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## STRATIGRAPHY, ARCHITECTURE AND LAY-OUT OF BOUQRAS

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**Summary.** - Tell Bouqras is situated on the W. edge of the Euphrates valley on a remnant of a Pleistocene river terrace, c. 30 kilometers downstream from Deir ez-Zor.

The paper describes the field activities pursued at Bouqras during the campaigns of 1976, 1977 and 1978. Vestiges of eroded mud-brick houses walls were visible at the surface and permitted the drawing-up of a plan showing a number of aligned individual houses. At the summit of the tell a reference section was dug, revealing 10 successive building layers with a total thickness of 4.50 m. Radiocarbon dates indicated an age of c. 6 400-5 900 B.C. (conventional C<sup>14</sup> chronology).

Five squares of 7.50 × 7.50 m on the eastern slope of the tell were excavated down to virgin soil. On the southern slope of the tell some 25 surface buildings were excavated to their base. They were apparently contemporaneous and belonged to the last-but-one phase. Test trenches revealed the presence of houses on the western slope of the tell, where surface indications for houses were lacking.

Both the house construction and the lay-out of the tell are discussed in detail. The total number of houses in the last-but-one phase is estimated at c. 180, indicating a total population of 700 to 1 000 individuals.

Preliminary analysis of faunal and botanical remains suggest that animal husbandry and hunting were the main food sources. Agriculture was practised on a modest scale, probably in the bottom of a nearby wadi.

A trial trench was dug at Tell-es-Sinn, a half-eroded tell from the Byzantine period on the opposite side of the valley near Deir ez-Zor. The nuclear part contained Neolithic layers contemporary with those at Bouqras. It is supposed that other contemporary settlements may have been completely destroyed by the meandering river.

**Résumé.** - Tell Bouqras est situé sur le versant ouest de la Vallée de l'Euphrate sur un témoin d'une terrasse pléistocène, à environ 30 km en aval de Deir-é-Zor.

Cet article décrit les activités de terrain poursuivies à Bouqras durant les campagnes de 1976, 1977 et 1978. Des murs de maisons érodés en briques crues étaient visibles à la surface et ont permis de relever un plan indiquant un certain nombre de maisons alignées. Au sommet du tell, un sondage de référence a été pratiqué, révélant 10 niveaux successifs de constructions sur une épaisseur totale de 4,50 m. La datation au radiocarbone indiquait un âge d'environ 6 400 - 5 900 av. J.-C. (chronologie C14 conventionnelle).

Cinq carrés de 7,50 × 7,50 m sur la pente est du tell ont été fouillés jusqu'au sol vierge. Sur la pente sud du tell quelque 25 constructions de surface ont été fouillées jusqu'à leur base. Elles étaient apparemment contemporaines et appartenaient à l'avant-dernière phase. Des tranchées-sondages ont révélé la présence de maisons sur la pente ouest du tell, où toute indication de construction faisait défaut en surface.

La construction des maisons et le tracé du tell ont tous les deux été évoqués en détail. Le nombre total de maisons dans l'avant-dernière phase est estimé à environ 180, indiquant une population totale de 700 à 1 000 habitants.

Une analyse préliminaire des restes de faune et de flore démontre que l'élevage et la chasse étaient les principales sources de nourriture. L'agriculture était pratiquée à une modeste échelle, probablement dans le fond d'un ouadi voisin.

Une tranchée-sondage a été creusée à Tell-es-Sinn, tell à moitié détruit par l'érosion datant de la période byzantine sur la rive opposée de la vallée, près de Deir-é-Zor. Le noyau du tell contenait des niveaux néolithiques contemporains de ceux de Bouqras. On suppose que d'autres installations contemporaines ont pu être complètement détruites par les méandres du fleuve.

## 1. - Introduction

The neolithic tell near the present village of Bouqras Fôqani was discovered by the soil scientist W.J. van Liere (Fig. 1). Together with H. de Contenson he excavated two test pits in 1965 (1). Plant remains recovered during this sounding were studied by S. Bottema and W. van Zeist. D.A. Hooijer identified the animal bones. Charcoal samples were dated by J.C. Vogel of the Groningen C<sup>14</sup> laboratory (2).

In 1975 one of us (H.T. Waterbolk) obtained permission for further excavations. Under the supervision of H.T. Waterbolk and M.N. van Loon a joint team of resp. the universities of Groningen and Amsterdam was formed with J.J. Roodenberg and P.A. Akkermans as field directors. The team worked at the site during three campaigns of c. 10 weeks (spring 76, autumn 77 and 78). Additional short visits of team members took place in spring 77 and autumn 79. The project was financed by the Netherlands Organization for the Advancement of Pure Research (Z.W.O.) and by the universities of Amsterdam and Groningen. We gratefully acknowledge the effective cooperation of Dr. A. Bahnassi and Dr A. Bounni of the General Directorate of Antiquities and Museums in Damascus and Mr. A. Mahmoud of the Museum in Deir ez-Zor.

Some preliminary reports have already been published, or prepared for publication (3). The present, still preliminary report deals with the excavation techniques and the results obtained on the stratigraphy, architecture and lay-out of the settlement.

(1) H. de Contenson and W.J. van Liere (1966). Premier sondage à Bouqras en 1965. *Annales Archéologiques Arabes Syriennes*, 16 : 181-192.

(2) J.C. Vogel and H.T. Waterbolk (1967). Groningen radiocarbon dates VII. *Radiocarbon*, 9 : 107-155.

(3) P.A. Akkermans, J.J. Roodenberg, M.N. van Loon and H.T. Waterbolk (1978-79). Tall Buqras. *Archiv für Orientforschung*, 26 : 152-156.

P.A. Akkermans, M.N. van Loon, J.J. Roodenberg and H.T. Waterbolk. The 1976-1977 excavations at Tell Bouqras. MS for the A.A.A.S.

## 2. Field activities

For a correct understanding of the data dealt with in this report, it is necessary to describe shortly the various field procedures pursued by the team.

A large part of the first season was spent on the initial activities : laying-out of the grid system and plotting of the contour map, a systematic surface sampling, the mapping of the architecture visible at the surface of the site and the digging of a reference section near the summit of the tell.

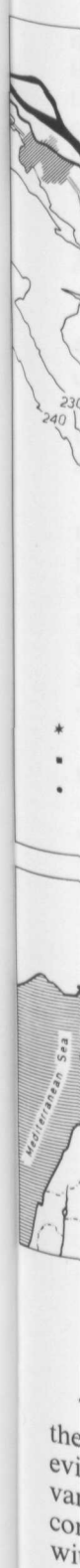
Next to the excavation properly of a series of squares down to virgin soil and the work on the youngest phases in the SW-quarter of the village, a couple of additional activities were executed on the site : the opening up of several testtrenches to determine subsurface architecture, the surface cleaning of squares around the excavated area for the same reasons, and the digging of a number of testpits for geomorphological investigations.

Finally, some regional activities were carried out, i.e. a settlement pattern survey, followed by the digging of a step-trench at a probably contemporary site, and an investigation of sources of raw material in this part of Syria.

### 1. Grid system and contour map

A grid system was laid out over the tell (2.75 ha) and its immediate surroundings (in total c. 7 ha) (Fig. 2). The main modules of the grid were 1.5 m, 9 m and 45 m. The general registration during the excavations was done by squares of 9 × 9 m. These dimensions were defined by the ones of the « plots », the basic units of 1.5 × 1.5 m, according to which the findings were collected. It was felt that smaller plot areas wouldn't leave enough space to effectively work in, while larger plot dimensions would obscure a clear distinction of the findings according to location within the architectural features.

The squares are identified by their position on the x and y axes in the NE-quadrant of the grid (e.g. square 15/13 is the one having its NE corner at point 15/13 of the grid). In these squares areas of 7.5 × 7.5 m were excavated, leaving balks of 1.5 m width at the N and E sides. If necessary, these balks could be excavated totally or partly in accordance with the plot system.



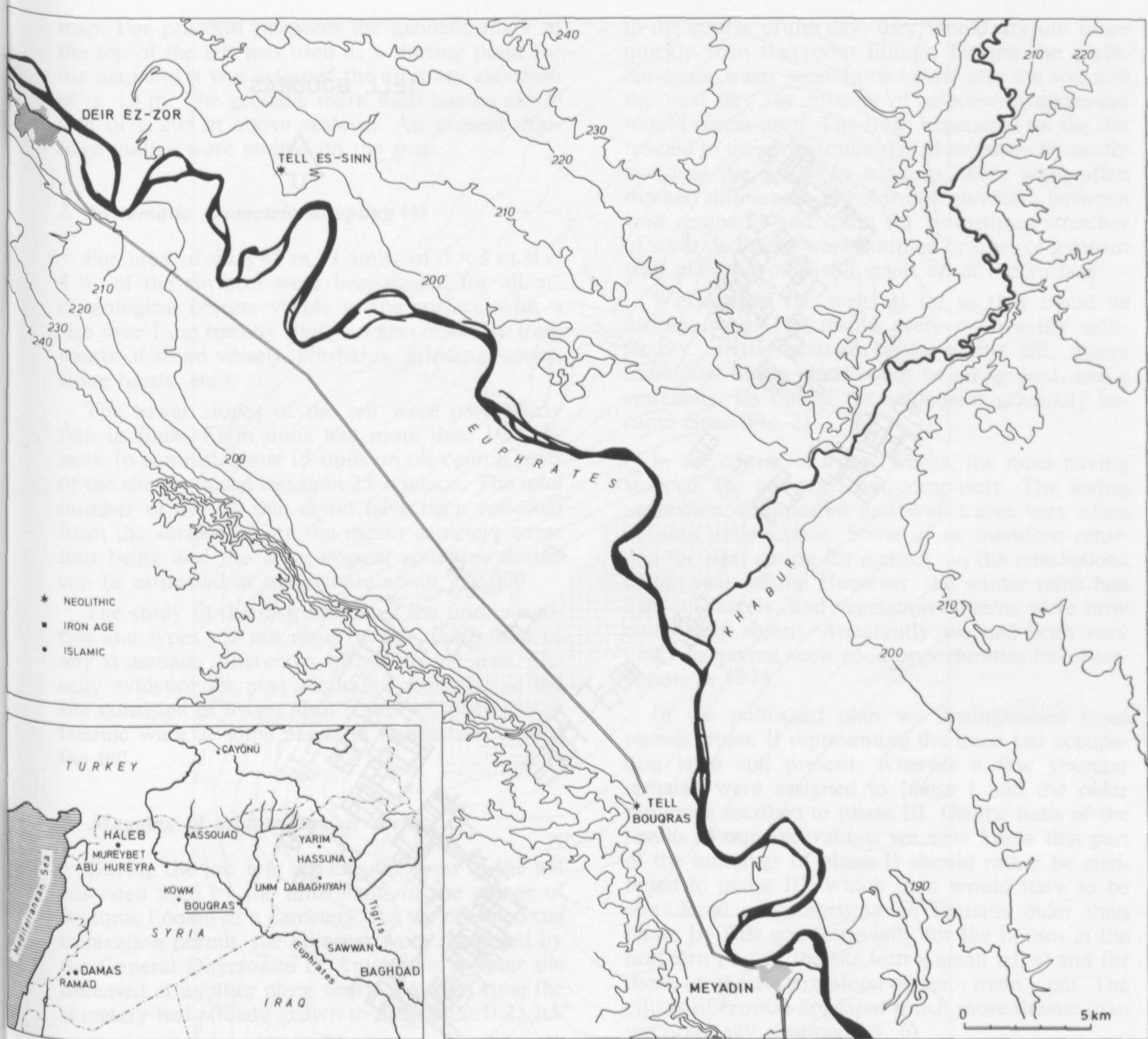


FIG. 1. - Location of Tell Bouqras and Tell es-Sinn (Drawing H. Praamstra).

The grid should intersect more or less diagonally the main orientation of the houses as these were evident from the observations of de Contenson and van Liere. With this in mind, and for reasons of convenience, the grid was orientated corresponding with the main compass directions. During all our

operations the grid orientation and the plot system have proven their usefulness. They permitted a maximum of flexibility, at the same time making it easy to fit in with the general excavation procedures.

The grid first served for plotting the contour



FIG. 2. - Tell Bouqras with contour lines and traces of architecture visible at the surface (Drawing H. Praamstra).

map. For practical purposes the geodetic mark at the top of the tell was used as a starting point for the map and it was assigned the arbitrary elevation of + 10 m. The geodetic mark itself has an elevation of c. 205 m above sealevel. All present drainage gullies were plotted on the map.

## 2. Systematic geometric sampling (4)

Per area of  $45 \times 45$  m, 9 units of  $3 \times 3$  m (i.e. 4 % of the surface) were investigated for all archaeological objects visible at the surface with a size over 1 cm (mostly flint, but also obsidian, fragments of stone vessels, potsherds, grinding stones, stone beads, etc.).

The lower slopes of the tell were particularly rich in finds. Eight units had more than 100 objects. In contrast, some 15 units on the central parts of the site produced less than 25 artefacts. The total number of objects that could have been collected from the surface before the recent cemetery came into being and the archeological activities started can be estimated at somewhere about 250,000.

The study of the distribution of the find categories and types did not result in the recognition of any systematic differences within the tell area. The only evidence for post-neolithic occupation at the site consisted of a very thin scatter of green-glazed Islamic ware at some places at the eastern foot of the tell.

## 3. Mapping of architecture at surface

During the last few decades the crest of the tell has been used by the inhabitants of the village of Bouqras Fôqani as a cemetery. As we obtained the excavation permit, the villagers were requested by the General Directorate of Antiquities to inter the deceased at another place nearby. At that time the cemetery had already grown to a size of c. 0.25 ha.

The participants in the 1965 campaign had observed at the surface evident vestiges of eroded walls. When we arrived in the early spring of 1976 these traces were very clear (Fig. 3). The amount of rain that winter had been much larger than usual, and the tell deposits appeared quite moist. The mudbrick walls showed up particularly well when,

in the course of the day, they would dry out more quickly than the room fillings. During the night, condense water would precipitate into the soil and the next day the process of selective evaporation would repeat itself. The fresh vegetation on the site reacted to these dissimilarities in moisture by neatly avoiding the walls. In addition, there were often marked differences in color and elevation between wall remnants and room fill. Sometimes stretches of separate bricks were outlined or lines of gypsum wall plaster would still stand up at the surface.

We mapped the walls as far as they could be distinguished. The results were noteworthy satisfactory on the southern slope of the tell, where individual house plans could be recognized, and a systematic lay-out of the settlement gradually became clear (Fig. 2).

In the course of a few weeks, the rains having stopped, the tell dried out completely. The spring vegetation disappeared and wall traces very often became undetectable. Some of us therefore returned the next spring for a check on the conclusions of the year before. However, the winter rains had held off largely, and vegetation patterns were now completely absent. Apparently we had been very lucky in having such good opportunities for observation in 1976.

In the published plan we distinguished three phases, phase II representing the main last occupation level still present, whereas a few younger remains were assigned to phase I and the older remnants ascribed to phase III. On the basis of the results of our excavations we now know that part of the buildings of phase II should rather be attributed to phase III, which then would have to be considered as comprising all remains older than phase II. This goes especially for the houses at the northern part of the site (our « small tell ») and for those on the eastern slope of the « main » tell. The effects of erosion appeared much more drastic than we originally assumed (cf. 6).

Leaving details aside, there is a large amount of agreement between the area covered by our map and the one of de Contenson and van Liere (1). These authors, however, missed the house traces we found in the NW part. A further discussion of the map will be given in par. 4 and 7.

(4) C.L. Redman (1974). *Archeological sampling strategies*. Addison-Wesley Module in Anthropology, 55.



FIG. 3. — House walls on the southern slope of the tell.

#### 4. Reference section at tell summit

The two adjacent pits dug by de Contenson and van Liere in 1965 were still open at the time of our arrival. The sections were, however, badly preserved as a result of weathering and bird burrowing. We decided to remove part of the dividing balk and to excavate c. 1 m of the resulting SE-profile. The new section (Fig. 4) was carefully drawn and studied in order to obtain a basic knowledge of the development in time of the settlement, to be used as a reference for the excavation down to virgin soil of a series of squares nearby. In the section 21 strata could be distinguished, corresponding with ten major architectural levels (5).

(5) The separate levels of the excavations properly were denoted in arabic numerals: 1thr. 10. Phases I and II of the surface map (cf. 2.3) correspond with resp. level 1 and 2 of the reference section; phase III stands for levels 3thr. 10.

The finds from this operation also served for purposes of comparison. Furthermore, some additional radiocarbon dates have been obtained from collected charcoal samples, proving that the tell had been inhabited from 6400-5900 B.C. (6). The bone material from the section has already been studied

- (6) GrN-8258 :  $8115 \pm 40$  BP (charcoal depth below surface : 0,50 m);  
 GrN-8259 :  $7925 \pm 40$  BP (charcoal depth below surface : 2,50 m);  
 GrN-8260 :  $7905 \pm 45$  BP (charcoal depth below surface : 2,60 m);  
 GrN-8261 :  $8155 \pm 45$  BP (charcoal depth below surface : 2,40 m);  
 GrN-8262 :  $8380 \pm 45$  BP (charcoal depth below surface : 4,50 m);  
 GrN-8263 :  $8330 \pm 80$  BP (charcoal depth below surface : 5,00 m);  
 GrN-8264 :  $7860 \pm 40$  BP (charcoal depth below surface : 0,50 m);



FIG. 4. — New SE section of the 1965 sounding.

by A.T. Clason (7). Botanical remains were very scanty.

Virgin soil was reached at c. 5 m above datum level, the actual occupation debris amounting here to a height of c. 4.5 m. In the center of the recent cemetery that now covers the crest of the tell the original height of the habitation deposits may have been c. 5 m.

##### 5. *Virgin soil squares 15/13 thr. 19/13*

A series of 5 squares was excavated down to virgin soil. Together they form a WE-strip from the center of the tell towards its eastern foot, star-

ting as closely as possible to the reference section (Fig. 5).

In the westernmost square, with a total deposit of c. 4.5 m, ten architectural levels could be recognized; at the down-slope squares successively older strata outcropped. Part of the original mound at the valley side has disappeared as a result of erosion (cf. par. 6).

The separate strata and also the top-surface of the virgin soil itself, and old terrace of the Euphrates c. 5 m above datum level, were roughly horizontal. Detailed information was obtained on the construction method of a sequence of individual houses and on the way the settlement had developed through time (cf. par. 4).

(7) A.T. Clason. The animal remains from Tell es-Sinn compared with those from Bouqras. *MS for Anatolica*, 7.



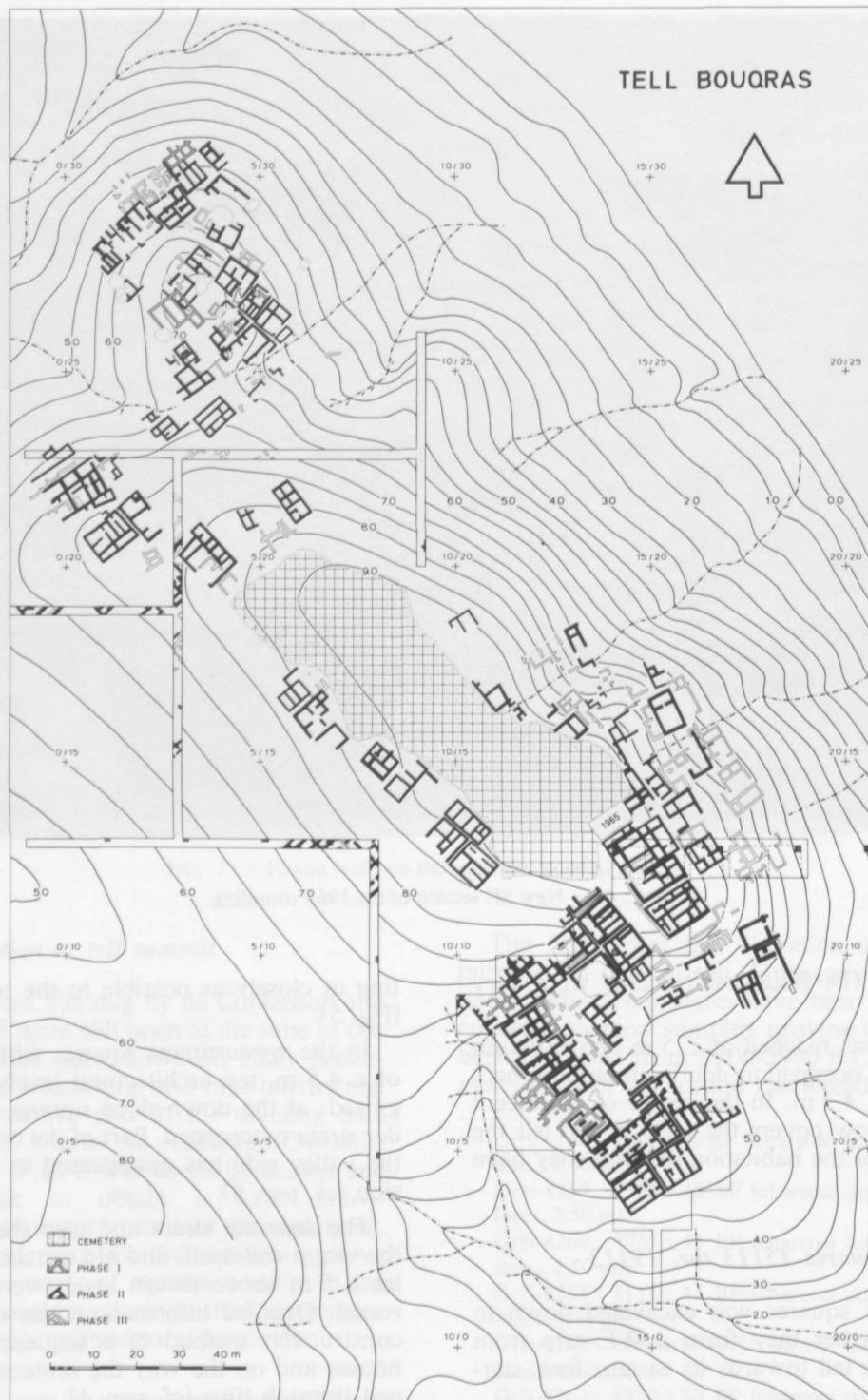


FIG. 5. - Tell Bouqras with the virgin soil squares, the area of the phase II excavations, the testtrenches, and the testpits (hatched).  
 Within the investigated area some of the house plans visible at the surface have been corrected and enhanced  
 (Drawing H. Praamstra).

### 6. Upper phases squares of SW-quarter

Our observations from the surface resulted in very accurate information on house plans and layout at the southern part of the tell. Here a zone of apparently contemporary buildings could be traced all the way from the summit of the tell (near the 1965 sounding) toward the southwestern foot.

It was decided to excavate these constructions down to their bases, in order to be able to verify and complete our surface map and to study the architectural details. Our aim was to concentrate on the buildings provisionally attributed to phase II; after investigation the scanty traces of some younger buildings (phase I), the wall foundations of which were often erected on top of the room fillings of their predecessors, were removed. Of some houses higher up the mound the wall foundations were situated at topsoil level or immediately underneath it. At the end of the activities in this area, most of the balks separating the squares were also excavated according to the plot system.

The detailed maps (Figs. 5, 7) show to what extent the final results differ from the map made solely on the basis of surface indications (Fig. 2) (cf. par. 5).

### 7. Testtrenches

Some areas of the mound had not given any indications for the presence of architecture, in spite of relatively large quantities of surface finds. This was particularly the case on the western side of the tell with its very gentle slope. It was decided, therefore, to investigate these areas by opening shallow testtrenches by way of a shovel of 2 m wide, mounted onto a tractor. The trenches were laid out according to the grid system. After some cleaning evident house walls turned up in nearly all trenches at a depth of 0.30-0.50 m below the surface. No remains of a defence wall or other peripheral structures were encountered (Fig. 5).

### 8. Surface cleaning

In the area surrounding the excavated phase II squares (cf. par. 2.6) a number of adjacent squares were cleaned from topsoil, also by way of the tractor-shovel. Several houseplans, or parts thereof, could be added to our map (cf. fig. 7 : 15, 28, 29, 30, 31). Just like was noticed at the utmost

northern edge of the site, also here the orientation of the house plans turned out to be related to the outer border of the village.

### 9. Testpits

A number of deep testpits into the subsoil of the Euphrates terrace was dug in a WE line from the westernmost virgin soil square onwards into the floodplain; in the same way a series of NS testpits was excavated over the southern slope of the tell. In some of the shallow testtrenches (cf. par. 2.7) several pits were dug to be able to investigate the upper layers of the terrace, but now also to determine the depth and nature of the cultural deposits. These testpits had dimensions of 1.5 × 1.5 m or 1.5 × 1 m.

Although everywhere in the southern part of the tell the top level of the terrace was reached at c. 5 m above datum, on the saddle between the « main » tell and the « small » one the virgin soil surprisingly had an elevation of c. 6.5 m. The implications will be discussed in par. 4.

### 10. Settlement pattern survey

With the permission of the General Directorate of Antiquities a survey from Deir ez-Zor to Meядin was completed in the Euphrates valley and on the cliffs of the steppe areas bordering the floodplain (Fig. 1). During the survey one other neolithic site was discovered. It was the nuclear part of Tell es-Sinn, a large settlement of the Roman/Byzantine period overlooking the valley east of Deir ez-Zor. Recent erosion had exposed the interior of the tell. A trial excavation took place in 1978 (cf. par. 2.11).

J.A.K. Boerma of the University of Utrecht has studied the geological development of the Euphrates valley (8). Both neolithic settlements occur on remnants of the so-called Q3-terrace, which would be of upper Pleistocene date. One of the tells in the surveyed part of the valley yielded material from the first millennium B.C., the others date from the medieval period. These sites all occur on the next younger terrace (Q4a).

(8) J.A.K. Boerma. Soils of the Tell Bouqras area (E-Syria). *MS for Anatolica*, 7.

At Bouqras the course of an ancient meander of the Euphrates passes close by the tell. Its date, however, cannot be established with certainty.

### 11. Steptrench at Tell es-Sinn

With the permission of the General Directorate of Antiquities, J.J. Roodenberg performed a small test excavation at Tell es-Sinn. On the steep slope, starting c. 7 m below the summit of the tell, a 4 m wide two-step section was cleaned and carefully excavated for a depth of 0.75 m. The neolithic layers had a total thickness of c. 4 m. Seven occupation phases were identified. Both the nature of the walls, floors, etc. and the finds point to contemporaneity with Bouqras (9). Radiocarbon dates are under way.

### 12. Sources of raw material

To determine the origin of some of the raw materials used for the fabric of implements (flint, obsidian) and containers (alabaster, asphalt), an investigation was made of areas which might have served as sources for the extraction of these elements. Apart from obsidian, which was imported from Turkey, most of these materials could have been derived from places at a reasonable distance from the settlement.

### 3. Location of Bouqras

Bouqras is situated in a steppe-desert environment with a mean annual rainfall of c. 125 mm (10). At present agriculture is practiced mainly on pump-irrigated fields in the Euphrates valley. In the nearby steppe cereals and vegetables are still grown in wadi bottoms and other favourable spots, although the crop obtained is now at its best about a quarter of the yields in the (irrigated) floodplain.

In general, remains of cereals were rather scanty in the tell deposits, but a few grains occur in many samples. In one house, however, a much larger quantity of grain was obtained. Up to date, emmer

wheat, free-threshing wheat (hard wheat/bread wheat), hulled and naked barley have been identified by W. van Zeist. Though on a small scale, agriculture did play a part in the food economy. We may assume that it was practiced in the wadi immediately south of the tell or in suitable areas in the floodplain. Remains of wild plants are equally rare. Seeds were found of both steppe plants (e.g. *Astragalus*) and marsh vegetation (e.g. *Cyperus*).

In contrast with the plant remains, the quantity of bones is enormous and animals must have constituted the main food supply. Although both herding and hunting were practiced, the former was of prime importance. Among the animal remains, sheep and goat, most of which probably were domesticated, were abundant (7). Also domesticated cattle and apparently domesticated pigs were found. Hunted animals include gazelle, wild goat, aurochs, an equid, wild boar and some birds. The small ruminants dominate. Fish and shell remains are rare, but they do occur. So far, only the bones from the reference section of Bouqras (cf. par. 2.4) and from the steptrench at Tell es-Sinn have been examined in detail. Although some animals, such as the wild boar, will have been caught in the poplar forest in the valley, the steppe was the main food resource. According to a map published by Wirth (10), the steppe zone southwest of Bouqras provides some of the best grazing of Syria.

The presence of varied agriculture here doesn't necessarily imply we have to assume immediately conditions of higher rainfall at the time of occupation. Apart from the possibilities in recent times, referred to above, we must realize that in the original steppe environment the vegetation was certainly much more luxurious than at the moment in its overgrazed situation (8). If different climatic conditions prevailed they may have been only very slight and not a prerequisite to the viability of a settlement like Bouqras.

The location of the site thus appears to present optimal possibilities for the exploitation of a variety of environments: the border between the steppe with its good grazing and hunting, and the valley with the river, the forests and the frequently inundated lands with their rich animal life, close to the mouth of a relatively large wadi, where moisture would be available in the growing season of the cultivated food plants.

It would have surprised us greatly if Bouqras had appeared to be the only habitation of the period in the area, and it was therefore very satis-

(9) J.J. Roodenberg. *Sondage des niveaux néolithiques de Tell es-Sinn, Syrie. MS for Anatolica*, 7.

(10) E. Wirth (1971). *Syrien*, Darmstadt.

factory that we could localize a contemporary site, Tell es-Sinn, at the opposite side of the valley, similarly overlooking the floodplain. From the fact that at present both sites are situated on protruding parts of a terrace (Q3) of very localized occurrence, of which at least the one of Tell es-Sinn was affected considerably by erosion, it is evident that other contemporary settlements may have been completely washed away by the meandering river.

#### 4. Stratigraphy

In the 5 virgin soil squares 15/13 thr. 19/13, the houses of the oldest phases could be studied. Constructed from rectangular mudbricks, they consisted of a varying number of relatively small rooms, bordering onto a spacious courtyard, which had nearly always an oven in one of the corners.

After some time, a standardized house plan was developed. The dimensions of the central yard decreased somewhat; ultimately it was probably roofed. At both sides it was flanked by a rectangular room. At one end of the building three small, more or less square rooms were added, which might have served as storage places or kitchens. The oven remained in the large central area, which from now on contained a square hearth as well.

The walls were frequently plastered. In some cases up to 30 successive plaster layers could be counted. Supposing that the houses were treated annually – as is still the habit in the area – they would have been in use for more than a quarter of a century. Most plaster layers consisted of gypsum, but mudplaster was also applied. Gypsum occurs profusely in the surrounding area; the white, powdery substance resulting from burning the raw material needed only to be mixed with water to be ready for use.

When a new house was built, first the mudbrick foundations were constructed, mostly on the floors of the preceding one, but sometimes also on what was left of its walls. Afterwards the space in between the new foundations was filled in with brick fragments, household refuse, etc. Next the erection of the walls was completed, reserving space for doors and recesses, and the roof was added. Finally, new floors were laid and the interior was plastered. At the eastern foot of the tell new floors were often less than 0.30 m above the preceding ones; in the center of the settlement, height differences of 0.50 m or more occurred.

At the southern part of the site some of the houses of phase II were constructed directly upon the terrace subsoil, others stood on a thin layer of cultural debris. As we have seen, at the center of the tell, however, 10 architectural levels were distinguished, together attaining a height of c. 4.5 m. As is also evident from the testpits, the build-on surface was enlarged fairly towards the south during the occupation. Whether this expansion could perhaps have coincided with a withdrawal of the habitation on the Euphrates-side of the terrace is unknown. All in all, it seems quite probable that in the course of its existence the settlement has somewhat grown in size.

At the western slope of the tell the situation differs in some degree from the one at the southern foot. From the testpits it appeared that the houses which we discovered in the testtrenches were built on top of a thick layer of cultural debris without any intact floors or walls. Apparently, the area served for a long time as a dump, before part of it was used for habitation.

At the northern end of the tell information on the stratigraphy is rather scanty. Over an east-west zone just north of the recent cemetery, the « saddle », the subsoil rises locally to c. 6.5 m above datum level. Terrace deposits are here lacking and weathered bedrock material is encountered close to the surface. Here, too, some houses were built directly on virgin soil. At the northernmost edge of the village, house remains occur on the slope of a side wadi. The same goes for the opposite end of the tell. Apparently both wadi's were already in existence during the time of occupation. In combination with the Euphrates valley these side wadi's provided good drainage for the settlement.

In general, the house remains at the surface of the small tell and on the saddle, with their narrower walls and less standardized plans, are more like the houses from the earlier phases, excavated in the virgin soil squares. Only the northernmost series of houses seems to have similar plans to the phase II houses on the southern slope.

#### 5. Architecture

The majority of the excavated houses on the southern part of the tell (Figs. 6, 7) was also built according to the principle described above for the youngest phases in the virgin soil squares (cf. par.

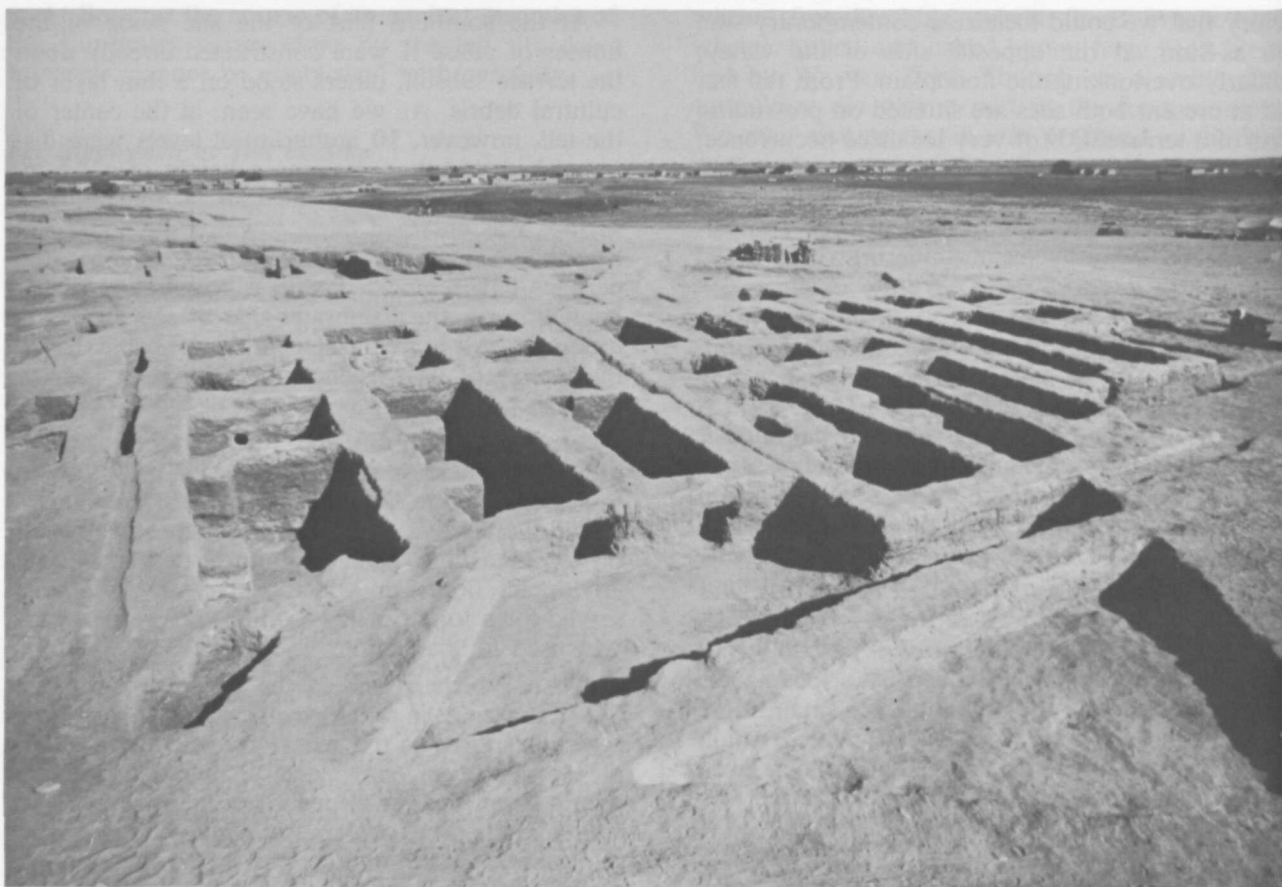


FIG. 6. - Houses 16, 17 and 18 (phase II) seen from the SW.

4). The central room of the houses, however, differs no longer in size from the adjacent ones. The basal pattern of the houses consists of a series of three narrow, rectangular rooms, on one side of which three small, more or less square ones were added (cf. houses 11, 16, 18, 19). Variations on this standard plan consisted of e.g. an extra series of three small rooms (houses 17, 20), an extra set of a square and a rectangular room (houses 28, 29), or an extra fourth rectangular room only (houses 7, 12). Since the outer doorways of the houses occur in the elongated rooms, these had to face an open space, such as a street or yard, or just the area outside the village.

A second, sparingly occurring « house » type was represented in the investigated part of the tell by n° 26. It has an elongated form with rooms extending over the total width of the building. To

the east of the rooms and separated from them by narrow walls, small cubicles were present.

Indications as to a difference in function between these two types could especially be found in the plans and the internal features. The dominating kind of construction possessed normal doorways to connect almost all rooms. The presence of ovens, hearths, cupboards, wall ornamentations, etc. points to a function as dwelling places. In building 26, on the contrary, the situation was completely different. The small cubicles east of the rooms had floors sloping towards the narrow walls. These partition walls possessed no doorways; the only connection consisted of small round portholes. The cubicles might be considered as the main storage accommodations, which apparently could only be filled from above. The rooms themselves contained several small bins which also served for storage

purposes. These rooms were not interconnected by doorways; to go from one room to another had to use the outer doors. Later on, the buildings still being used, these doorways were blocked. From now on the rooms could only be reached from the roof. All in all, it seems very probable that structure 36, and the others of this type, served as dwelling places. These rooms, which we call them, must have been used for special activities, such as the storage of certain products, at the same time, they had the opportunity to process these products.

Various details of the construction of the houses 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

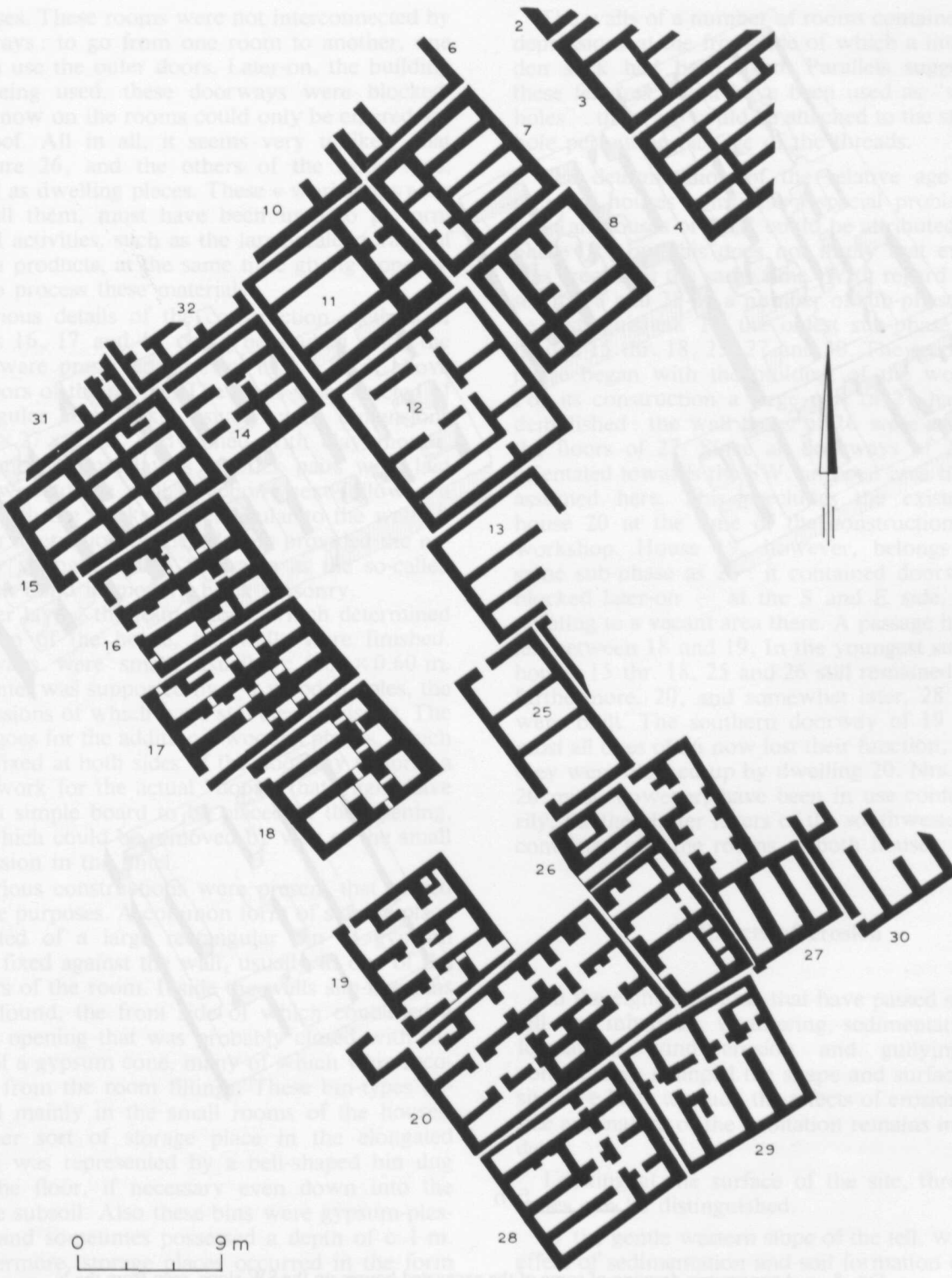


FIG. 7. - Detailed plan of the houses excavated on the southwestern slope.

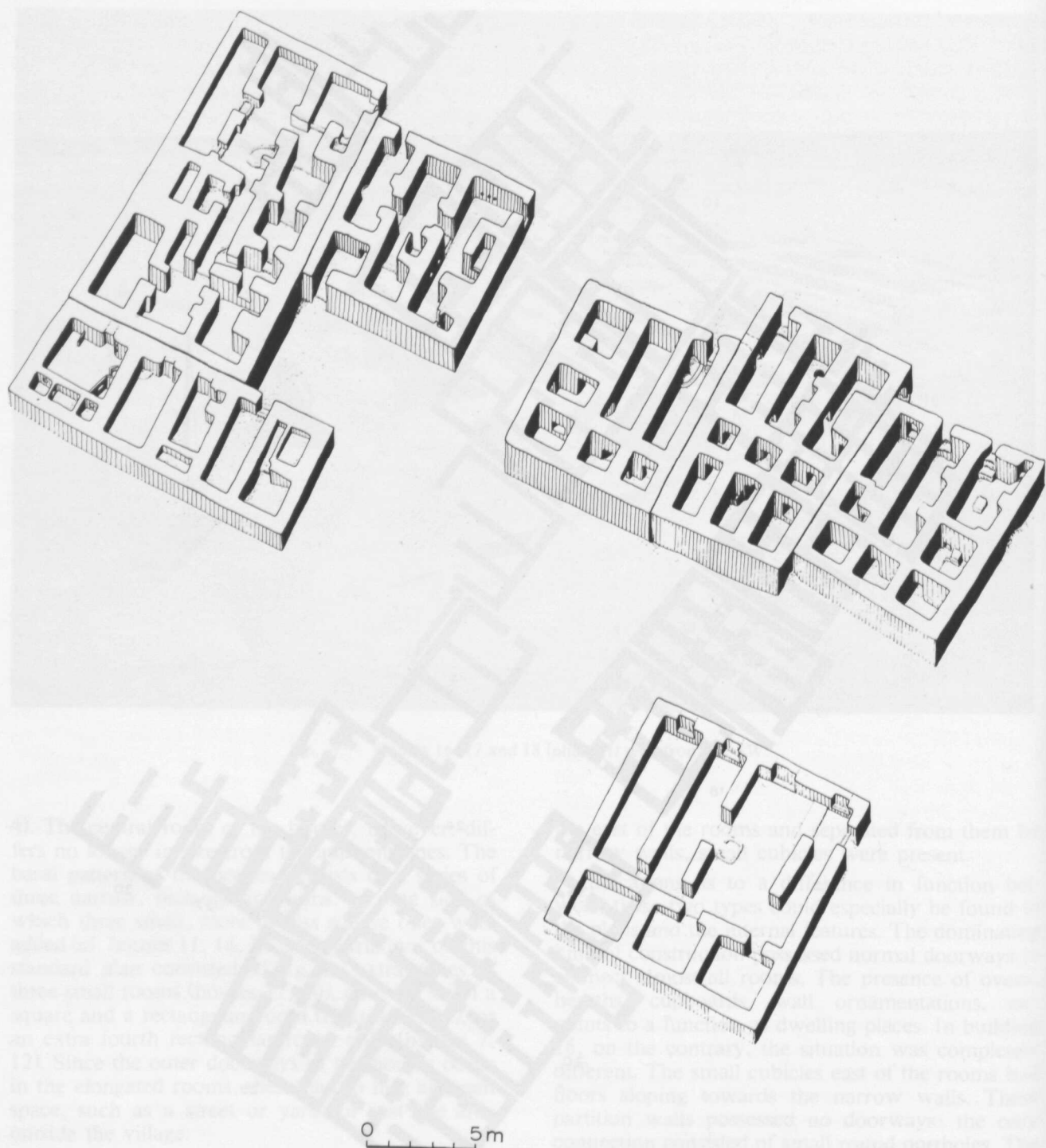


FIG. 8. - Axonometric drawing of some of the excavated houses on the SW slope, seen from the N  
(Drawing K. van Dam).

purposes. These rooms were not interconnected by doorways: to go from one room to another, one had to use the outer doors. Later-on, the building still being used, these doorways were blocked. From now on the rooms could only be entered via the roof. All in all, it seems very unlikely that structure 26, and the others of the same type, served as dwelling places. These « workshops », as we call them, must have been used to perform special activities, such as the large-scale storage of certain products, at the same time giving opportunity to process these materials.

Various details of the construction method of houses 16, 17 and 18 could be studied since the walls were preserved here up to c. 1.80 m above the floors of the rooms. The walls were erected of rectangular mudbricks, usually with dimensions of  $54 \times 27 \times 7$  cm, and joined with clay mortar. First one or more layers of brick pairs were laid lengthwise to the wall direction; next followed a layer with the bricks perpendicular to the wall. A regular alternation of these layers provided the necessary strength, much the same as the so-called Flemish bond in modern brick masonry.

After laying the foundations, which determined the plan of the house, the walls were finished. Doorways were small, usually c.  $0.80 \times 0.60$  m. The lintel was supported by 3-5 wooden poles, the impressions of which were still clearly visible. The same goes for the additional wooden planks, which were fixed at both sides of the doorway to form a framework for the actual "door", that might have been a simple board to be placed in the opening, and which could be removed by way of the small depression in the lintel.

Various constructions were present that served storage purposes. A common form of storage place consisted of a large rectangular bin of gypsum plates fixed against the wall, usually in one of the corners of the room. Inside the walls silo-like bins were found, the front side of which contained a round opening that was probably closed with the help of a gypsum cone, many of which were recovered from the room fillings. These bin-types occurred mainly in the small rooms of the houses. Another sort of storage place in the elongated rooms was represented by a bell-shaped bin dug into the floor, if necessary even down into the terrace subsoil. Also these bins were gypsum-plastered and sometimes possessed a depth of c. 1 m. Furthermore, storage places occurred in the form of large L-shaped structures (cf. Fig. 7) as well as small square cupboards, both made of mudbricks.

The walls of a number of rooms contained small depressions at the front side of which a little wooden stick had been fixed. Parallels suggest that these features might have been used as "weaving holes": the warp could be attached to the stick, the hole permitting passage of the threads.

The determination of the relative age of the different houses constitute a special problem. Almost all houses of fig. 7 could be attributed to one phase (II), but this does not imply that everyone was erected at the same time. With regard to houses 15-20 and 25-30 a number of sub-phases could be distinguished. To the oldest sub-phase belong houses 15 thr. 18, 25, 27 and 30. The second sub-phase began with the building of the workshop. For its construction a large part of 27 had to be demolished: the wall bases of 26 were resting on the floors of 27. Since all doorways of 26 were orientated towards the SW, an open area has to be assumed here. This precludes the existence of house 20 at the time of the construction of the workshop. House 19, however, belongs to the same sub-phase as 26: it contained doorways – blocked later-on – at the S and E side, equally pointing to a vacant area there. A passage had been left between 18 and 19. In the youngest sub-phase houses 15 thr. 18, 25 and 26 still remained in use; furthermore, 20, and somewhat later, 28 and 29 were built. The southern doorway of 19 and almost all ones of 26 now lost their function, because they were blocked up by dwelling 20. Nrs. 19 and 20 must, however, have been in use contemporarily, for the plaster layers of the southwestern yard continued into the rooms of both houses.

## 6. Effects of erosion

In the eight millennia that have passed since the tell was inhabited, weathering, sedimentation, soil formation, wind erosion and gullyng have considerably changed the shape and surface of the site. We have to study the effects of erosion on the size and nature of the habitation remains in greater detail.

Looking at the surface of the site, three main zones can be distinguished.

a) the gentle western slope of the tell, where the effect of sedimentation and soil formation dominated the effect of wind erosion, as a result of which no house remnants are visible at the surface;



b) the somewhat less gentle southern slope of the tell, where soil formation and wind erosion have apparently kept in pace so as to produce optimal recognizability of house remains (a corresponding zone occurs at the northern foot of the mound);

c) the steep eastern slope and the top of the northern part of the site, where wind erosion and gullying prevail, no consolidated soil of any importance developed, and the house record is fragmentary and multiphased.

We have mentioned the presence of two side wadi's antedating the formation of the tell. From these wadi's active erosion gullies are now attacking the mound: one at the NW side, two at the S side. Six erosion gullies can be seen at the eastern slope, some of them creeping up close to the crest of the tell. In our testtrenches, we observed that at the western side of the settlement too erosion had been more wide-spread than would appear from the present surface contours.

It seems quite probable that the northern extension of the site, which we called the "small" tell, has been isolated from the "main" tell by the combined effect of two opposite erosion gullies, one starting from the floodplain, the other departing from the northern side wadi. The absence of a consolidated soil and the nature of the house remains on the saddle agree with this supposition.

Erosion of the meandering Euphrates may have removed part of the eastern edge of the Q3 terrace. The slight promontory near point 10/25 belongs to a higher, rocky subsoil zone, which by nature was more resistant to erosion than the loose tell deposits and the terrace gravels.

The eastern foot of the tell might originally have been situated more to the east than it is now. In the series of five virgin soil squares all levels are roughly horizontal; in the eastern squares there is no reduction in the number of architectural levels from the earlier phases, as was the case at the SW-quarter of the mound. The fact, however, that the strata-sequence appeared to be much denser in the easternmost squares than in the center of the site (cf. par. 4) suggests that erosion didn't result in the removal of large parts of the original habitation deposits.

Bearing all these erosion effects in mind, one can make an estimate of the original size of the tell and of the build-up area. On a very conservative basis, we come to an original tell surface of 3.25 ha

(the present being 2.75 ha), and to a surface of 2.5 ha for the area that was actually used for houses, streets and yards in the last major phase preserved (II).

## 7. Lay-out of the settlement

The excavated southern part of the tell can be considered as representative of the habitation during the last-but-one phase (II) (Fig. 7). We feel justified in doing so, since some of the testtrenches have yielded quite comparable traces and the series of houses on the northernmost foot of the site, though fragmentarily observed, appeared to be of exactly the same nature. One should note, for example, the change in direction of the houses on the slope of both side wadi's.

A main feature is the road between houses 1 thr. 4, and 6 thr. 8. From the evidence of the reference section in the extended 1965 trenches and virgin soil square 15/13 it appears that the present position of this street had already been fixed in level 7. The road follows the crest of the central part of the tell and was probably the main road through this quarter of the village. If so, one might assume that the zone of habitation at the NE side of the road had about the same width as the zone SW of it. There is some suggestion of a direct continuation of this street on the northern part of the site. Unfortunately, the effects of erosion have eliminated any indications of this road further to the SE. Directly S of house 4 a perpendicular side alley to the NE was attested. Between houses 18 and 19 a SW-NE passage gives access to a second road, parallel to the main one.

The most conspicuous feature in the lay-out of the settlement, both on the main and the small tell, is the alignment of houses in two directions, parallel as well as perpendicular to the main streets. Parallel series of houses are 1 thr. 4; 6 thr. 8; 10 thr. 13; 32 and 14; 31, 15 thr. 20, and 28. Transversal lines of houses are 6, 10, 32 and 31; 3, 7, 11, 14 and 15; 4, 8, 12 and 16; 30, 27, 26 and 20; 29 and 28. The houses even stand opposite each other at both sides of the road: cf. houses 2 and 6, 3 and 7, 4 and 8. Of course, there are some anomalies, particularly around the open space between houses 16 thr. 19 and 12/13 - 25/26, but the dominant pattern is of a striking regularity.

The area examined in detail is about 0.28 ha, or c. 1/9 of the estimated total inhabited surface. It contains (parts of) c. 25 buildings, two of which probably were workshops. A few others may have been uninhabited or demolished, so that c. 20 houses were truly contemporarily in use. Assuming an equal density of occupation all over the site, the total number of coexistent inhabited houses may have been c. 180. If each gave room to a family of 4-6 persons (11), we come to a total village population of 700-1000 individuals.

Such an agglomeration of let us say 850 people, living closely together for about 500 years, could not maintain itself without some form of leadership or central organization. Our excavations, however, have not given any direct evidence for the presence of status distinctions. Neither building differs enough from the others to suggest a special social standing of its inhabitants. House 12 did yield most of our better finds, but this is easily explained by the fact that it was destroyed by fire. The catastrophe killed three villagers, whose bodies were found among the debris.

The regular lay-out of the village, the uniform house type and the standardized mode of house construction could perhaps point to the presence in the settlement of specialized craftsmen. If so, our village would represent an early stage in the development of complex social structures, which can be traced, for example, at slightly younger sites in low land Iraq (12).

## 8. Final considerations

Tell Bouqras presents us with rich and detailed data on the development, architecture and lay-out of an advanced settlement from the late 7th millennium BC, which had adapted itself successfully to the existing steppe-desert environment. The unusually small quantity of plant remains in the debris and the abundance of animal bones strongly suggest that animal food predominated.

Since the flint industry, with its Byblos and Amuq arrowheads, shows clear affinities to other complexes of «PPNB final» context (13) in the Levant, it is in the west that we seek the ultimate origin of the material culture of Bouqras, Tell es-Sinn and other related sites that we may suppose to have existed in the area. In particular one might think of the up-stream area in the Euphrates valley, where the large site of Abu Hureyra – at a distance of c. 200 km of Bouqras – presents many points of similarity (14).

The settlement evidence from the period is scanty and we do not know of any parallel to the controlled lay-out of the village. But the individual house plans remind us of somewhat later settlements in Iraq, e.g. Yarim Tepe I (15). Parallels to some of the find categories, such as pottery and gypsum and alabaster vessels can equally be found in easterly regions, such as at Umm Dabaghiyah (16). An interesting result of our excavations forms the observation that Bouqras seems related to the oldest known settlements in the lowlands of northern Mesopotamia.

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