine individuals suitable for this investigation, there are four adults and five children. Seven of the nine show this defect. Among the four adults, only one did not have transversal enamel hypoplasia. Among four of the infants, in whom the deciduous teeth could be examined, only one had the transversal enamel hypoplasia. Two of three children show these alterations in the permanent teeth.

A probable case of scurvy is seen in one of the five children; there were no traces of C-avitaminosis among the four adults. It appears that in infancy stomatitis is induced by scurvy (Schultz 1989b). In the Basța population, there is one case in which stomatitis was definitely caused by chronic vitamin C deficiency. A second case was probably caused by periodontal disease. The findings correspond in two of the four adults. *Cribra orbitalia* was not diagnosed in the examination of six children and six adults.

As found among the skeletons excavated in 1987, inflammatory conditions of the meninges and the skull vault appear relatively frequently. The evidence of these conditions indicated the following distribution among the six children and six adults:

- Meningoencephalitis: two children, three adults.
- Osteomyelitis: one child, two adults (all induced by trauma).
- Perisinous abscesses (resulting from meningoencephalitis): one child, one adult.

Three adult male skulls out of twelve (from burials 31, 39c and 40) exhibited depressed fractures of the skull vault which had healed. This seems to be a characteristic of the Basța population, providing a glimpse of the life situation in Neolithic times.

There is strong evidence of arthrosis in the skeletons of several individuals. Slight alterations due to arthrosis have been diagnosed among the young adult individuals. The shoulder joints in males seem to have been severely affected. As would be expected, the destruction was much more extensive in the late mature/senile age group.

Corresponding results are observable in the vertebral column. Spondylosis is present mainly in the older age group. The late mature male from burial 39 (Ind. C) probably suffered from rheumatic arthritis: the manu ligaments of the vertebral column are ossified; two segments of the cranial part of the thoracic spine are fused; and the sacro-iliac joint is in a state of ankylosis.

Myositis ossificans, probably caused by physicogenic stress, is manifest in muscle attachments of the left humerus of a late adult/early mature male (burial 40).

The unusual composition of six elements of the sacral bone found in an adult individual must be interpreted as a congenital malformation, without any relevant clinical consequence. The scoliosis in a late adult/early mature male (burial 40) must be judged as an acquired vertebral malformation, probably induced by excessive physical strain especially during the subadult years.

The slight alterations on the surfaces of the tibiae of two adult individuals have been diagnosed as periostal reaction, which could be an example of early bone inflammation.

It is not likely that pleurisy or pleural effusion was present in the population of Basța, as there are no changes on the internal surfaces of the ribs among the well-preserved skeletons (three children, four adults).

These preliminary data provide the basis for a better understanding of life conditions in a population of the Late Aceramic Neolithic Age of the Near East.

**Observations on the Flint Industry** (Figs. 2-4)

The range of types was considerably increased by new finds during this season. Consequently, we had to modify our assumption that we had more or less exhausted the range of variability in previous seasons. With

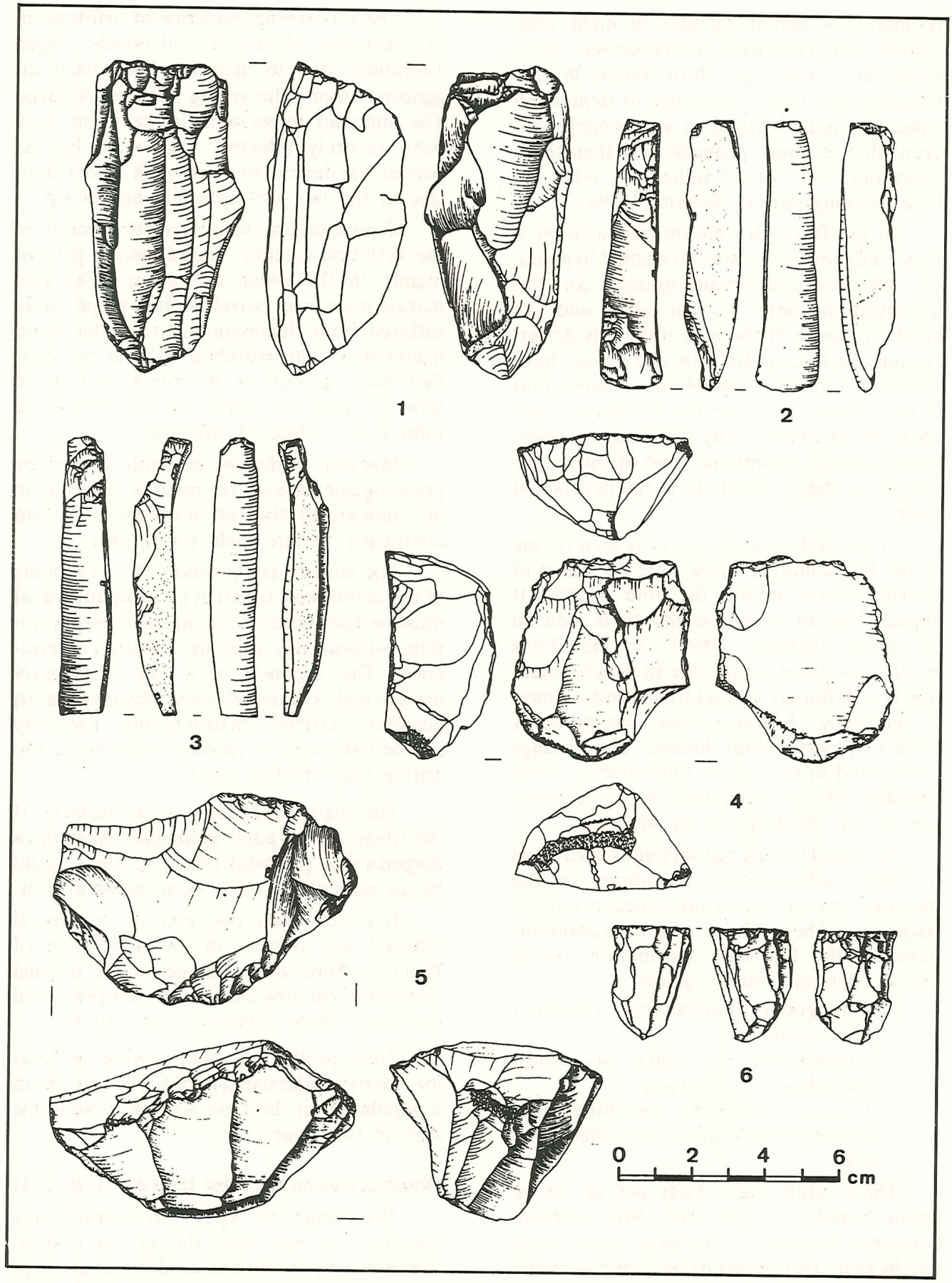


Fig. 2. Flint cores: 1. Bipolar core; 2-3. Bipolar core rejuvenation products; 4-5. Flake cores; 6. Micro-blade core.

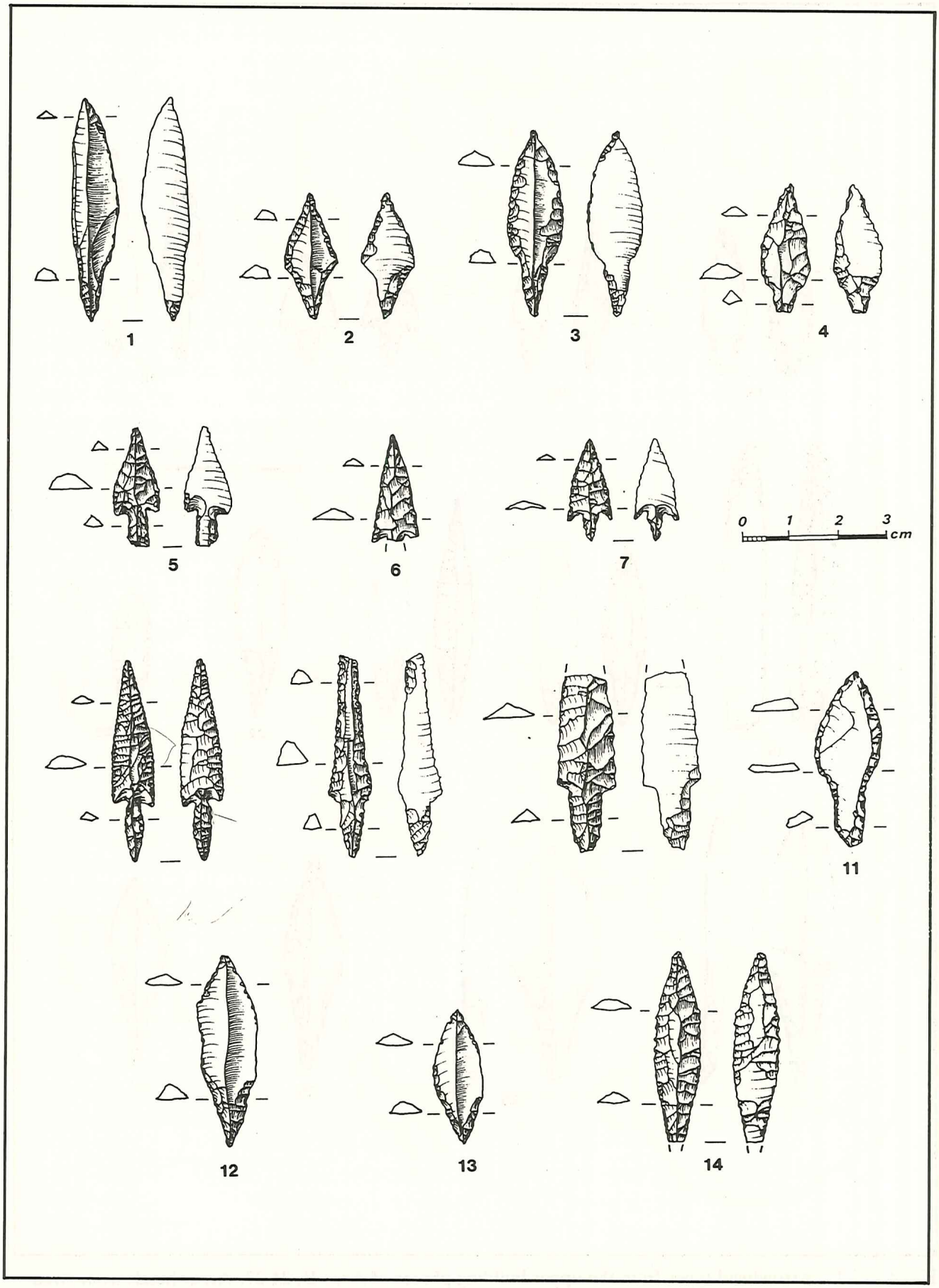


Fig. 3. 1-14. Arrowhead types from the upper layers of Area B ("limestone debris layer").

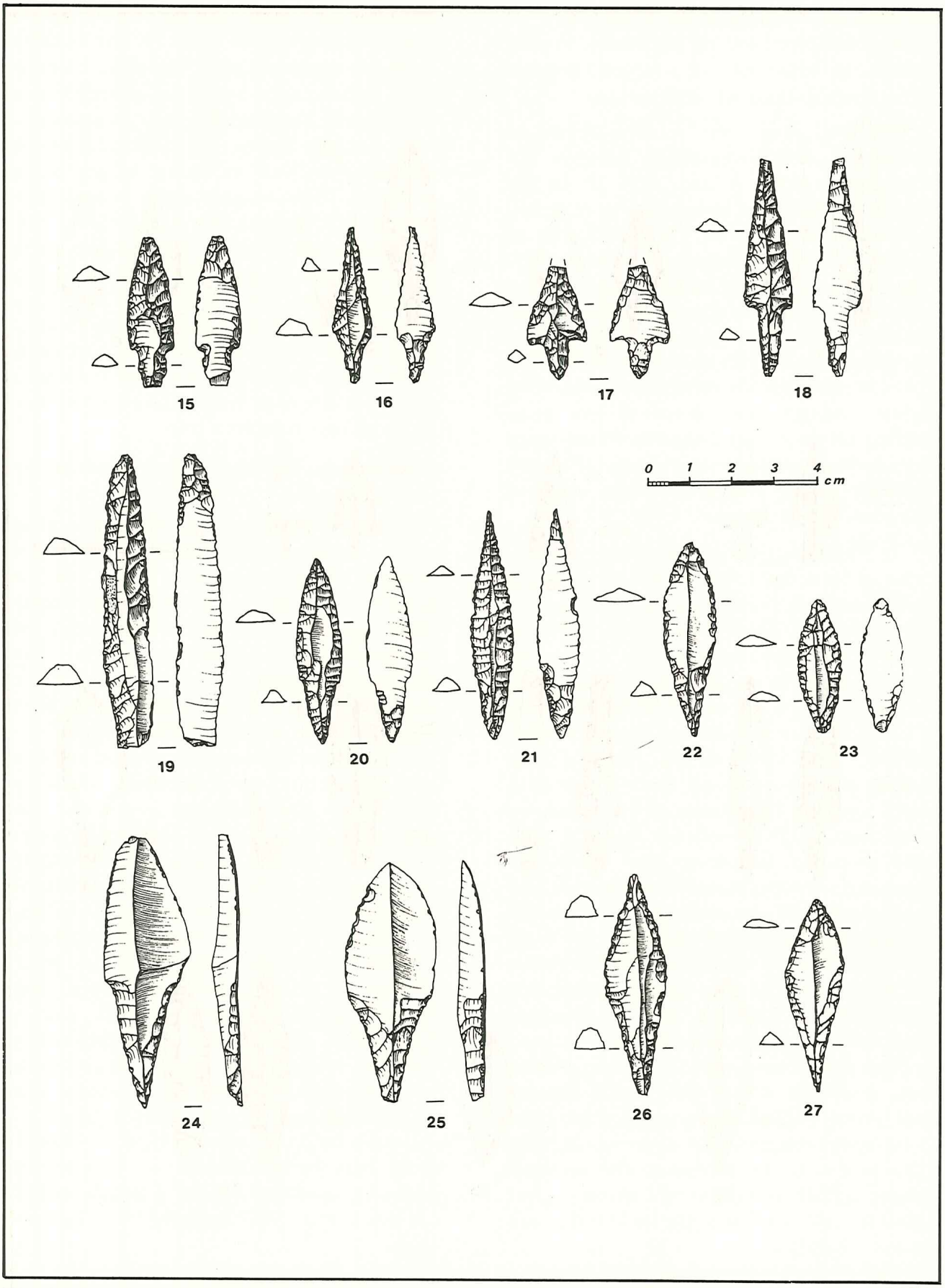


Fig. 4. 15-23. Arrowhead types from the upper building phases of Area B; 24-27. Arrowheads from Area C (Loci 8-13).

the present evidence from three areas of investigation, we have, in particular, to deal with strong indications of a larger temporal differentiation than we anticipated.

We had, even last season, begun to recognize a shift in emphasis between the industries in Area A and Area B: in the former, bipolar core techniques were dominant, while, in the latter, the significance of flaking techniques increased considerably. This observation could be confirmed. At the same time, there was also an indication that the tool kit and its arrowheads from the limestone debris layers in Area B might be — from a chronologically relative perspective — slightly younger than those of the main building phase underneath. We found types already resembling the early Pottery Neolithic among the arrowheads in these limestone debris layers.

In 1988, the technological study concentrated on cores from Area B. We can state for all the areas excavated that cores are not in any reasonable quantitative relationship to the amounts of debitage and tools. The use or re-use of cores as hammerstones is attested, but that feature is not explained quantitatively. Cores in Area B reused as hammerstones, probably derived from the [upper] main building phase, are found, quite frequently, reused again as flake cores in the limestone debris layers. This evidence accords with other evidence indicating that there was increasingly less exploitation of selective raw material towards the end of and after the architectural occupation in Area B. Wadi pebbles — the often breccial — local flint rubble and the "*in situ*" flint of sometimes inferior quality, which covered the surrounding heights, became the major raw materials used for flake production; and, the bipolar techniques, using the distinctive tabular flint of basal Area A and of Area C (test: unit stratigraphy) disappear. In other words, core techniques in Basṭa, related to raw material groups, appear as very rough chronological indicators. The sources of the tabular flint are not yet identified.

The spherical-polyhedric flake cores outnumber the single platform blade cores (and removals > or < 50% of core edge), single platform flake cores (like Fig. 2:4-5), and the bipolar core types in Area B. The discoidal cores are extremely rare. The flake cores are often characterized by the use of the cortex as a platform. They exhibit heavy battering of trial flakings below the last edge-of-core (A-edge) as well as many hinges on all surfaces. Their weights differ considerably, from 22 to 350g, with an average of 75g. Their dimensions are between 30 and 90mm for the lengths below the last core edge used; 18 to 60mm for the maximum width and 25 to 70mm for the maximum thickness (orientations according to the last core surface reduced). The latest core surfaces have up to four complete negatives, but sometimes hardly show two complete ones.

**Worked Bone Industry** (contribution by Wajeeh Karasneh)

The worked bone sample from Basṭa most recently collected consists of 289 pieces, of which 145 are from Area A and 144 from Area B. The bones came from both domesticated animals (e.g. sheep and goats) and undomesticated animals (e.g. gazelle). They were worked into tools by the techniques of cutting, sawing, percussion and scoring. Some were polished; perhaps with a cloth.

There are five categories of worked bone tools (Table 1): 1) pointed tools, which may be further classified into perforated and needle types; 2) cutting edge tools, within which there are also recognizable distinctions; 3) smoothing edge tools, consisting of two basic shapes; 4) ornamental artefacts; and, 5) technic, a residual category (see below).

The perforators make up the largest number of items in the assemblage. They consist of four distinguishable shapes: 1) pointed split bone; 2) perforator of rounded cylindroconical base; 3) perforator with straight cylindroconical base; and 4) bevelled base prepared for hafting.

Needles, the second type of pointed tools, may be subdivided into thin needles and wide needles. In 1988, a needle with an ear was found. This should be listed as a new type.

The cutting edge tools make up two types, within each of which a division can be made:

**Table 1:** Typological classification of the worked bone sample from Area B.

| Type | Quantity | Percentage Total |
|---|---|---|
| **Pointed Tools** | | |
| Perforator Type 1 | 1 | |
| Perforator Type 2 | 13 | |
| Perforator Type 3 | 6 | |
| Perforator Type 4 | 1 | |
| Perforator Type 5 | 1 | |
| Perforator Type 6 | 9 | |
| Fragments possible Type 1-2 | 29 | |
| Fragments possible Type 5-6 | 10 | |
| Needle Type 1 | 1 | |
| Needle Type 2 | 2 | |
| **Total** | **73** | **50.6%** |
| **Cutting Edge Tools** | | |
| Cutting Edge Tools Type 1a | 5 | |
| Cutting Edge Tools Type 1b | 8 | |
| Cutting Edge Tools Type 2 | 2 | |
| **Total** | **15** | **10.4%** |
| **Smoothing Edge Tools** | | |
| Smoothing Edge Tools Type 1 | 5 | |
| Smoothing Edge Tools Type 2 | 4 | |
| Smoothing Edge Tools Type 3 | 3 | |
| **Total** | **12** | **8.3%** |
| **Ornaments** | | |
| Rings and Discoid Bead | 7 | |
| Tublar Beads | 2 | |
| Phalange Q | 3 | |
| **Total** | **12** | **8.3%** |
| **Technic** | | |
| UD Pointed Tools | 17 | |
| Unfinished Artefacts | 4 | |
| Bone Nuclei | 4 | |
| Debris from Fabrication | 7 | |
| **Total** | **32** | **22.2%** |
| **Final Total** | **144** | **100%** |

Type 1a: a flat large tool, blade leaf shaped with curved sides and ends.
Type 1b: a flat large tool, with straight base.
Type 2a: a flat narrow tool with parallel sides.
Type 2b: a flat narrow tool with curved sides and narrow perforated base.

The smoothing edge tools are either flat, large and thick burnished with parallel sides or flat, narrow and thick burnished with straight ends, though also possibly scoop-shaped with rounded ends.

The ornamental type consists of rings, discoid beads, tubular beads and pierced phalanges. Rings worked in bone similar to those worked in shell are also found, though infrequently. They were finger rings to judge from their size.

Finally, fabrication debris, bone nuclei and unfinished artefacts are included.

**Ground Stones Industry and Stone Vessels** (contribution by Nabil Qadi; Pls. III-V)

The ground stones and stone vessels assembled from Baṣṭa during the 1986-1988 seasons are characteristic of the PPNB period of the Levant. Handstones represent between 60 and 75 per cent of all the stone collected. The abundance of this type raises questions about their manufacture in such huge quantities. Thus, this type of stone at Baṣṭa requires further detailed research and analysis, followed by a comparative study of all Levantine sites. Such a program of research is needed to obtain clear results about 1) the technique of manufacture; 2) the function of manufacture; 3) the raw materials used in manufacture; and, 4) communication between the Baṣṭa region and the rest of the Levant area during the PPNB period.

This report is based upon a preliminary study of the types of ground stone tools found at Baṣṭa during the 1988 campaign and their comparative status. The statistics (Table 2) are drawn from the 1988 excavation season;

**Table 2:** Frequency of ground stone and stone vessels from Basța 1988.

| Type | Raw Material | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LIME | CRBT | QRTZ | SAND | FLNT | QZIT | BSLT | VLCN | GRNT | CGMT | SLCD | COMP | INCO | Total | % |
| Handstone | 34 | 4 | 227 | 178 | 1 | 514 | 4 | | | 1 | | 103 | 860 | 963 | 59.5 |
| Rubbing | 7 | 1 | 28 | 13 | 1 | 20 | 1 | 7 | | | | 31 | 47 | 78 | 4.82 |
| Quern | 5 | 4 | 32 | 20 | | 33 | 1 | | | 1 | | 9 | 87 | 96 | 5.94 |
| Grinding | | | 13 | 22 | | 42 | | | | | | 14 | 63 | 77 | 4.85 |
| Pestle | 1 | 2 | 4 | 7 | | 10 | 1 | | | | | 6 | 19 | 25 | 1.54 |
| Cup-mark | 4 | 3 | 1 | | | 4 | | | | | | 5 | 7 | 12 | 0.74 |
| Mortar | 8 | 6 | 2 | 2 | | 4 | | | | | | 4 | 18 | 22 | 1.45 |
| Hammer st. | 24 | 1 | 4 | 1 | 1 | 10 | | 1 | | | | 33 | 9 | 42 | 2.59 |
| Grooved | 6 | | 3 | 14 | | 6 | 1 | | 2 | | 1 | 16 | 17 | 33 | 2.01 |
| Disk | 9 | 1 | 2 | 8 | | 6 | | | | 1 | | 24 | 3 | 27 | 1.66 |
| Perforated | 6 | 1 | 1 | 3 | | 2 | | 1 | | | | | 14 | 14 | 0.86 |
| Weight | 53 | | 5 | 7 | | 22 | 5 | 6 | | | | 22 | 76 | 98 | 6.05 |
| Egg shape | 30 | | | 3 | | 13 | | | | | | 40 | 6 | 46 | 0.84 |
| Plate | | 12 | | 2 | | | | | | 1 | | | 15 | 15 | 0.92 |
| Small bowl | 1 | 14 | 1 | | | 1 | 2 | | | | | 3 | 16 | 19 | 1.17 |
| Large bowl | 4 | 24 | 3 | 2 | | 1 | 1 | | | | | | 35 | 35 | 2.16 |
| Chisel | | | | | | 2 | | | | | | | 2 | 2 | 0.12 |
| Stopper | 1 | | | | | 1 | | | | | | 1 | 1 | 2 | 0.12 |
| Perforator | | | | | | 2 | | | | | | 1 | 1 | 2 | 0.12 |
| Bead | | | | 1 | | | | | | | | 1 | | 1 | 0.06 |
| Axe | | | | | | 1 | | | | | | | 1 | 1 | 0.06 |
| UD | 3 | 1 | | 1 | | 1 | 1 | | | 1 | | 2 | 6 | 8 | 0.49 |
| **Total** | **196** | **74** | **326** | **284** | **3** | **695** | **17** | **15** | **2** | **5** | **1** | **315** | **1303** | **1618** | **100%** |
| **Percentage** | **12.1** | **4.57** | **20.1** | **17.5** | **0.18** | **42.9** | **1.05** | **0.92** | **0.12** | **0.3** | **0.06** | **19.5** | **80.5** | **100%** | |

**CRBT = carbonate stone, QRTZ = quartz, FLNT = flint, QZIT = quartzite, GRNT = granite, CGMT = conglomerate, SLCD = silicide.**

they do not differentiate between the late PPNB layers of Areas A, B and C.

The variety of grinding tools, represented by hand stones, rubbing stones, grinding slabs and querns, emphasizes the importance of plant resources. This suggests that Early Neolithic groups at Basța were familiar with processing domesticated crops (see Neef 1987). It does not, however, explain the abundance of the grinding stone tools. More than 1200 (complete and fragmentary) were collected during this excavation season, constituting 75 per cent of the ground stone items, but not all could have been used for grinding crops. Many hand stones show no traces of wear. This suggests that they either had other uses or were manufactured as an industrial product. The same could be argued for pounding materials, represented by pestles, mortars, cupmarked stones and hammerstones. Clearly, such resources were an important basis of the subsistence economy.

We had an exceptionally rich yield of grinding stones and pestles with about 1618 pieces. This greatly enlarged our type catalogue, particularly by the addition of a large number of pieces among previously established types. There are good individual items among the "weights" and grooved stones. It is possible that other pieces may be identified as maces. Stone slabs with long grooves and pea-sized haloes may have been arrow smootheners, though this seems to be contradicted by the triangular shape of some pieces.

Several stone vessels were also found, predominantly from Area A. Their fragments were among a layer of small stones which formed a foundation before the mud floor was laid. They were found in many sizes, but the basic shape was calotte-like. Larger bowls, with a slightly inverted, sharp rim, were well-finished; they were made of a marble-like stone, the source of which is not yet known. In addition, there were similar shaped pieces made of local limestone. These were worked more coarsely. The bowls still showed traces of red paint in a number of cases. One bowl in particular, found in two halves, had been coated first with yellow ochre and then with a second coating of red ochre. The smaller vessels tended to be shallow; some seemed to have been produced by simply using the natural depression of stone slabs and cutting off any extraneous

protrusions. The local limestone was normally used, but two items indicate use of a chlorite-like stone, the origin of which is not yet known. Among the unusual pieces found is a flint disk with a ground-off edge. One side (the upper side?) also showed a natural depression with the cortex still present as well as some red pigment; the "lower side" was worked in a manner similar to a discoid core.

The raw materials exploited for manufacture of ground stone tools and stone vessels are generally available locally. These include limestone of varied quality, carbonate rocks, quartz and quartzitic sandstone. Other materials such as sandstone, basalt, volcanic, granite, conglomerate and silicate stones, appear to have been brought from outside the area.

**Small Finds** (contribution by Bo Dahl Hermansen)

The main raw materials used for ornaments and other small objects are shells of marine molluscs from the Red Sea and the Mediterranean. This has been recognized in previous preliminary reports (Nissen, Muheisen and Gebel 1987; Gebel, Muheisen and Nissen 1988). The material also shows evidence of fresh water mussels from the Jordan and/or Nile Valleys. Mother-of-pearl used for paillettes and other kinds of ornaments at Baṣta comes from the latter location.

Non-local minerals provisionally identified as malachite, carnelian, steatite and colored sandstone appear in limited quantities. Corals from the Red Sea are also an important raw material used in the Baṣta industry. In addition, various kinds of limestone, quartz and fired clay were used as raw material in the production of small objects. Many of these materials are represented in their raw form and as processed artefacts. This suggests that Baṣta was a node in a regional network of transportation and exchange which was flourishing in the late PPNB; and further that production of ornaments in exotic materials may have been practiced at the site.

The conclusions and generalization about the Baṣta small finds industry reached in previous reports are generally supported by the results of the 1988 excavation season. There is no reason to repeat these results. Consequently, the following brief presentation will concentrate on individual objects of significance which do not fit directly into established patterns:

An interesting new aspect of the shell industry is represented in Fig. 5: 6-7. These objects are small rings of conus species shells, which apparently have been cut through the cross section of the apex. The illustrated specimens are among the largest examples of this type, though they appear in many sizes.

Mother-of-pearl, as is often the case, was used in the production of aesthetically pleasing objects. A large triangular paillette (Fig. 5:1) is especially beautiful. It is of a type well-represented in the 1988 material. Three other mother-of-pearl objects have been chosen for illustration (Fig. 5:3-5). They are ovoid, subrectangular and diamond-shaped respectively. Each of them has been pierced twice, which gives them a strong resemblance to what we would call "buttons". However, they have been sewn on textiles or skins as paillettes.

A carved, ground object, showing the highly stylized features of a human face, decorated at the top with an incised nipple and pierced in the expected position of the mouth (Fig. 6:2), may have been made of malachite. The outline of the perforation, clearly illustrated in the drawing, suggests that it was probably used as a pendant. Here we have an indication that exotic raw materials, such as malachite, were not only used in the production of beads and paillettes.

Limestone of various kinds was used for different purposes. The human face engraved into the surface of a tabular piece of soft limestone (Fig. 6:1) is unique. Notice the asymmetry. If, however, all the material to the left of the transversing groove were removed, approximate symmetry would result. There is a similar groove in roughly the same position on the other side of the stone. Its presence prompts the conjecture that the groove was meant as a preparation to cut the stone at that point, but that the piece was thrown away unfinished. The engraved paillette or weight (Fig. 5:2) is another unusual

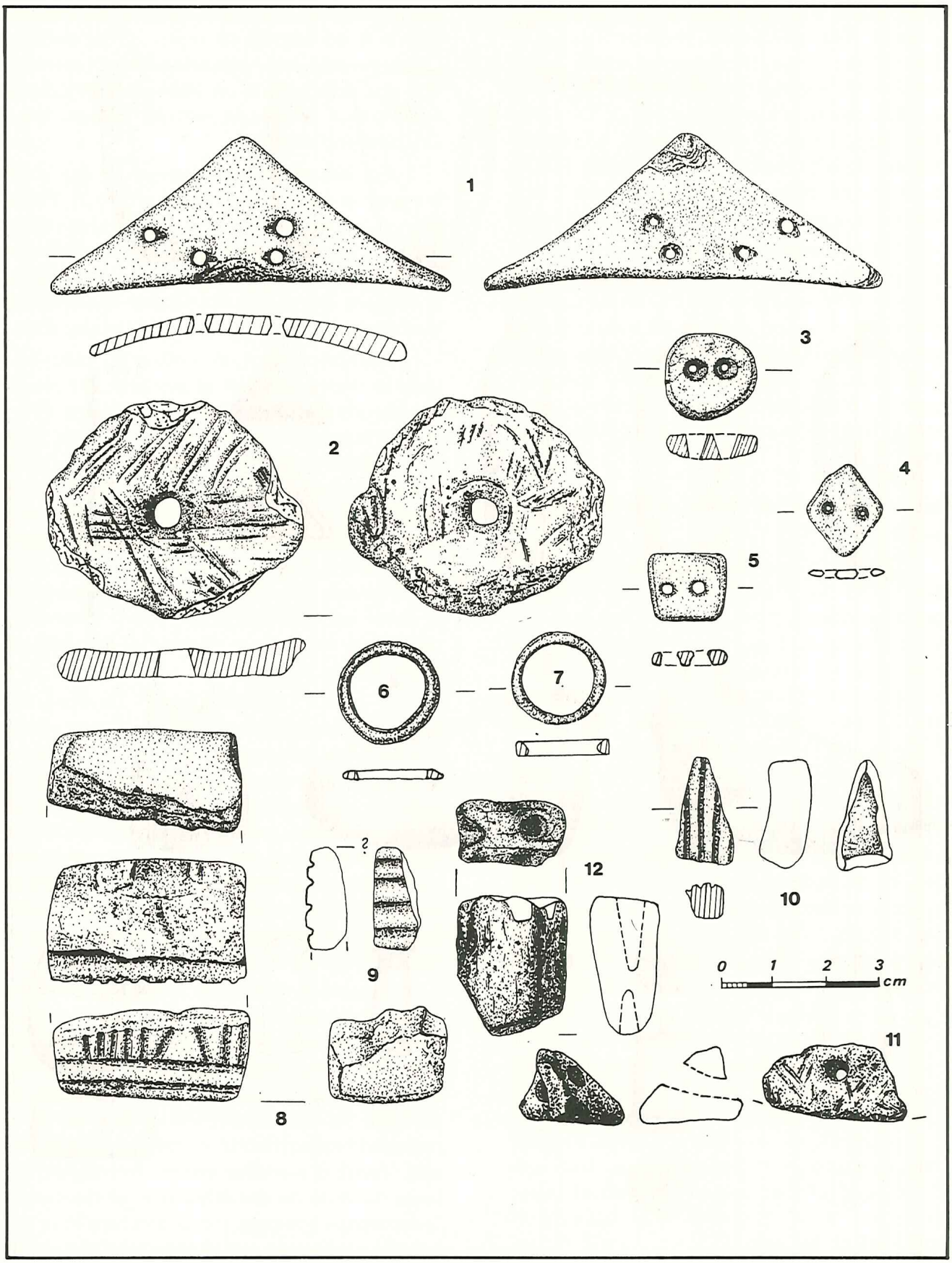


Fig. 5. 1. Triangular paillette (mother-of-pearl); 2. Paillette engraved of soft limestone; 3-5. Button-like objects (mother-of-pearl); 6-7. Marine mollusc rings; 8-12. Fragments of carved engraved limestone objects.

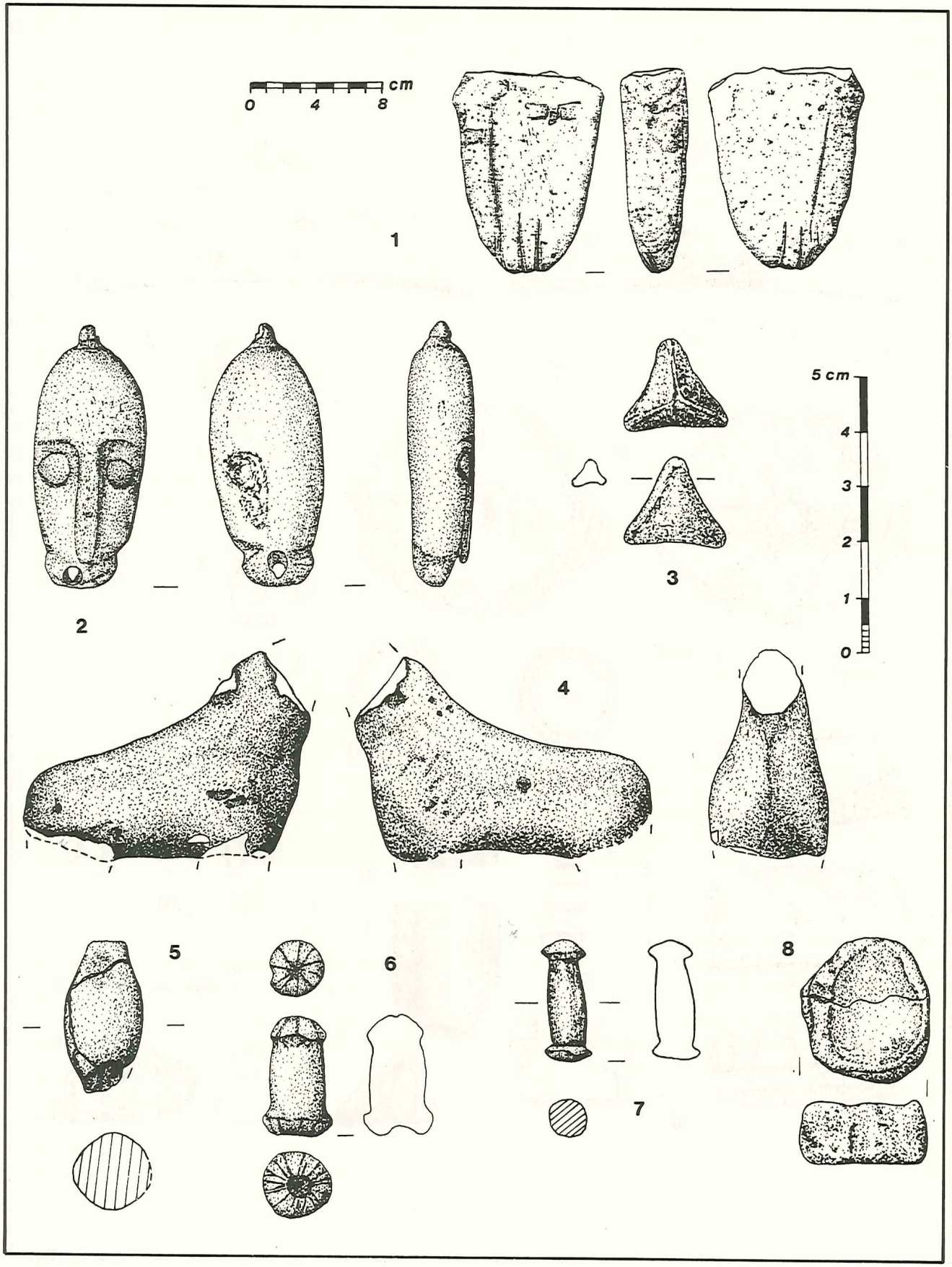


Fig. 6. 1. Representation of a human face carved out in soft limestone; 2. Representation of a human head in copper-containing mineral; 3. Fired clay "counter"; 4. Fragment of an animal figurine of fired clay; 5-8. Objects of unknown function (5,8: fired clay, 6-7: limestone).

object of soft limestone. The incised decoration was made apparently before the final shaping of the stone. The ovoid shape, then, was achieved through partly bifacial knapping, almost obliterating the stone's original edge.

There are several small, "pulley-shaped" objects cut in limestone (Fig. 6:6-7) which are interesting. Many interpretations of their meaning and function in the Basṭa assemblage are possible, rendering them difficult to assess. The author of this contribution is inclined to interpret them as "tokens" or "counters" similar to the geometric clay objects mentioned below. A number of other limestone objects too fragmentary to be interpreted were recovered. The engravings (Fig. 5:8-10) seem to be geometric in all cases.

Finally, several fired clay objects were found. Among them was an animal figurine (Fig. 6:4). Unfortunately, the front and hind limbs, as well as the head, were broken off. Consequently, a precise identification is impossible. The surface is reddish to brown, with a black core visible at all breaks. This suggests incomplete oxidation.

A small number of fired clay objects were of geometric design. The illustrated example (Fig. 6:3) is the only completely preserved specimen. Widespread throughout the Near East from the early Neolithic onwards, they are generally identified by Near Eastern prehistorians as "tokens" or "counters" (Schmandt-Besserat 1982). More irregularly shaped fired clay objects were also recovered. Two well-preserved examples are illustrated here (Fig. 6:5 & 8). All of this class of objects appear to be hand-moulded. They seem also to have been fired at relatively low temperatures and under conditions which did not allow full oxidation. Nevertheless, they provide evidence that the inhabitants of Basṭa may have possessed the technological understanding necessary to produce pottery.

**Faunal Remains** (contribution by Cornelia Becker)

Approximately 52 kg of animal bones (n = 22,778) extracted from the PPNB layers at Basṭa in 1988 were analyzed. This was done during a three week stay in Jordan in the summer, in part at the site itself and in part at the British Institute at Amman for Archaeology and History.[2] The cross-section of the analysis already provides crucial data on the use of domesticated and wild animals during the PPNB of this region of the Levant. Many new questions have to be asked, however, because of the abundance of material (*cf.* first preliminary material, Becker 1987).

Excavation in Area B yielded about 70 per cent of the animal bones, Area A about 30 per cent. This year's excavation season was marked by the conclusion of archaeological activity in Area A. Thus, it permits a detailed analysis of faunal material and its relation to the archaeological context of this excavation site.[3]

Almost the entire mass of the bones consists of slaughter and consumption residue. The material is mostly disarticulated, heavily fractured, and much of it bears marks of flint tool manipulation. Extensive sieving resulted in the registration of even the smallest splinters. Thus, the identification of much of this yield became a difficult and time-consuming task. Under the circumstances, my aim during field work was to find an adequate relation between the time at my disposal and the results to be achieved. Of the total number, 40 per cent remained unidentified; this is the equivalent to about 15 per cent in relation to weight.

The small ruminants provide 68 per cent of dietary consumption, as shown in Table 3. The domesticated animals in this group clearly dominate. The goat herds supplied at least 50 per cent of the food supply and raw material; sheep husbandry provided supplies on a smaller scale. This result may be

2. My most particular thanks go to A. Garrard, K. Rielly and A. McQuitty for the welcoming reception in Amman. My access to the osteological collection of the institute as well as the many discussions we had proved extremely helpful.
3. The bones from Area A will be published later.

**Table 3:** Quantitative analysis of the identified vertebrate remains on the basis of bone weight (in gram).

| | Weight | % |
|---|---|---|
| *Capra hircus/Ovis aries* | 25,290 | 56.9 |
| *Capra aegagrus/C. ibex (O. orientalis?)* | 1,058 | 2.4 |
| Ovis/Capra/Gazella | 1,510 | 3.4 |
| *Gazella subgutturosa/G. gazella* | 2,349 | 5.3 |
| *Cervus dama* | 3 | ‹0.1 |
| *Bos primigenius (B. taurus?)* | 4,646 | 10.4 |
| Bos/Equus | 3,348 | 7.5 |
| *Equus hemionus/E. africanus* | 5,214 | 11.7 |
| *Sus scrofa* | 21 | ‹0.1 |
| *Canis familiaris* | 331 | 0.7 |
| Wild carnivores, rodents, lagomorphs, birds and tortoises | 701 | 1.6 |
| **Total** | **44,471** | **100.0** |

regarded as confirmed after an analysis of approximately 20,000 ovicaprine bones from this site. It seems that the animals were kept for their meat rather than for their milk, judging from the distribution of ages at the time of slaughtering.

The remaining meat and raw material requirements were satisfied by hunting a variety of wild animals (aurochsen, equids, fallow deer, wild boar, gazelles, wild goats/sheep/ibex, foxes, felines, badgers, hares, birds and tortoises). The range of species at Basṭa is narrow in comparison to other PPNB sites, e.g. 'Ain Ghazal (Kohler-Rollefson *et al.* 1985).

The distributional percentage of wild and domesticated animals cannot yet be precisely determined because some taxonomic identification requires further confirmation. For example, whether or not cattle were kept as domesticated animals remains to be established. Bones of the genus *Bos* occur in substantial numbers. The extent of variability among them raises a problem, especially with the small ones (Pl. VI:1): the remains may not be female aurochsen only, but contain domesticated specimens as well. The number of adequately preserved bones is too small at present for a statistically defensible statement to solve the problem morphometrically. The difficulty is increased if the existence of several subspecies of the urus, whose Levantine form is said to be among the smallest, is considered. About 2 per cent of the ovicaprine bones could be assigned with some degree of confidence to a related wild form of the subfamily *Caprinae*. Morphologically, these bones appear very close to the genus *Capra*. The existence of wild sheep in Basṭa remains in doubt for lack of evidence. This may be due to the preliminary status of my investigations. Both wild goat and ibex have been identified from the Natufian site at Beiḍa (Hecker 1974). This region of the Levant, including the area around Basṭa, seems to favor the co-existence of these species. They are so closely related and their osteology is so strikingly similar that it is very difficult to distinguish fragments of single bones (*cf.* von den Driesch 1972). The corresponding large-sized horn cores found at Basṭa belong to the wild goat. They have the typical sharply keeled section at their base. My own observations on extremity bones[4] — if distinguishing criteria are indeed valid — suggest the probability that most postcranial bones are more similar to the wild goat than to the ibex. Final conclusions, however, cannot be

4. My sincere thanks as well to H.P. Uerpmann (Tubingen), who allowed me to view his exceptional comparative collection of skeletons from the Middle East. He showed much patience in explaining the special aspects related to the osteology of equids, gazelles and sheep/goat/ibex which contributed to the preliminary results represented here.

**Table 4:** Relative distribution of the animal remains in the excavation areas A and B on the basis of bone weight.

| | A | B |
|---|---|---|
| *Capra hircus/Ovis aries* | 56.8 | 56.8 |
| *Capra aegagrus/C. ibex (O. orientalis?)* | 5.5 | 0.7 |
| Ovis/Capra/Gazella | 3.8 | 3.2 |
| *Gazella subgutturosa/G. gazella* | 7.2 | 4.3 |
| *Cervus dama* | 0.1 | — |
| *Bos primigenius (B. taurus ?)* | 15.7 | 7.6 |
| Bos/Equus | 5.7 | 8.7 |
| *Equus hemionus/E. africanus* | 3.9 | 15.9 |
| *Sus scrofa* | — | ‹0.1 |
| *Canis familiaris* | — | 1.2 |
| Wild carnivores, rodents, lagomorphs, birds, tortoises | 1.6 | 1.5 |
| **Total** | **100.0** | **100.0** |

reported now.

The faunal material acquired during the 1988 excavation season includes more than 100 remains of gazelle. The environment and the presumed radius of hunting activities at Baṣṭa, stretching from the mountainous regions in the west to the arid steppes in the east, makes it plausible to expect three species of the genus *Gazella* in the material: *Gazella subgutturosa, G. gazella* and *G. dorcas* (Uerpmann 1987). The skeletal elements of these species are very similar, except for horn cores and skulls. The differences in size can only give some hints for identification. Some of the postcranial gazelle remains from Baṣṭa do show some slight dissimilarities. It was impossible, however, to differentiate them according to their origin. Twenty cores provide clear evidence for distinguishing male from female gazelles. They belong to *Gazella subgutturosa*, the Goitered Gazelle, and *G. gazella*, the Mountain Gazelle. Two males were young.[5] The taxonomic identity of the equid remains has also proven to be problematic (Meadow and Uerpmann 1986). According to recent research, we must assume not only the presence of the onager, *Equus hemionus*, but also the wild ass, *Equus africanus*. The distribution of the latter was not restricted to Africa, but also covered several regions of the Arabian Peninsula (Ducos 1978; Payne 1982; Uerpmann 1982; 1986, 1987; Boessneck 1987). The range of these two species might have overlapped during the PPNB in the Baṣṭa region. The material includes a variety of equid bones which are metrically and morphologically assignable both to the onager and the wild ass. The percentage of distribution is 50:50 in the present state of analysis (Pl. VI:2,3).

The small amount of evidence from carnivores, small mammals, birds etc., has not yet been identified clearly because an appropriate comparative collection is not available in West Berlin. There are five fragments of ostrich shells among the bird remains. The extremity bones of this large, flightless bird, which was formerly represented by a subspecies of the African ostrich in the flat steppes of this region, have not yet been identified. Since none of the animals mentioned are represented in great majority, it would appear that the PPNB inhabitants did not specialize in their hunting activities. Instead, to compensate, they sought out a larger variety of game over a wide territory.

The differences in the distribution of species' remains between excavation Area A and B are prominent (Table 4). In contrast to Area B, for example, Area A produced a higher proportion of slaughter and consumption refuse among the wild caprines (5.5% versus 0.7%), the aurochsen (15.7% versus 7.6%) and the gazelles (7.2% versus 4.3%).

5. See note 4.

On the other hand, Area B contained four times more equid mass (15.9% versus 3.9%). The sparse evidence of wild boar occurring exclusively in Area B and the fallow deer detected only in Area A is less striking. Coincidence seems a likely explanation for this phenomenon.

The repeated discovery of partly preserved skeletons of adult dogs is more important. Medium-size and slender, they were found exclusively in Area B. Their bones were completely intact and devoid of any traces of flint tool use. Canine meat, it can be argued therefore, was not considered appropriate for human consumption. The remaining species, with the exception of goats and sheep, represent a small proportion of the remains (1.6% and 1.5%) in both excavation areas; domestic goats (and sheep) have proportionately a high representation in both areas (56.8% each).

The evaluation of results, conflicting and otherwise, must be put in relation to the archaeological evidence before a reasonable interpretation can be assured. Chronological differences and connected divergences in social structures at the site may be of great importance for understanding the distribution of these faunal remains. The study of economic developments at Baṣta during the PPNB period will remain a crucial point of interest for osteological analysis.

In conclusion, the quantity and quality of this faunal material provides an equally favorable basis for the evaluation of both the zoogeographic and the archaeozoological problems which have been mentioned.

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M. Muheisen
H.G. Gebel

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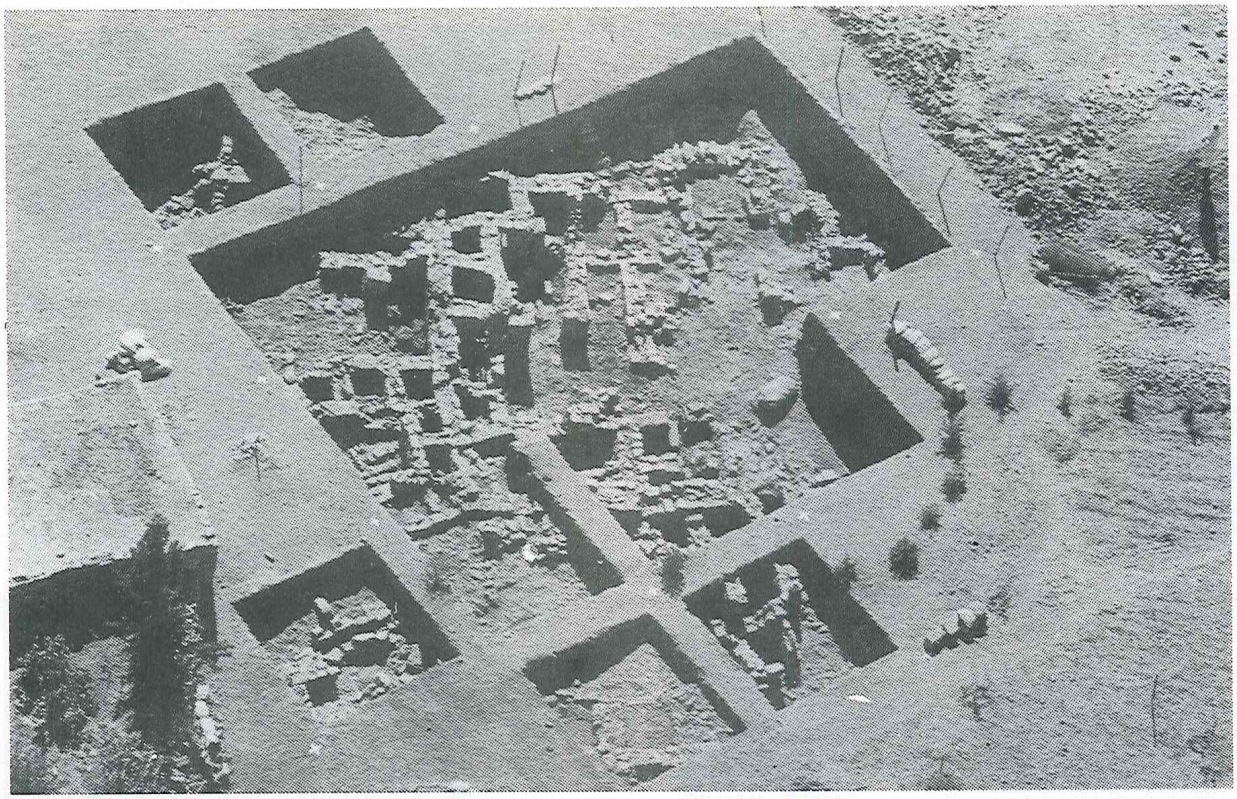
1. View of the excavated part of Area A seen from the south (before sounding).

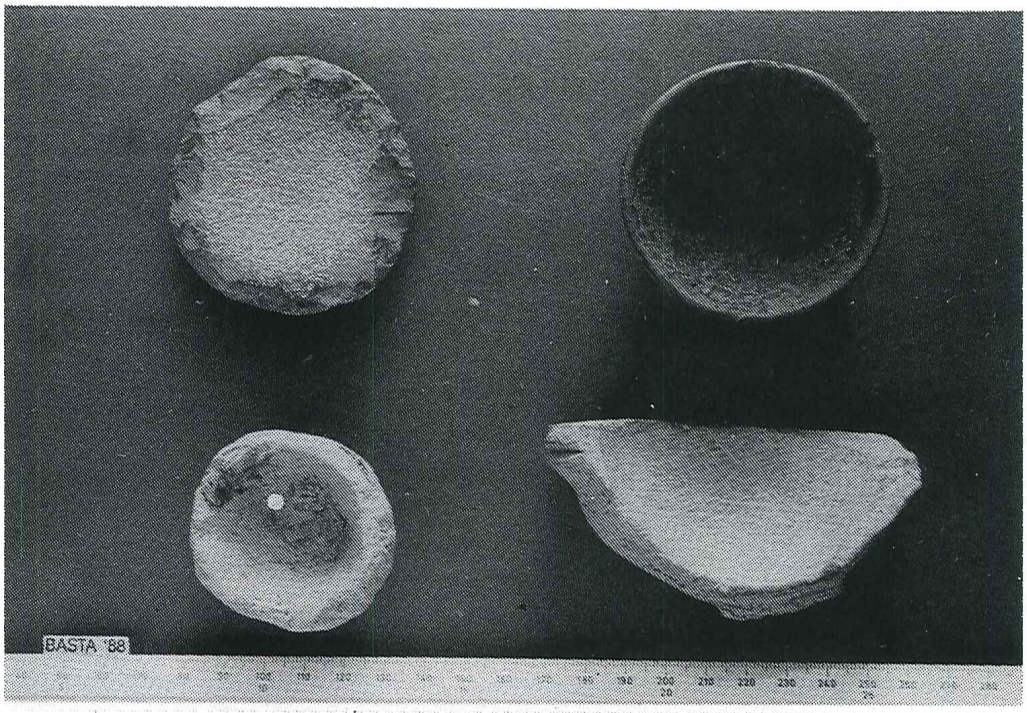
2. Two burials (33 and 35) in room A 29.

3. Part of the channels excavated in 1988 in Area A.

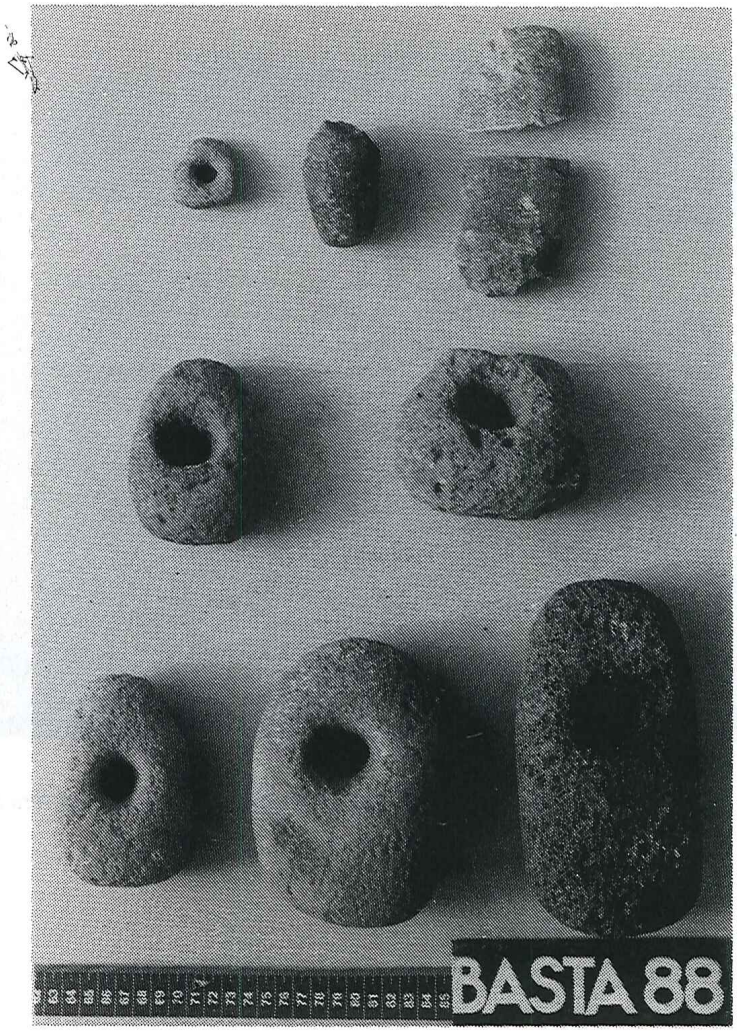


1. Aerial view of Area B at the end of the 1988 season.

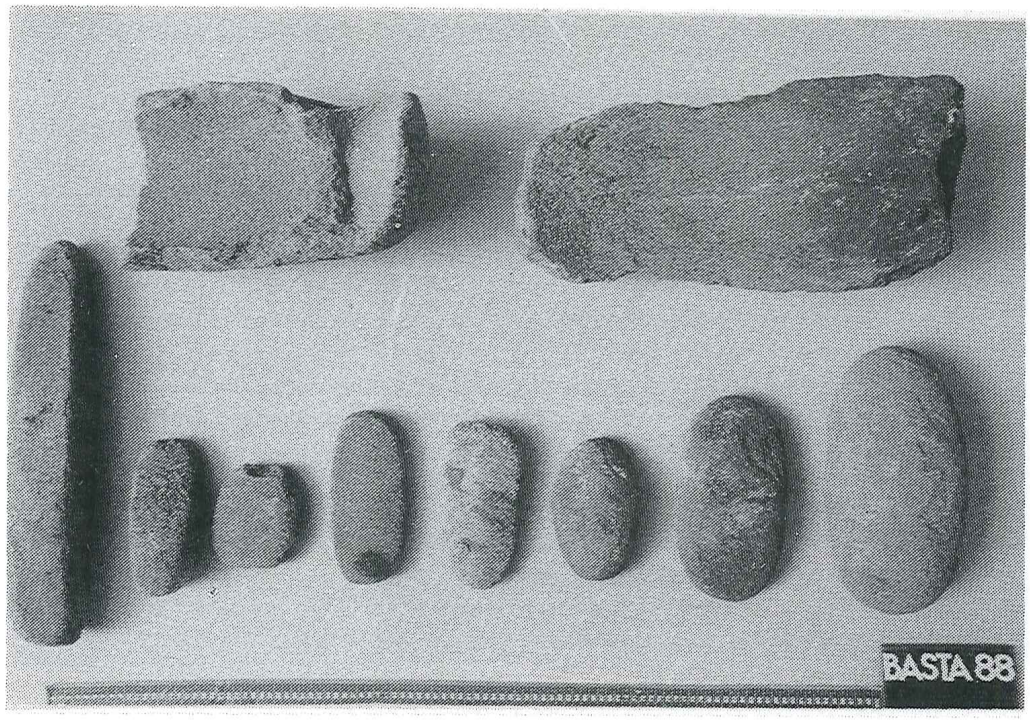
2. Overview of excavated remains in Area B (from the south).

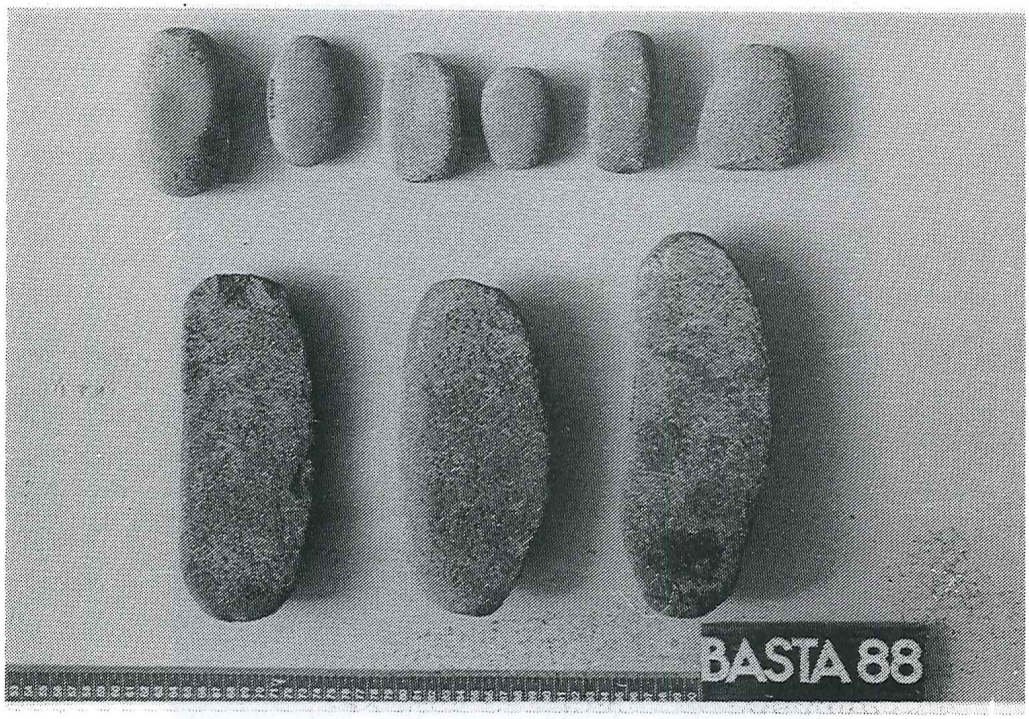



1. Stone vessels, two complete small bowls, fragment of large bowl and a disk with shallow depression.

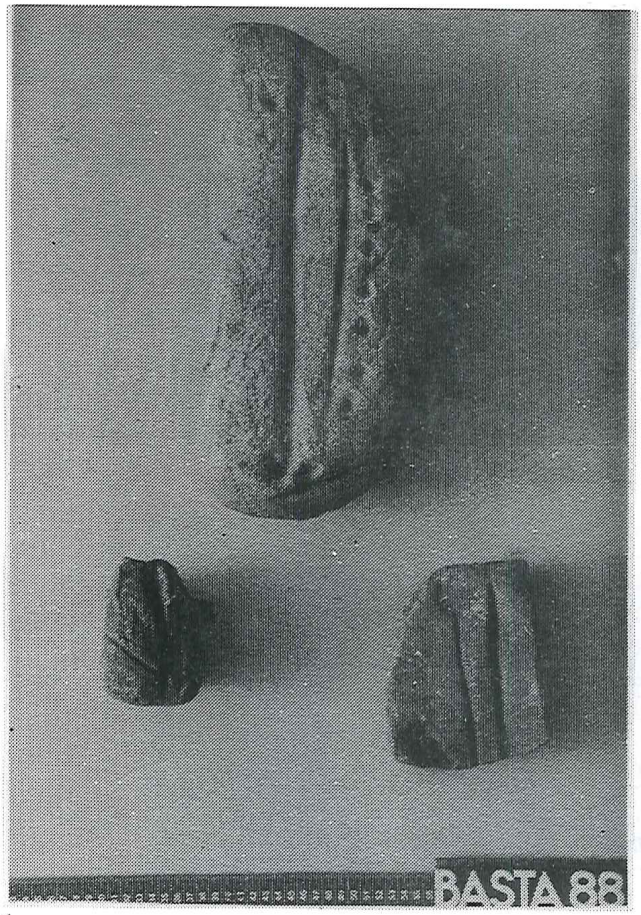



2. Stone weights made of different raw materials, with part of uncomplete pestle.



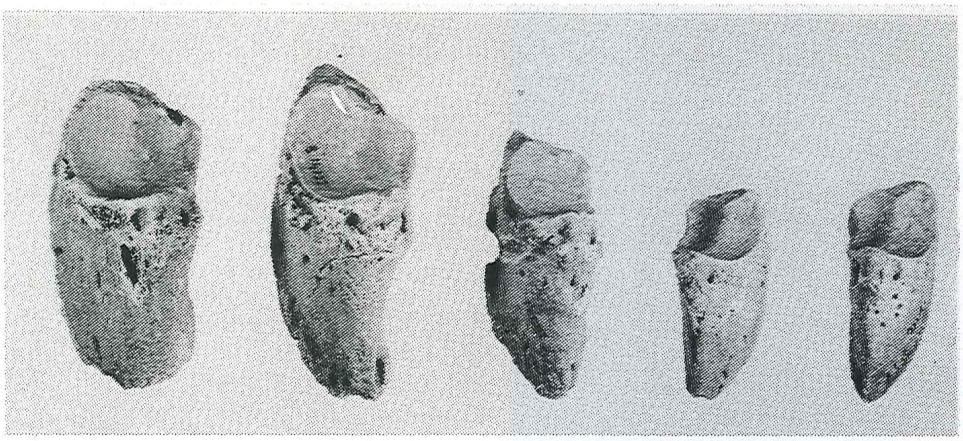

1-2. Different forms and types of hand stones and grinding slabs, some hand stones secondarily used as pestles.



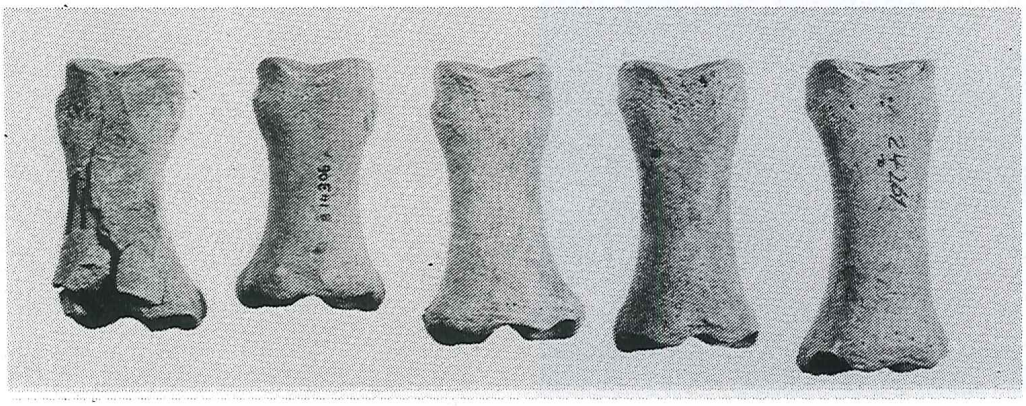

1.


2.

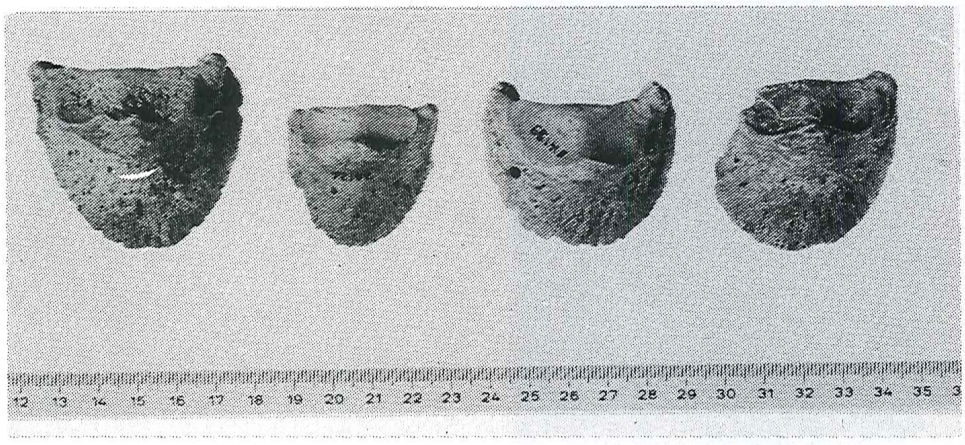
Sharpener sandstone, with elongated grooves and small holes, perhaps used for shaping arrowheads.



1. *Bos primigenius* (left) and *Bos taurus* (?, right): phalanges 3 of adult individuals.



2. *Equus hemionus* (1-3) and *Equus africanus* (4-5): phalanges 1 anteriores and posteriores.



3. *Equus hemionus* (1,4) and *Equus africanus* (2-3): phalanges 3.