

Architecture

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(Plates III - XV¹, LXXXVI, 5 - XCIV)

LEVEL 4

(Plates VI, IX-XI, XII, LXXXVI, 5 - LXXXVII)

The oldest artifacts found at Tell Karrana 3 are six Halaf sherds (see Plate XXV, 183-186) which, however, come from much younger levels (see E. Rova in this volume, p. 51). The earliest traces of human presence emerged in the southeastern (squares S 17/18) and R 18/19) and in the western (square Q 17) part of the mound. In squares S/R 17 a compact whitish clay floor (AF 62=107, altitude: -382 to -388) was superimposed on the natural conglomerate. The floor was partially covered with a thin layer of grey ash. Three post-holes with densely packed stones and small sherds (1.: at 16.1m S / 4.1m E, diameter 13cm; 2.-3.: ca. 13.3-13.6m S / 6-6.5m E, diameter 28 resp. 30cm; see Plate LXXXVIII, 1-2) hinted at a wooden construction in this area. However, mudbrick debris, remains of small mudbrick walls (AF 108, 109; see Plate LXXXVI, 5-6) and a stone door-socket, unfortunately not *in situ*, were found as well in the same square. A slab of 46 x 60cm resting on a shallow depression in the floor served as a fire-place, as was proved by the surrounding ashes. Another fire-place (AF 102²) was found further to the south (square R 19, ca. 23.5m N / 0.7m E). In its oldest form it consisted of a horizontal slab and three flat stones in an upright position. It was covered by ashes and sherds among which there were several parts of a carinated bowl (Pottery Cat. 330, see Plate C, 2).

Several grave-pits were dug into the natural conglomerate down to the solid bed-rock (Burials 11, 12, 13). They cut the whitish floor AF 62=107, but were sealed by a layer of ash (AF 99) which marks the transition between Level 4 and Level 3c. Burial 13, which produced a carnelian bead with an elegant engraving of a panther or lioness (Small Finds Cat. no. 8), was the only grave with an architectural element: a

wall built of 4-5 layers of 6 mudbricks each (format: 20(?) x 14 x 11cm), laid on their long side, delimited the grave towards the south. Since the burial was mostly hidden under the balk between squares R 18 and S 18, the relevant part of the balk was carefully removed in order to clarify the stratigraphical attribution of the tomb. As a result it became clear that the ash layer AF 99 (-352), which marks the transition from Level 4 to Level 3c, was not cut by a grave pit. A pavement of flat stones (AF 123, upper limit: -340 to -345) had been laid on this ash layer. On top of the pavement, the wall AF 25/2 of Level 3c and a connected wall (AF 122), running towards the east, had been erected. A floor (AF 130), which corresponds to the floor of Level 4, AF 62=107, was found cut by the grave pit of Burial 13. The pit had been covered with two or three layers of mudbricks and filled with lumps of clay or fragments of mudbrick. On the level of the floor AF 62-107, the grave pit was marked by ashes, which might be the remains of funerary sacrifices. Thus, Burial 13 can be attributed to Level 4 beyond doubt.

LEVEL 3c-a

WESTERN AREA

Level 3c

(Plates VI, XII-XIV, LXXXIX, 1-5)

In the western area of Tell Karrana 3 the main architectural remains pertaining to Level 3c have been detected in squares Q 17, Q 16 and R 16, respectively west and north of the wide open space (courtyard?) whose eastern and southern limits are marked by the wall AF 25/2 and by the western end of the wall AF 44 + 23. In square Q 17 the most important structure is the Parallel Wall Structure (hereafter: PWS) I, which closely resembles the contemporary PWS II, located in squares S 17/18. It consists of four parallel walls (AF 111, AF 112, AF 113, AF 114)³ resting on the floor AF 116, at a depth of -342

¹The plans and sections were drawn by Dr. Marcello Guaitoli, Dr. Livio Crescenzi and Dr. Paolo Liverani according to the standards of the Roman school of topography.

²The figure given in Wilhelm / Zaccagnini 1991:8, first line, has to be corrected accordingly.

³AF 115, whose presence had been tentatively hypothesized by analysing the western section of square Q 17, most probably does not exist.

to -352. These walls are made of two layers of bricks (24-26 x 13-17 x 11cm) laid in single rows on their short side and covered with plaster: the total excavated length of PWS I stretches for ca. 2 metres: its eastern end-alignment reaches the western limit of the later kiln AF 125 (Level 3b); its western part could not be excavated - comparison with PWS II (and III) however suggests a total length of approximately 4 to 5 metres. The distance between the walls is 33 to 38cm. To the south, PWS I is delimited by the brick wall AF 110, running almost parallel to AF 111: its eastern end coincides with that of PWS I, its western end was not excavated. In contrast with the walls AF 111 -> 114, which have no superstructures, AF 110 was succeeded by AF 89, immediately after the end of PWS I: the new wall, pertaining to Level 3b, is a brick construction with stone foundations directly laid on top of AF 110 itself. Since AF 89 was left in situ, AF 110 can only be observed in its southern and northern profiles, just below AF 89. To all appearances, it consists of a double row of bricks, two layers of which are preserved, just as is the case with the walls AF 111 -> 114, albeit of different dimensions: 30 x [] x 10cm. Also AF 110 rests on the floor AF 116, at a depth of -342 to -344: its maximum height (-318) coincides with that of AF 111 -> 114 (-319 to -326). The northern limit of the PWS I area is more difficult to trace: the most plausible candidate is AF 144, a strong wall ca. 70-80cm wide running parallel to PWS I, approximately 1.3m north of AF 114. Its mudbrick superstructure was not preserved, but its massive stone basis - laid at a depth of -367 to -372 and reaching a height of -338 to -341 (that corresponds to the level of floor AF 116, above which PWS I was built) - was unearthed in squares Q 16/17. Concerning the western part of PWS I, the western section of AF 144 (in square P 16) remained unexcavated.

In the interspace between AF 110 and AF 111, AF 111 and AF 112, AF 112 and AF 113, and in the area east of them, large quantities of animal bones and minor deposits of corn seeds were detected.

AF 144 which, according to our interpretation, represented the northern delimitation of the open space associated with PWS I also represented the southern end of the north-western living quarters of Karrana Level 3c. The main structure detected there was a big room (?) of which the southern part was excavated: it is delimited by wall AF 98 running east-west⁴ parallel to PWS I at a distance of approximately 2.6m north of AF 114. AF 98 consists of two layers of bricks, both laid on their long side in a double row. The dimensions of the bricks are ca. 30 x 15 x 10cm, roughly corresponding to those of PWS I. In the western part of square Q 16, the stone foundations of AF 98 were detected (maximum depth -340, corresponding to the lower level of PWS I; the top of the second

row of bricks of AF 98 (-306) well fits the preserved height of PWS I (-319 to -326). The northern face of AF 98 was covered by three different strata of plaster, reaching a total width of ca. 3cm. The floor of the room (AF 103) consisted of a series of compact layers of light grey and brown mud tied to AF 98: the upper level of AF 103 is -326 to -331, the lowest level is -340. In the north-eastern part of AF 103, a corrugated mark on the floor - ca. 6cm higher than the level of AF 103 - marks a fire-place / hearth, whose inner space reaches a depth of -336.

To all appearances, the interspace between the two parallel walls AF 144 and AF 98 (ca. 1m) was a tiny road that marked the E-W passage between the southern area, where PWS I installations were located, and the northern area, where living quarters were located.

The western limit of the living quarter was not reached: no significant structures pertaining to Level 3c were found in squares Q 16 and P 16. The wall AF 92 - which continues from Level 3c to Level 3b - may well represent the main architectural partition between the adjoining eastern and western quarters in squares P 16, Q 16 and R 16. AF 92 consists of several layers of bricks of the usual dimensions (ca. 30 x 15 x 10cm) which were alternatively laid in a double row along their long side or in a "ladder" arrangement (one row of bricks laid on their long side encased by two rows of bricks laid on their short side). As already mentioned, the western room is delimited by AF 98 in its southern part and by AF 92 in its eastern part. Its main entrance, from the south courtyard, is marked by a notable doorsill and a door-socket made of large flat stones (AF 100) that are placed in perfect alignment with AF 98 (upper level of AF 100: -307). The northern limit (or inner partition?) of this western room is represented by the wall AF 90, made of four layers of two parallel rows of bricks (again, ca. 30 x 15 x 10cm) respectively laid on their long and short sides. AF 90 leans towards AF 92 and was cut at its western end: its upper level is -275, its lowest level is -322. The floor of the western room, which was detected between AF 98, AF 92 and AF 90, is AF 96, whose depth ranges from -319 to -324; on its eastern side, AF 96 leans to wall AF 92. At the eastern side of the room, ca. 1m west of AF 92, and parallel to it, a tiny wall (AF 97), which was built over floor AF 96 and consisted of three layers of bricks laid in a single row on their short side⁵, may represent an inner partition of the room: its actual meaning can not be fully ascertained, as we do not know the western limit of the room. The great quantity of ashes and seeds that were found above floor AF 96, especially to the east and west of AF 97, may indicate that this structure served as a storage place for grain, although no conclusive information was provided by the assemblage of archaeological remains excavated in this area. It should further

⁴For the sake of simplicity, the alignments N-NE - S-SW, E-NE - W-SW, etc. will be referred to as N - S, E - W, etc.

⁵As far as our excavation has shown, this architectural technique is unique at Karrana.

be noted that AF 92, at its northern end, has a gap in its mud-brick structures, stretching for ca. 60cm, which might be yet another entrance to this room, in addition to that marked by the doorsill AF 100 discussed above.

East of AF 92 there was another room, whose main entrance from the south was marked by a doorsill made of two large flat stones (AF 101) laid at a depth of -355. In Level 3b this entrance was filled and closed by a western prolongation of wall AF 44 + 23 and the adjacent wall AF 42. The room which AF 101 gives access to is delimited by AF 92 on the west and by AF 44 + 23 on the south; its northern and eastern limits were not detected⁶. The foundation of this room lies on floor AF 60 - a compact layer of light brown earth filled with charcoal and ash that blends into a thick, compact layer of whitish gypsum in square S 17.

Level 3b-a

(Plates VI, XII-XIV, LXXXIX, 6 - XC, 2)

The period immediately following Level 3c, i.e. Level 3b-a, is characterized by significant changes in the arrangement of the architectural structures. The earlier PWS I in square Q 17 and PWS II in squares S 17/18 ceased to exist and were replaced by two younger PWS in the eastern area of Karrana: PWS III in squares S 16 - T 16 and PWS IV in square S 187. One of the main features displayed by the new architectural arrangement in Level 3b (and 3a) - at least as far as the north-western sector of the tell is concerned - is the building of circular kilns (*kura*) probably intended for pottery firing⁸. The kilns are best preserved in the wide open space - a courtyard - west of AF 25: they are AF 125 (Level 3b), located directly south-east of PWS I, and AF 36 (Level 3b-a), just west of AF 25/1.

AF 125 is a massive circular structure with an outer diameter of ca. 2.5m: it was built with an outer row of bigger bricks and an inner row of smaller bricks, of which three layers are preserved: its preserved height reaches -275, while the lowest layer of bricks is set at -315. A wall (AF 89) made of two brick layers laid at a depth of -300 on a stone foundation, which is placed immediately above AF 110 (i.e. the southernmost wall of PWS I) leans towards the western section of AF 125: the junction of AF 89 and AF 125 is marked

⁶In later phases - possibly in Level 3b and certainly in Level 3a - the eastern delimitation of this space was marked by wall AF 41, running south-north.

⁷PWS III is in fact a series of more or less superimposed structures which represent at least three phases: AF 145, AF 120, AF 124 + AF 118 = PWS III/3; Level 3b; AF 19A, AF 20A, AF 16A + AF 126 = PWS III/2; younger phase of the same Level 3b; AF 19, AF 20, AF 16 (and AF 21) = PWS III/1; Level 3a. PWS IV in square S 18 comprises AF 67, AF 68, AF 69 and AF 74 and belongs to Level 3b.

⁸Cf. the later kiln AF 137 (Level 2), in square Q 15, which contained several slags: cf. A.F. Sedda's chemical analysis, appendix III, *infra* p. 35.

by two big stones which are placed on top of the outer row of bricks of the same AF 125. The dimensions of the bricks of AF 89 conform with the typical Karrana *Riemchen*, i.e. ca. 30 x 15 x 10cm: they are laid in two rows, respectively on their short and long sides, changing the order in each layer. AF 125 was filled with loose earth, many fragments of fired bricks as well as ash.

The 4-6cm thick floor AF 104 (-312 to -321) marks the stratigraphic and chronological division between Level 3c (= PWS I) and Level 3b (AF 125 and AF 89): it covers the parallel walls AF 110, AF 111, AF 112, AF 113 and AF 114 and SU 106 (= the interspace between these walls) and represents the basis of the later kiln AF 125 (and its adjoining structure).

The kiln AF 36 in square R 18 is rather poorly preserved: it consists of one layer of bricks laid on their short sides: the outer diameter of the structure is 1.8m. It contained abundant quantities of ash, a baked brick and a carinated bowl with incised decoration of a Late Uruk type (Pottery Cat. no. 238). The floor of the kiln consists of several layers of compact clay (AF 39) corresponding stratigraphically to floor AF 26, which stretches in the courtyard where kiln AF 36 is located. It appears that walls AF 51 and AF 52, which run east-west directly north of the kiln, lean towards and support it much as wall AF 89 reinforced kiln AF 125.

Although different in construction and archaeologically poorly preserved, another kiln (or firing place?) associated with Level 3b can be observed in the northern area of squares R 16 - S 16, in the space east of wall AF 92 (levels 3c-b) and west of wall AF 41 (Level 3a). The only surviving and/or discernible architectural remains related to this kiln is wall AF 106 (not reproduced on Plate V), made by an alignment of two parallel rows of bricks of the usual dimensions (30 x 15 x 10cm) laid on their long side (upper level: -267 to -274 in its northern section, -280 in its southern section; level of its basis: -285). AF 106 runs east of wall AF 92 and shows the same orientation. East of it, an area measuring ca. 2 x 2m (= SU 105) represents the actual remains of the kiln, which contained abundant layers of ash and charcoal, down to a depth of -319.

In the same period corresponding to Level 3b, new structures were built in the north-western area of the tell, and the arrangement of some structures from Level 3c was slightly modified. A new feature common to the new buildings is their solid stone base below layers of mudbricks - of the typical *Riemchen*-type dimensions - which were laid, alternately in a double row on their long side or in a "ladder" arrangement, as mentioned before in regard to the architecture of Level 3c. The stone foundation of the walls, which are clearly visible in squares P 16, Q 16 and R 16, have roughly the same height: their uppermost level, below the bricks, is ca. -300: this fi-

gure corresponds to the upper limit of the stone foundations of AF 89 (in square Q 16), the wall which buttresses kiln AF 125.

In square P 16, two parallel walls AF 159 (upper level of stone basis: ca. -300 plus two preserved layers of bricks) and AF 164 (only its upper brick layers were excavated) represent the western part of the north-south delimitation of the area of PWS I and the northern quarters - a delimitation that was previously marked by the older walls AF 144 and AF 98 in Level 3c.

In squares P 16 and Q 16, the stone base of the long wall AF 95 is fairly well preserved for a length of ca. 6.5m: its upper level reaches -286; traces of three disturbed layers of bricks can only be seen in the section E-E', reaching a maximum height of -250.

In squares R 15 and R 16, the long wall AF 86, which joins the wall AF 91 at a right angle, has its stone foundation at a depth that starts at -269 (in its northern part) and reaches -300 (at its southern limit): the latter depth corresponds to the -301 measure of the upper stone foundation of AF 91. Five layers of bricks are preserved above the stone basis of AF 91, reaching a height of ca. -240. It is unclear what the function of the stone accumulation AF 160 in square R 15 was, which lies directly east of the stone alignment that served as a basis for the wall AF 86.

The younger phase of the wall AF 92 was built immediately on its predecessor in Level 3c and, therefore, has no stone foundation: its upper level is preserved up to a height of -241 to -258.

The architectural changes during Level 3b particularly concern the central area of Karrana, i.e. the space delimited by the south-north wall AF 25/2 and the east-west adjacent walls AF 44 + 23 and AF 42. As mentioned before, access to the eastern room in squares R/S 16 (east of AF 92) - i.e. the doorsill AF 101 - was closed by a west prolongation of wall AF 44 + 23. Similarly, the access to the western room in square R 16 - and possibly also S 16 - (i.e. the doorsill AF 100) was closed by the erection of wall AF 91. As far as the excavation has shown, there were no further entrances to these living quarters from the southern courtyard. One should also take into account the contemporary erection of wall AF 25/1, which is inserted into AF 44 + 23 and joins at a right angle with the east-west wall AF 45 added to wall AF 44 + 23 on its southern side. AF 25/1 and AF 45 are superimposed on the western section of PWS II, which ceased to function at the end of Level 3c. At the same time, access was blocked between the courtyard and the area east of it. Generally speaking, there seems to have been a sharp divide between the south-western and the north-eastern sectors of the Karrana settlement.

Lack of time prevented us from exploring the northernmost part of the tell down to the Level 3 strata, and, therefore, it is impossible to hypothesize about the overall arrangement of the site and its functional modifications discussed above.

No significant architectural remains relating to Level 3a were detected in the western area of the tell.

EASTERN AREA

Level 3c

(Plates VI, LXXXVIII)

In the southeastern area (squares S 17-18), where most of the Level 4 structures were detected, the transition to Level 3 is marked by the ash layer "AF" 99 which covers large parts of the area at a depth of ca. -350. On the eastern side of the courtyard in square R 17-18, a parallel wall structure (PWS II) was found which lay opposite PWS I and showed the same orientation. The manner of building, however, was different in one aspect: the mudbricks showed a different size (30 x 15 x 15) and they were laid on their long sides. PWS II consisted of four walls (AF 57, 53, 58, 88) made of three layers of bricks each. The original length was 3.30m. Imprints of reeds in the plaster on top of the western part of the walls are clearly visible (see Plate LXXXVIII, 4). The reeds were aligned at a right angle to the walls themselves. In a later phase, the walls had been extended to the east by rows of bricks laid on their short sides, thus reaching a total length of 4.50m. At the same time or later the northernmost wall was enlarged by the addition of another row of bricks laid on their short sides. A fifth thin, irregularly built wall was added in the south at a later date.

The space between the walls measured 40 to 60cm. Here, lumps of clay with reed imprints were found, suggesting that the walls had not only been covered by reeds, but also by clay. A good quantity of carbonized grains was collected between the walls (see L. Costantini / L. Costantini Biasini in this volume). In the easternmost part of the interspace between the walls AF 53 and 58 carbonized remains of a wooden implement - maybe a table or a shelf - and a conical bowl (Pottery Cat. no. 265; see Plate XXIX, 265) were detected.

The southernmost wall of PWS II, AF 88, presumably formed a right angle with a much thicker wall (AF 25/2), which ran towards the south and delimited the courtyard in square R 18 towards the east. It is clearly visible in the east section of square R 18 (see Plate XI), though the wall itself had not been noticed when the square was excavated. Below the wall AF 25/2, at a position of 16.50m S / 0.6m W, many

fragments of a large painted jar with nose-pierced lugs of the well-known Late Uruk type were found lying on the ash layer "AF" 99 (Pottery Cat. no. 18; see Plate XVII, 18).

A massive wall with a width of ca. 1.20m (AF 44) delimited the courtyard and the PWS II area towards the north. It ran further to the west where two doors gave access to the domestic area of the settlement (cf. *supra*, p. 22 f.). The impressive thickness of this wall, its repairs, reuse and reinforced walls (AF 42, 45) in later phases of Level 3 suggest that it had an important function. Presumably it protected the domestic area on the northwestern part of the hill, which was difficult to climb from the north, east and west, but which was easily accessible from the south.

Level 3b-a

(Plates V, XV, XC, 3 - XCI, 5)

The end of PWS II of Level 3c in square S 17 is marked by the renewal and extension of the wall AF 25/2, which separates the courtyard in squares R 17-19 from the PWS II area east of it, giving access to the PWS between the northern end of AF 25/2 at 16.55m S and the big enclosure wall AF 44. By the end of Level 3c, the PWS was filled and the passageway blocked; the wall AF 25/2 was raised and extended to the north (AF 25/1), where it slightly cut into AF 44. The base of the northern extension of AF 25 corresponds to the upper limit of the PWS II stratum (SU 49=46).

PWS II seems to have been replaced by another PWS (III) of slightly bigger dimensions 11.30m further to the northeast, closer to the steeply sloping eastern edge of the hill. The orientation of the new PWS follows exactly that of the older ones. The new location (squares S/T 16) was north of the old enclosure wall AF 44 which had been widened already in Level 3c by addition of AF 42 and in Level 3b by AF 45, thus reaching a remarkable width of approx. 2.33m. Apparently it partially collapsed, but was rebuilt in Level 3a on a smaller scale (AF 23).

In the area of PWS III, there had been some mudbrick structures already in Level 3c (SU 139 with AF 158), contemporary with the northern widening (AF 42) of the enclosure wall AF 44. Due to the end of the excavation's last campaign, the floor belonging to AF 158 could not be reached, but there is little doubt that it is identical with the floor AF 60 observed in the east section of squares S 16/17. The end of Level 3c in the area north of the enclosure wall AF 44+42 is marked by a layer of ash ("AF" 55) stretches all over square T 16 at an altitude of -337 in the southwest to -316 in the north. It is up to 12.5cm thick and contained sherds and animal bones.

The earliest phase of Level 3b in square T 16 is represented by a rectangular structure made of one row of bricks placed on their short sides (AF 139, see Plate XV, a). It is only preserved to a height of less than 8cm. Its function remains unclear. It is very likely that three stones on top of it are not part of the structure but serve the function to even out the slope for the floor on which PWS III was built.

PWS III shows several phases and subphases, which are not clear in every respect. The oldest phase, PWS III/3, seems to be represented by three parallel walls in the northern half of square T 16 (AF 145, 120, 124). AF 145 was only visible in the north section of square T 16. It consisted of two layers of mudbricks with a square cross-section, which suggests that the wall was built in the same way as most of the walls of PWS III, i.e. by a row of bricks with the format 30 x 15 x 15cm laid on their long side. AF 145 as well as the wall next to the south, AF 120, and the interspace between them were covered by ashes. AF 120 and the third wall, AF 124, show a slight curvature. Both walls are basically built the same way as AF 145, but in AF 120, the row of bricks laid on their long side was interrupted - at random, as it seems - by two rows of bricks laid on their short side. The bricks of AF 120 show alternately a red and grey colour, which suggests that they were reused. AF 124, like AF 145 and presumably AF 120, was preserved in only two layers of bricks. The interspace between AF 124 and AF 120 is covered by a layer of ash. It might be assumed, then, that AF 145, 120 and 124 (and possibly another wall in the unexcavated area further to the north) belong to one and the same construction, PWS III/3. South of these walls, there are three more walls of the same type (AF 16A, 20A, 19A), which will be called PWS III/2. One cannot totally exclude that PWS III/2 existed simultaneously with PWS III/3 or even formed one and the same structure together with it. It is unquestionable, however, that what we called PWS III/2 still existed when PWS III/3 was already destroyed and covered by ash.

The eastern end of PWS III/2 is marked by big stones (AF 126) which served the purpose to even out the sloping of the surface to the east. The three walls of PWS III/2 consist of three to four layers of mudbrick. AF 20A was heavily plastered on the sides in the younger phase of its use. AF 19A and 20A had the width of one brick's length, whereas AF 16A was wider, perhaps formed by a row of bricks laid on their long side and one laid on their short side. In its older phase, AF 19A did not exactly parallel the other walls. In the younger phase, this inaccuracy was corrected by attaching bricks, halfbricks and plaster to the northern side of AF 19A so that the interspace between AF 19A and AF 20A gained a more regular shape. In the western part, PWS III/2 is connected with a floor of greenish clay (AF 61), which has not been observed further to the east.

The filling between the walls of PWS III/2 (SU 124) contained bones of an equid, possibly an onager, and those of a cow (cf. Boessneck / von den Driesch / Ziegler in this volume). In the interspace between AF 20A and AF 19A, there is a layer of ash approximately on the level of the first layer of bricks, which divides the two subphases of PWS III/2. The three walls had been covered by reeds whose imprints are still visible (Plate XC, 3; XCI, 3). In the interspace between the walls, the reeds were slightly sunk in. A wall (AF 118) which forms a right angle is attached to the eastern end of AF 16A. It is younger than the wall AF 120 belonging to the older PWS III/3, because it is built on the layer of ash which covers AF 120.

PWS III/2 was replaced by a new construction of the same sort (PWS III/1). The walls AF 16, 20 and 19 used their older predecessors as foundations, but they were slightly staggered (cf. Plate XC, 6; XCI, 1-3). The walls of PWS III/1 were preserved at a length of 5.30m, thus being slightly longer than the walls of PWS III/2, which are shorter in the west. AF 19, 20 and 16 had a width of 30cm. They consisted of three to four layers of mudbricks measuring 30 x 15 x 15 or 10cm, alternatively formed by two rows of bricks laid on their short side and one row of bricks laid on their long side. Both sides of the walls were plastered with mortar, which was preserved to a large extent on AF 16 and 20 (cf. Plate XCI, 2).

A fourth wall (AF 21) seems to have been added later. It was erected on the floor of greenish clay (AF 61) which was laid out simultaneously with PWS III/2. Its width is different from that of the other walls of PWS II/3 (ca. 60cm), and so is its distance: The interspace between the walls AF 19, 20, and 16 measured 45cm, that between AF 16 and the fourth wall AF 21 was somewhat larger (54cm). The walls were partially baked by fire. The filling (SU 30) consisted of rather compact clay which contained abundant ashes, some bones - among them one from the hind leg of a cow or bull - and few sherds, but no seeds.

Together with PWS III/2 or later, the PWS area was closed to the west by a wall (AF 41) which ran at a distance of ca. 1.60m from the western heads of the PWS III/1 walls. It was erected on the floor AF 61. In the south, it leaned against the older enclosure wall AF 42; its northern end was not excavated. The preserved length is 6.40m. It consisted of a single row of bricks, two layers only having remained in situ. The north section of squares S/T 16, however, shows that the wall had at least five more layers of bricks which at the closure of Level 3a had collapsed towards the east. Since the brick format was 35 x 20 x 20cm, the height of the wall was thus at least 1.40m. The entrance to the PWS area is expected in the north (square S 15), because there is no aperture in the preserved part of AF 41.

With the end of Level 3a, PWS III/1 was not renewed or replaced by a similar structure at the same spot. Instead, a house was erected in Level 2 (see below), and its floor (AF 5) was placed immediately upon the walls of PWS III/1. The alignment of one of the walls of this building (AF 9) followed exactly that of the PWS wall AF 20. Although there was a thin layer of earth between them, it must be assumed, that AF 9 of Level 2 used AF 20 of Level 3a deliberately as foundation, which points to a certain continuity between the associated levels.

Another PWS (IV) was found in square S 18, south of the location of PWS II of Level 3c (see Plate XCIII, 1). PWS IV was only preserved in one layer of mudbricks. Its floor sloped to SE (-282 to -318). The building consisted of three parallel walls (AF 67, 68, 69) running E-W, which were made of mudbricks of the format 15 x 25-33 x 8(+) cm laid on their long side, and a wall delimiting the structure on the W (AF 74) made of very large bricks (28 x 60 x 9(+)) which were laid on their short side. The orientation of the building was roughly according to the points of the compass. Though the stratigraphic attribution of the structure was not beyond doubt, it should be dated to Level 3b(-a), because it is later than PWS II of Level 3c, but younger than Burial 9, which contained a painted Ninevite 5 jar and which cut walls AF 68 and AF 69 (cf. p. 204, 205).

LEVEL 2

(Plates IV, XCII, 3 - XCIII, 1)

As in the case of Level 3b-a vs. Level 3c, or perhaps more so, Level 2 is characterized by substantial changes in the general organisation of the Karrana settlement as well as in its architectural features and building techniques. What remains unaltered of the older levels of occupation is the general orientation of the walls (i.e. roughly north-south and east-west)⁹, the standard dimensions of the mudbricks (ca. 30 x 15 x 10cm) and their various assemblages. The main features to be observed in Level 2 can be summarized as follows:

1. First of all it should be noted that PWS were either no longer built or not found in the excavated area: the same situation can be observed in the architectural remains of Level 1 - the youngest phase of the tell.

2. The original partition of the settlement area, which in Level 3 was marked by the big wall AF 25/2-1 and by the

⁹Cf. *supra* fn. 2.

complex sequence of walls AF 44 + 23, AF 42, AF 144, AF 164 and AF 159, seems to have lost much of its importance. As concerns the east-west partition, the stone foundations of wall AF 34 (maximum height -341 to -355) in squares R 19/20, whose mudbrick superstructures were totally eroded, directly join onto the southern part of the wall AF 25/1, which has no stone foundation. It is clear that AF 34 represents a younger prolongation of the older wall. Aside from this, no further traces of the older settlement structures were discovered in this part of the tell.

3. The very scanty architectural remains in the squares of the N-S alignment 17-20 provide little if any evidence of the organisation in the southern part of the tell. On the other hand, the abundant remains in squares of the N-S alignment 14-16 gives us a fairly good idea of the overall arrangement of the site, as will be explained shortly.

In square R 19, the water conduit AF 32, which is made of stones and bricks and which ends with two big flat stones laid on their vertical side (maximum height -310, base level of the bricks -329) runs west to east and cuts AF 25/1 precisely at the point where wall AF 34 - mentioned above - joins the same AF 25/1 (see Plate XCII, 2).

In square Q 18, the north-south wall AF 156 forms a right angle with wall AF 155 and its extension AF 37 in square R 18 (the total length of AF 155 + 37 is 5m). It may represent the south-western corner of a big room, of which the eastern and northern limits were totally lost.

As concerns the architectural remains in the central-northern section of the tell, it should tentatively be observed that there seems to be a sharp distinction between those comprised in the area of squares Q 15, Q 16, R 16 and those located in the area north and east of these squares, i.e. R 14/15, S 14-16, T 16/17. The main walls in squares Q 16 (AF 73 and AF 76) and R 16 (AF 4) make use of very elaborate stone bases (cf. also the stone foundations of the wall AF 34, in squares R 19/20), thus following the well-established tradition current in Level 3b (-a). However, in most cases the stones that are used as bases for mudbrick walls in Level 2 are different from those of Level 3b (-a) insofar as they are flat and hewn at right angles, rather than round and/or oval shaped. In contrast to the widespread use of stones as foundations for the massive walls in the north-western part of the tell, the north-eastern architectural structures (in squares R 14/15, S 14-16 and T 16/17) do not adopt stone bases.

The main structures in the former area are represented by the north-south wall AF 4 (in square R 16), which is only preserved in its stone foundations, at a depth of -181 to -204. Its alignment corresponds to that of the long wall AF 25/2-1, its location however is ca. 1.5m west of the older wall(s). Three floors superimposed on one another and partially separated by

thin layers of ash (AF 71: -187 to -204) lean towards AF 4 and run westwards.

In square Q 16 a massive wall running south-north was detected: it consists of two layers of flat stones (AF 73: -185 to -220; see Plate XCIII, 4-5) that served as the basis for a very poorly preserved mudbrick superstructure, which is only traceable in section G - G'. Parallel to it, and superimposed on an unexcavated western extension of the same AF 73, runs the mudbrick wall AF 80, just west of the excavated part of AF 73. It consists of two layers of bricks, laid in a double row, on their long and short side, respectively (maximum preserved height: -189 to -195). The northern end of AF 73 joins at a right angle to a wall that runs west to east: it consists of a stone basis (AF 76) of long flat stones (-201 to -217) above which at least three layers of bricks are extant (AF 85: upper level -168, lowest level -210).

In the adjacent square Q 15, the main architectural feature is the well-preserved kiln AF 137 (and nearby structures AF 150 and 154), for which see Appendix II. Less clear is the function of the stone accumulation AF 149 which was detected in the south-western part of the same square Q 15, at a depth ranging from -197 to -221: no mudbrick remains have been found over it, and the dimensions as well as the shape of the stone alignment hardly suggest the presence of a wall. Thus it would appear that AF 149 is a stone pavement similar to those that typify the last phase of occupation at Karrana (Level 1) in the northernmost part of the tell (squares R/S 14).

Aside from the building technique already described (i.e. absence of stone bases), the architectural structures located in squares R 14/15, S 14-16 and T 16/17 have other distinctive peculiarities. Basically, they consist of a complex of adjacent small rooms delimited by walls which are preserved only in one or two mudbrick layers laid at depths ranging from -124 down to ca. -200, depending upon the original north-south slope of the tell as well as the west-east and east-west slopes, whose watershed lay between the R and S squares alignments¹⁰.

The highest levels are to be seen in square S 14, where the northernmost walls (AF 136, AF 140, AF 141; see Plate XCII, 4-5) are laid at a depth of -125 to -129. Starting from square T 16, and proceeding anticlockwise, the main architectural features of Level 2 are the following. Wall AF 40, which is fairly well preserved in square T 16 (three layers of bricks laid at a depth of -234 and reaching a height of -221) but whose western extension in square S 17 is almost completely lost, possibly represents the southern delimitation

¹⁰This fact is clearly discernible in the various heights that characterize the compact clay-gypsum floor AF 5+5bis (in squares S/T 16) = AF 13 (in squares T 16, S 16/17) = AF 127 (in square S 15): according to the above mentioned inclination of the north-south and west-east slopes, they range from -165 (in square S 15) to -194 (in square S 17).

of the north(-eastern) quarter of Karrana Level 2. North of AF 40, a series of rooms linked to one another extends through squares T 16, S 16-14 and R 14, while structures of some other kind were detected in square R 15. The sequence of rooms that have come to light - none of which were completely preserved on all four sides - is delimited by the following walls: 1. AF 9 and the southern end of AF 8 (squares S/T 16); 2. AF 9, AF 8 and AF 31 (square S 16 east); 3. AF 8 (square S 16 west); 4. AF 31, AF 133 (later covered by AF 134) and AF 135 (square S 15); 5. AF 135, AF 136, AF 140 (square S 14 south); 6. AF 136 (northern end), AF 140, AF 141 (square S 14 north). The big wall AF 163 (ca. 7m length, 1m width) runs north-south in the central/western part of squares R 14/15 parallel to the twin walls AF 146 and AF 147 (in the south-eastern part of square R 15) and to the massive wall AF 148 (in the same part of square R 15) - the latter possibly to be linked with AF 133 and AF 134 in the adjacent square S 15. AF 163 stratigraphically belongs to the architectural complex described above. The various brick wall structures that have been detected (e.g. AF 151 and AF 152) between these two main walls are difficult to interpret, also due to later disturbances like e.g. a large pit and a medieval burial in the north-eastern part of square R 15. Nonetheless, a series of small spaces delimited by tiny parallel walls running west-east between the main wall AF 163 and AF 146 (+ AF 147 + AF 148) suggest the presence of some sort of storage installations. At the same time, the wall AF 163 represents the border between this non-residential area and the areas further to the west, where the massive kiln AF 137 was installed.

LEVEL 1

(Plates III, XCIV, 2-4)

The architectural remains pertaining to Level 1 are mainly concentrated in the southern and northern areas of the tell (i.e. in squares R 18-20 and R 14/15, S 14-16, respectively).

The preserved structures, which must have been deeply affected by some 4000 years of erosion, are characterised by a widespread use of flat sharp-hewn stones, identical to those which were in use in Level 2. These stones served either as foundations for walls - whose mudbrick superstructures were almost completely eroded - or as large platforms upon which no mudbrick traces have been preserved. Although there is no gap in the stratigraphic sequence and in the ceramic assemblages of Level 2 and Level 1, the overall layout and/or the character of the late Karrana settlement appears to have undergone significant changes, especially in regard to its northern part.

In square R 19 the south-north stone basis AF 33 (-307 to -312), which is preserved for a length of ca. 3.5m and which is possibly connected with the stone alignment AF 30 (also running south-north), is laid closely to AF 34, the stone basis for the southern prolongation of the wall AF 25/1 (in Level 2). The adjacent stone foundations AF 28 and AF 29 (in square R 18) - of very irregular shape - do not suffice for interpretation.

In square S 16, the wall AF 1, made of two layers of bricks of the usual dimensions (ca. 30 x 15 x 10cm) laid in two rows along their long and short sides respectively, mark the southernmost discernible limit of the Karrana Level 1 settlement in the northern part of the tell. North of AF 1, a massive wall (AF 6 = 11) made of several layers of flat (but also round) stones represents the centre of a large (and fortified?) building, whose area is marked by the huge stone pavings AF 22 (in the western part of square S 15) and AF 121 (in the whole of square R 14 and in the western part of square S 14). The northern limit of this area is represented by the stone wall AF 117, running west-east in the northern part of square S 14 (maximum height -017, basis at -055). To judge from the rather scanty archaeological remains, it would seem that we are dealing with some sort of fortified structure, albeit without any precedent in the previous phases of occupation on the tell. It is difficult to determine what its function was and how this apparently unprecedented structure relates to the southern part of Tell Karrana, where the architectural method and overall layout follow in the tradition of the older levels 3 and 2.

APPENDIX I: COMMENTS ON THE PARALLEL WALL STRUCTURES

Carlo Zaccagnini

The "Parallel Walls Structure(s)" (= PWS) excavated at Tell Karrana 3 represent the most characteristic architectural feature of the site. They were in use throughout the period of occupation corresponding to Level 3: PWS I (in square Q 17) and PWS II (in squares S 17 - 18) belong to Level 3c; PWS III (in squares S 16 - T 16) exhibits various phases which stretch from Level 3b (PWS III/3 and PWS III/2) to Level 3a (PWS III/1); PWS IV (in square S 18) belongs to Level 3b. No traces of PWS have been detected in levels 2 and 1.

The problem arises as concerns the function(s) of these peculiar structures. The remains of layers of reed floorings laid on top of the walls, across the orientation of the walls themselves, suggest the presence of platforms secured with sufficient air ventilation beneath them. It is conceivable that the east - west alignment of all the Karrana PWS depends on the direction of the prevailing winds blowing in that area. As to the possible existence of superimposed structures placed above the reed floors, nothing can be said or even guessed since no traces of architectural remains have been detected in the fill that covered and/or sealed all our PWS.

The abundant presence of cereal seed on top of, and in the interspaces between the walls of most PWS - in the latter case as a consequence of ruptures or collapses of the reed floors - strongly suggest that these platforms served as a support for drying (and/or stocking?) the cereals collected from the crops of the nearby cultivated countryside. At the same time, the retrieval of numerous bones belonging to domesticated and wild animals hint at the possibility that these platforms also served as an open air support for salting / drying / smoking(?) pieces of chopped meat of freshly slaughtered animals.

Interestingly enough, identical or closely similar structures have been found in various ancient Near Eastern sites, located in a vast area that stretches from south-eastern Anatolia to the Indus Valley. They are chronologically distributed from the early 7th millennium (pre-ceramic neolithicum) to the early 3rd millennium (Early Dynastic I). In the Syro-Mesopotamian region, there appears to be a remarkable concentration of the archaeological evidence during the Late Uruk - Early Dynastic I period.

To my knowledge, a comprehensive and comparative analysis of these structures as yet has never been attempted. Hereafter I will limit myself to point out some pieces of evidence

that parallel the Karrana foundations. It goes without saying that the following list does not aim at being exhaustive, were not for the fact that we still lack adequate information concerning many excavations carried out in Syria and Iraq in the past decade: this state of affairs is particularly regrettable in the case of the sites which were excavated in the area of the Saddam Dam Salvage Project, since they offer the closest geographical and chronological comparisons for the Karrana remains.

For the reader's convenience I recall that - except for PWS IV - the Karrana PWS consist of a series of thin and low mud-brick walls laid parallel to one another: the number of the walls varies from 3 (PWS III) to 4 (PWS II, PWS I [or 5?]); their length is ca. 5m (PWS II and III - the total length of PWS I was not detected); the distance between the single walls is ca. 40 to 50cm. As a rule, the Karrana PWS - which are located in open spaces (presumably courtyards) - are not linked to any other architectural structure. Only PWS III/2 is delimited at its eastern end by an alignment of big stones (AF 126), probably intended to even out the beginning of the eastern slope of the tell. The arrangement of PWS IV is somewhat different: there, we have three parallel walls (AF 67, AF 68, AF 69) in the customary west-east alignment: the western end of these walls is marked by the wall AF 74, running north-south; the eastern section of PWS IV was not excavated.

The archaeological evidence to be adduced in comparison with the Karrana materials exhibit two basic architectural patterns: 1) parallel walls without any delimitation on their short sides or with delimitation in one or both of their short sides; 2) pigeon-hole structures consisting of a more or less wide network of walls joining at 90° according to a square and/or rectangular plan. The latter pattern is absent at Karrana; in some other sites it is at times associated with the former pattern: it is difficult to ascertain what the possible functional differences of the two patterns might have been.

The following list of sites which have yielded PWS is arranged in a roughly chronological order.

1. At Jarmo, level 5 of the Operation J-II (late 7th millennium) has revealed a "curious grill-like floor plan" made of "five *tauf* [i.e. hand-molded courses of clayey mud] humps or joistlike dividers over which reeds had been bedded" (Braidwood 1983, p. 162 and figs. 33, 51, 70 and 94). The

excavators state that "the original reason for the grill-like plan eludes us"; they refer to the similar stone-built features of Çayönü (for which see presently) and quote the opinion of the agronomist J.R. Harlan, according to which there is "no reason to agree with the frequently offered suggestion that the room was originally intended to be a granary" (ibid.).

2. At Çayönü, in south-eastern Anatolia, comparable structures have been detected: their dating is decidedly earlier than that of the Jarmo structures and can be placed in the first half of the 7th millennium. In the words of the excavators, they consist of "curious *grill plan* stone foundations for rectangular structures, of which we have at least seven more-or-less complete examples" (Çambel / Braidwood 1980, p. 45 and Pls. 37-38). "The rectangles approach 5 x 7m in size and were provided with a number of loosely set lines of stone foundations running parallel to the end foundations of the shorter sides of each rectangle" (ibid.). As concerns the function of these structures, the authors "speculate that the parallel lines of foundation stones may have served as joists for the support of floor constructions with some air space beneath, but the evidence for this is not yet firm" (ibid.).

3. At Umm Dabaghiyah, a late neolithic village in the northern plain of Iraq, few kilometres west of the Wadi Tharthar, whose occupation spans the period from ca. 6200 to 5750 B.C., some PWS - closely similar to those of Karrana - were excavated. "Basically they are individual groups of four or five low, non-load bearing walls built parallel to each other and about 30cm apart. One early example, built in a courtyard, consists of two separate units about a metre apart. Here the individual walls are three metres long" (Kirkbride 1982, p. 16 and p. 12 fig. 2; previously Kirkbride 1975, p. 9 and Pl. I). In the excavator's opinion "obviously such a design is intended to allow warm, dry air to circulate freely. So one may conclude that these units were probably racks for drying some commodity" (Kirkbride 1982, p. 16): the author adduces (ibid.) the examples of the later structures of Yarim Tepe (for which see below) and the earlier ones of Çayönü - the only ones known to her.

4. Quite remarkable are the remains of PWS unearthed at Yarim Tepe I levels 10 and 9 (period of Hassuna: ca. 5500-5200 B.C.) and at Yarim Tepe II (period of Halaf: first half of the 5th millennium [cf. the radiocarbon determinations quoted in Merpert / Munchaev 1987, p. 35]). At Yarim Tepe I, level 10, complex 27 included "a grain-drying platform with a system of parallel walls and a number of ancillary structures" (Merpert / Munchaev / Bader 1976, p. 31 and and Pl. V 1 = Merpert / Munchaev 1987, p. 6, p. 5 fig. 3 I [square 37], Pl. III a). In the same square 37, in level 9, another "grain-drying platform similar to and overlying that in the previous level" was detected (it is part of the domestic complex 26: Merpert / Munchaev / Bader 1976, p. 30 and Pl. IV 2 = Merpert /

Munchaev 1987, p. 6, p. 5 fig. 4 I). In the same level 9, in squares 57-47, the building complex 32 included "three grain-drying platforms and an open yard with at least three ovens" (Merpert / Munchaev 1987, p. 6, p. 5 fig. 4 I). The PWS included in the domestic complex 26 are particularly worthy of notice: "The walling covered an area 4 x 3m. The walls ran from north to south with slight deviation to the west. The length of the walls reached 4m, the width 20-25cm, with a height rising to as much as 22cm. On the upper section of a number of walls some traces of mat have been noted. Spaces between walls resembling elongated narrow canals are about 15cm wide which sometimes broaden up to 25cm or grow as narrow as 10cm. Seven walls have been noted altogether" (Merpert / Munchaev / Bader 1976, p. 30).

As concerns Yarim Tepe II, a comparable PWS was found in connection with the house excavated in Tholos 44: "It consisted of four pisé walls standing along the western part of the house which ran in parallel to one another. [...] This interesting structure first discovered at Yarim Tepe II obviously presents the remains of a granary or a store-house for grain drying, similar to those unearthed at Yarim Tepe I [...]. Though no cereal grains have been discovered in it" (Merpert / Munchaev / Bader 1976, p. 47).

5. Particular attention deserve the pigeon-like and the parallel walls structures discovered at Oueili (near Larsa) in phase III of the Ubaid 0 period (ca. 5200-5000 B.C.) (see lastly Forest 1991). Especially worthy of notice are the five parallel walls in square W 35 (ibid., p. 38, p. 110 fig. 9, Pl. IV/1, p. 112 fig. 12 [section]) and the complex 85.28.1-2-3-4 in square W 36 (ibid., pp. 45-46, p. 114 fig. 15, p. 115 fig. 16 a, Pl. VII/1-2, p. 118 fig. 19 [section]): the latter complex closely resembles PWS IV at Karrana. It is further to be noted that the Oueili PWS are covered by layers of reed, as at Karrana and elsewhere. A detailed analysis and a tentative explanation of these structures has been carried out by Forest 1991, pp. 95-101. The main conclusions reached by the author are the following: "On a très vraisemblablement affaire [sic!] à des aménagements qui comprenaient une partie 'dormante' (la seule à nous être parvenue, et ce, peut-être intégralement lorsque des traces du plancher sont encore visibles) et une partie fonctionnelle ou 'active' à laquelle on ne peut plus attribuer, au mieux, que quelques briques éparses conservées parfois au-dessus du niveau du plancher. La solidité de l'installation, susceptible de recevoir une charge, la surélévation et donc l'isolation relative de ses sols, suffiraient à évoquer une fois de plus l'idée de greniers à céréales [...]. Enfin, la fragilité des murets [...] évoque des constructions relativement peu élevées. En résumé, les aménagements de la phase III correspondraient à des plates-formes, surélevées pour limiter les remontées de l'humidité, sur lesquelles prenaient place les greniers proprement dits. Ces derniers ne doivent sans doute pas être conçus comme des pièces à

l'intérieur desquelles on pouvait circuler, mais plutôt comme des réceptacles juxtaposés, indépendants et d'ampleur limitée" (*ibid.*, pp. 95-96).

6. At Tell Rijim - a site located ca. 9km north of the Saddam Dam in the vicinity of the western bank of the Tigris - a Late Uruk level of occupation has revealed unquestionable remains of a PWS: "The structure is composed of a series of four narrow mudbrick walls running on a N-S axis and of a more substantial wall running transversely further north. The whole exposed fragment is about 4m long. It seems probable that this structure served as a granary" (Bielinski 1987, p. 31 and p. 28 fig. 12).

7. In the Late Uruk levels investigated at Tell Mohammed Arab - on the eastern cliff of the Tigris ca. 5km west of the Saddam Dam - "several mudbrick walls have been found including a structure consisting of three parallel walls about 80cm apart" (Roaf 1984, p. 155). According to the excavator, "the function of this structure is not known" (*ibid.*).

8. In the Late Uruk occupation at Hassek Höyük (south-eastern Anatolia, along the upper course of the Euphrates) a comparable structure was detected (Behm-Blancke 1991-92, p. 84, fig. 73 1 = Behm-Blancke (ed.) 1992, Pl. 31): it consists of an alignment of six major and one minor parallel walls framed, on their shorter sides, by two perpendicular walls: to judge from the plan, the dimensions of the structure - which is simply defined as "ein Kornspeicher" (Behm-Blancke 1991-92, p. 83) - are ca. 21 x 7.5m.

9. Area TW at Tell Brak has recently yielded architectural structures chronologically pertaining to the period between the Late Uruk and Ninevite 5 phases: in this stratigraphic context "a grill pattern of low walls, perhaps designed for underfloor ventilation" was discovered (Oates / Oates 1991, p. 138 and Pl. XXXI a). The excavators duly stress the significance of the similar finds of Karrana, both as concerns the PWS and the ceramic material associated with it (*ibid.*, pp. 139-140).

10. Of special interest is the evidence provided by Jebel Aruda, a settlement chronologically strictly related to Karrana Level 3 (see above p. 19). In the area of the House NC, and adjoining the dividing wall of the adjacent House NA, a structure of four parallel walls, sunk into the subsoil, was detected (van Driel / van Driel-Murray 1983, p. 11 and Map 2). In the excavator's words, "the function of the complex is problematical, though it might have formed the substructure for some kind of silo or drying platform" (*ibid.*, p. 11).

11. At Tell al-Raqa'i - a site located on the eastern bank of the Khabur, ca. 12km downstream from Hasseke - in the complex of levels 5-7, which can be dated to the early Ninevite 5 period, "grill-like structures of parallel walls similar to installations identified as grain storage or drying facilities

elsewhere" have been detected (Schwartz / Curvers 1992, pp. 415-416 and figs. 27-28).

12. At Telul eth-Thalathat Mound V (ca. first quarter of the 3rd millennium) a trapezoidal structure measuring ca. 16.4 x 6.3 x 17.8 x 6m has been detected: although much more elaborated than the similar and/or comparable structures quoted so far, it displays architectural peculiarities which commonly recur in other PWS: a grid of low parallel walls covered by a thick layer of reeds on top of which clay was placed in order to obtain an even floor (Fukai et al. 1974, pp. 18-25). As pieces of comparative evidence adduced by the excavators, attention is been called to the Harappa granary (in the Indus Valley, Pakistan) and to the PWS of Çayönü (*ibid.*, p. 24).

13. Some examples of PWS were detected in Early Dynastic I sites excavated in the Diyala region in connection with the Hamrin Dam Salvage Project. At Tell Madhhur level II "a curious structure which may have been a grain store" was excavated (Killick / Roaf 1979, p. 541 and p. 536 [plan]; cf. Excavations 1977-78, p. 176): "It consists of a platform edged with baked bricks, on which four paralleled walls of mudbrick were built. On top of these walls and channels there were traces of a partly collapsed floor and of the bases of the side walls of the rectangular bin". The authors add that "similar structures have been found at Tell Gubba and at Tell Abu Qasim in Early Dynastic I levels and grain stores of similar design are still in use in that region" (Killick / Roaf 1979, p. 541).

14. The informations concerning the remains unearthed in levels IV and V (Early Dynastic I) at Tell Gubba are somewhat intriguing: according to Fuji 1979, p. 517, in level V "more than 30 small rooms measuring about 1.2 to 3m, which are furnished with ventilation grids at the bottom, were uncovered". According to Excavations 1977-78, p. 172, "level IV comprised two phases of ED I occupation each preserving about 10 small, rectangular rooms with ventilation grids beneath them"; as concerns the ED I remains of level V, "more than 30 rooms of a type similar to Level IV were uncovered" (*ibid.*).

15. Even more elusive are the reports concerning the alleged presence of PWS at Tell Abu Qasim: no mention of them is to be found in Al-Kassar 1979, p. 476; in Excavations 1977-78, p. 165 mention is made of "much thinner, unbonded walls" that were unearthed within the enclosure of a rectangular building of level II, which occupies the main part of the mound.

As mentioned before, evidence for PWS and related architectural features is provided by a number of ancient sites east of the Syro-Anatolian and Mesopotamian region. Particularly consistent is the documentation stemming from various centres

of Afghanistan and Pakistan, whose periods of occupation ranges from the 5th to the 1st millennium: just to quote a few examples, see the case of Mundigak (Casal 1961, pp. 93-96, fig. 46 and Pl. XXVII A), Mehrgarh (Jarrige 1981) and Harappa (Vats 1940, pp. 17-22).

To judge from the evidence quoted so far, it seems that one and the same principle lies at the basis of these structures - be they parallel walls alignments or pigeon-hole complexes: namely to build superelevated platforms, isolated from the ground level and provided with adequate underfloor ventilation. In the pertinent literature, the prevailing opinion is that these structures served as grain-drying platforms or as grain-storing facilities. Though quite plausible, either hypotheses lack definite and cogent archaeological evidence: to my knowledge, the abundant cereal remains that were retrieved on top and in the interspaces of the Karrana PWS represent the first and unquestionable piece of evidence that provides important clues for an overall albeit tentative evaluation of the functional meaning of these structures.

The crucial subject-matter at hand is to guess what kind of superstructures - if any at all - might have been raised above, or placed on top of the parallel walls (or pigeon-holes) alignments. In the case of structures of greater dimensions (e.g. those of Telul eth-Thalathat and Harappa) it is well conceivable that roofed masonry works - with or without inner partitions - were erected above the platforms in order to attain "granaries" in the proper sense of the term. The most recurrent case of smaller PWS probably displays a somewhat different situation, also to judge from the total absence (or the extreme paucity) of the extant archaeological remains that have been detected in a functional (and stratigraphic) association with these PWS. To this regard, I refer to the suggestion of Casal 1961, p. 94, concerning the Mundigak PWS: "Ces murettes devaient assurer la circulation d'air indispensable à la conservation de grains *en sacs* [italics mine], qu'il y eût ou non l'intermédiaire d'un plancher ou d'un poutrage, dont rien en tout cas ne nous laisse deviner l'existence". (As we have seen, the existence of such platforms is often clearly attested in many PWS detected in ancient Near Eastern sites).

At times it has been stated that similar structures are still in use nowadays: see e.g. Braidwood 1983, p. 162, with reference to the Jarmo PWS: "in the high Elburz region today villagers still construct low stone foundation joists, upon which they place saplings, brush, and finally, mud as flooring"; Killick / Roaf 1979, with reference to the Tell Madhhur PWS: "grain stores of similar design are still in use in the region"; in a more general fashion, Forest 1991, p. 96 states that "il suffit d'ouvrir n'importe quel ouvrage consacré par exemple à l'Afrique traditionnelle, pour constater que les villages de céréaliculteurs comprennent toujours deux types d'édifices, d'une part des habitations, d'autre part des greniers

qui sont en général surélevés selon divers procédés". Indeed, in nowadays tropics and subtropics and, more generally, in drier areas, storage structures and granaries used by small-scale farmers most frequently resort to superelevated wooden platforms above which structures of various kinds are arranged in order to store (and protect) grain therein (cf. Bodholt / Diop 1987). Among others, one recurrent feature - especially common in drier areas - is the so-called mud-built granary which "is normally built on an elevated platform of either wooden material or large stones or combination of both. The walls are constructed in successive layers using lumps of mud reinforced with straw" (ibid., p.7).

I wonder whether this kind of structure - whatever its actual shape and dimensions might have been - possibly represents an appropriate term of comparison for the Ancient Near Eastern PWS previously described. The erection of mud-built structures resting on the superelevated platforms, to serve as more or less durable containers for the storage of grain, could well account for the absence of any significant architectural remains on top and/or around the Ancient Near Eastern PWS.

On a less sophisticated and much less precarious level, it is not without interest that a similar technique was observed, at the time of our excavation in Iraq, in the nearby village of Karrana: there, heaps of straw - but not grain - reaching a height of ca. 1.5m were stored within a rectangular space (ca. 4 x 3m) delimited by low brick walls and entirely covered by a mud-plastering ca. 3-4cm thick.

To sum up, the possibility that PWS might have served the purpose of drying cereals (and, less probably, pieces of chopped meat) should not be discarded a priori, yet would require more cogent archaeological (and ethnographic) support. In the lack of other persuasive working hypotheses, the tentative interpretation of these structures as isolated and ventilated supports for grain storing facilities - whatever the nature and the shape of the containers and/or the techniques used for covering and sealing the cereals - stands within reason.

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APPENDIX II: THE KILN IN SQUARE Q 15

Volkmar Schön

(Plates XV, XCV)

Course of Excavation and Stratigraphy

During the excavation of square Q 15, we expected to find the extension of the widespread pavement of Level 1 in squares S 14 and R 14, at least in the northeastern corner of Q 15. Isolated stones found directly below the surface in the northeastern quadrant, beside the eastern balk, could not be associated with the pavement. A more coherent group of flat stones (AF 153) set further south along the eastern balk continued into square R 15. The dimensions and the shape of the stones suggest that they belong to an E-W oriented burial.

Following the removal of the 20-30cm thick surface deposit (SU 127), it appeared that the stone formation AF 153 covered a circular mudbrick construction (AF 137), which lay directly below SU 127 in the northeastern corner of the square and which projected into the northern balk.

In the following sequence, we first excavated the SW quadrant and then the SE quadrant of AF 137 in order to expose both its N-S, i.e. cross-section, and its E-W, i.e. longitudinal section. To complete the cross-section, we then excavated the NW quadrant and the last quarter of the NE quadrant. The contents of AF 137 were collected separately and labelled SU 134 according to their locus.

Already during the excavation of the SW quadrant of AF 134, we found a single-row stone structure 20-30cm south of AF 137 at a depth of ca. 80cm. Preserved to a height of two layers, this stone structure belonged to an E-W wall (AF 150). Half way along AF 150, the wall was superimposed on a row of 3 stones (AF 154) which extended southwards. Southeast of the corner formed by the walls AF 150 + AF 154 in square Q 15 a pit was cut into the otherwise clayey deposit below SU 127. The content of this pit was labelled SU 130. In view of the fact that AF 137 was covered by the stone structure AF 153 associated with Level 1, it can be assigned to Level 2.

Results of Excavation

AF 137 was an almost circular mudbrick construction of ca. 1.50m in diameter. The structure was framed by a ca. 60mm thick mudwall. Within this frame, there were fragments

of partly burnt mudbrick and individual stones. In the west, the structure showed a slight constriction at the junction with a not quite continuous wall, which extended ca. 1m to the east. The width of this small wall corresponded to the length of a mudbrick, amounting to ca. 24cm including the plaster. In the east, AF 137 formed a ca. 30cm long bottlenecked bulge with a curved arch, which ended just in front of the eastern balk. During the course of excavation, it became clear that most of the individual stones found in the upper segment of AF 137 bore no connection with the general structure.

The N-S profile running through AF 137 yielded the following observations: On the west, the small E-W oriented wall divided the structure into two chambers, which were preserved to a height of ca. 1m. The small wall comprised 9 layers of mudbrick and was superimposed on a very hard compact grey-green clay deposit, which may have resulted from extreme heat. Both the north and south sides as well as the east edge of the wall were mud-plastered. The lower three mudbrick courses were difficult to distinguish, as conflagration, presumably, had turned them into reddish burnt sand. The two chambers cut into the clay. The lower part of their walls had a thin greenish-black mudplaster, whereas the upper part of the walls had a thick coating of mud. Remnants of slag were found on the interior of the walls and in the plastering of the small wall as well as on individual brick fragments found in the fill. The lower half of the room was filled with a loose, almost sandy deposit mixed with traces of ash and burnt red mudbrick fragments.

The E-W profile through AF 137 sheds light in particular on the entrance area of the structure. From the eastern end of the small wall in AF 137, the ground level of the now undivided chamber rose approx. 60cm to the east. The reconstructed height of the arched entrance was still ca. 55cm. In the middle of the arch, the mud ceiling had collapsed. Here lay a big flat stone with traces of burnt clay on its underside. This stone lay between two similar stones, on the north and south respectively, which, however, lay a bit higher. It is possible that all three stones in some way covered the entrance area.

Of note are several indentations on the exterior walls of the southern chamber. They may indicate an exterior

extension to the structure, although no regular construction was found.

AF 150, the E-W oriented stone wall composed of one row and two courses, ran south of AF 137. The upper edge is approximately level with that in the fourth course of the small mudbrick-wall associated with AF 137.

A pit (SU 130) was dug into the mud against the south side of the wall. The pit was filled with a large ash deposit which sloped to the south. The western border of the pit was formed by a row of stones (AF 154), which ran south, under AF 150, almost as far as the southern balk. As this feature (SU 130) did not continue in square R 15, the eastern edge of the pit presumably lay within the balk.

Interpretation

AF 137 appears to have been a pottery kiln. The kiln had two chambers; the heating and feeding of the pottery was affected through the opening in the east. The kiln roof, whose existence can be deduced from the rounded roof of the entrance, was probably domed, although it cannot be recon-

structed. The fire burned in the lower half of the chambers, as indicated by the loose reddish fill and the condition of the lower mudbrick courses of the small wall connected with AF 137. The pottery was fired in the upper half of the chambers, as suggested by the remnants of slag found in this part of the kiln.

An analysis of the slag by A.F. Sedda (see *infra*) showed that its composition was typical of clay. Noteworthy is only the rather light pink tone of the clay which, according to Sedda, indicated either a low firing temperature or a non-oxidizing environment. The pit SU 130 dug into the clay to the south of the kiln, was filled with the ash after the firing. The significance of wall AF 150, which lay between the kiln and the pit, is unclear. Possibly it served both as a protection against the heat which issues during the process of firing and as a border of the pit to keep the ashy contents in place.

The kiln had not been destroyed; it had been cleared of its contents and contained none of the pottery which had been fired there. In this respect, this isolated kiln reflects the overall impression of the occupation of Tell Karrana 3, which in the end was evidently abandoned without violent destruction.

APPENDIX III:

MATERIAL ANALYSIS OF CLAY SAMPLES

ES 89 and ES 91 from kiln in square Q 15

Antioco F. Sedda

The material under examination represents a compact mass of a pink colour. The texture is fine and homogeneous, and in several specimens the material is mixed with lapideous inclusions.

An equal part of each specimen was detached, separated from possible lapideous inclusions and ground.

We performed a quantitative evaluation by X-ray fluorescence analysis of the elements present in each of the specimens.

All the samples examined proved to be homogeneous, with a maximum deviation of 3-4%, showing the following composition:

Si	20.4 %
Al	20.6 %
Fe	2.4 %
Sr	702 ppm
Zn	158 ppm
Rb	62 ppm
Zr	18 ppm
As	6 ppm
Y	2 ppm

The composition is typical of clay with an average content of iron. The rather light colour suggests that it was fired at a very low temperature or in a non-oxidizing environment.