STUDI ARCHEOLOGICI SU QATNA 01





URBAN AND NATURAL LANDSCAPES OF AN ANCIENT SYRIAN CAPITAL

SETTLEMENT AND ENVIRONMENT AT TELL MISHRIFEH/QATNA AND IN CENTRAL-WESTERN SYRIA

EDITED BY DANIELE MORANDI BONACOSSI

FORUM

Università degli studi di Udine
Dipartimento di Storia e tutela dei beni culturali
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Archaeological Investigations in the Royal Palace of Qatna

Peter Pfälzner[1]

إن ثمانية مواسم من الحفريات من عام 1999 - 2006 من قبل البعثة الألمانية السورية المشتركة في تل المشرفة والتي هي جزء من الجهد الدولي المشترك لاتمام الحفريات وإعادة كشف وتقييم القصر الملكي لمدينة قطنا القديمة، سمحت بتوليفة مبدئية لنتائج الأعمال المنجزة حتى الآن.
إن عملية التنقيب الآثاري السورية الألمانية في القطاع G من القصر الملكي أعطتنا مجموعة من الإضاءات المهمة حول العمارة والحقبة الزمنية والأعمال الإنشائية والدور السياسي والاجتماعي للقصر الملكي، الفترة التاريخية للقصر الملكي هي بين عصر البرونز الوسيط وعصر البرونز المتأخر ومن الممكن أن يكون قد أدخل تعديل في المخطط المعماري للقصر أعيد من خلاله توظيف عدد من الغرف وربما تم اقتراح بناء مجموعة من الغرف داخل القصر.
المخطط المعماري الضخم والحجم الكبير والواسع للبناء بدا جلياً من خلال الحفريات الجديدة.
على هذه القواعد يمكن أن أناقش العلاقة القوية بين تقنية البناء والمفاهيم الرمزية والبيئة للعمارة في القصر الملكي، وهنالك مظاهر أخرى مهمة لهذا البحث الجديد مركزة حول نظام إمداد المياه في القصر والذي يتمثل بالآبار الرائعة المحفورة والمبينة بشكل جيد.
إن القبور الملكية تحت الأرضية الموجودة في اسفل القصر وآباره التخزينية ومخازنه ومستودعاته ليست مجرد مفاجئة واكتشاف غير متوقع لكنها مقدمات موسعة لدراسة الفن المعماري في مدينة قطنا خلال عصر البرونز المتأخر، هذا من جهة بالإضافة إلى دراسة الطقوس الجنائزية الممارسة في سوريا القديمة من جهة أخرى ، علاوة على ذلك أن هذا الكشف هو نقطة بداية لدراسة واسعة ومنظمة لهذا الموضوع باستخدام عدداً من فروع العلوم الطبيعية.
فاجتماع اللقى الآثارية والمعطيات المتحصلة من الدراسات البيئية في القصر والقبر الملكي تحت الأرض يقدم لنا فرصة لإعادة بناء الحقبة التاريخية والتي تبين أن السياسة والبيئة الطبيعية المحيطة مرتبطة بتاريخ القصر الملكي في قطنا.

Abstract

The completion of eight seasons of excavations (1999-2006) of the German-Syrian Mission at Tell Mishrifeh as part of the joint international effort to re-excavate and re-evaluate the Royal Palace of Qatna allows for a preliminary synthesis of the achieved results. The German-Syrian Operation G of the Royal Palace has given us a number of interesting new insights into the architecture, chronology, function and socio-political role of the Royal Palace. The chronology of the palace in the Middle and the Late Bronze Age could be refined and a functional reconstruction for a number of rooms and room-units within the palace could be proposed. The monumental architectural layout and the vast size of the building became apparent through the new excavations. On this basis, it can be argued that there is a strong relationship between the building techniques, the architectural symbolism and the 'architectural ecology' of the Royal Palace. Important aspects of the new research focus on the water supply of the palace manifested in a magnificently built palace well. The Royal Hypogeum below the palace and its well preserved inventories are not only a surprising and totally unexpected discovery but also offer ample perspectives for the study of Late Bronze Age art at Qatna on the one hand, as well as of the burial rituals practised in ancient Syria on the other. Furthermore, the discovery is the starting point for broad interdisciplinary studies of the objects, materials, and deposits preserved in the four subterranean burial chambers, involving many different disciplines of the Natural Sciences. Taken together, the archaeological materials and the data from environmental studies in the palace and the Hypogeum offer the opportunity to reconstruct a historical picture that demonstrates how politics and the natural environment were related in the Royal Palace of Qatna.

[1] University of Tübingen.

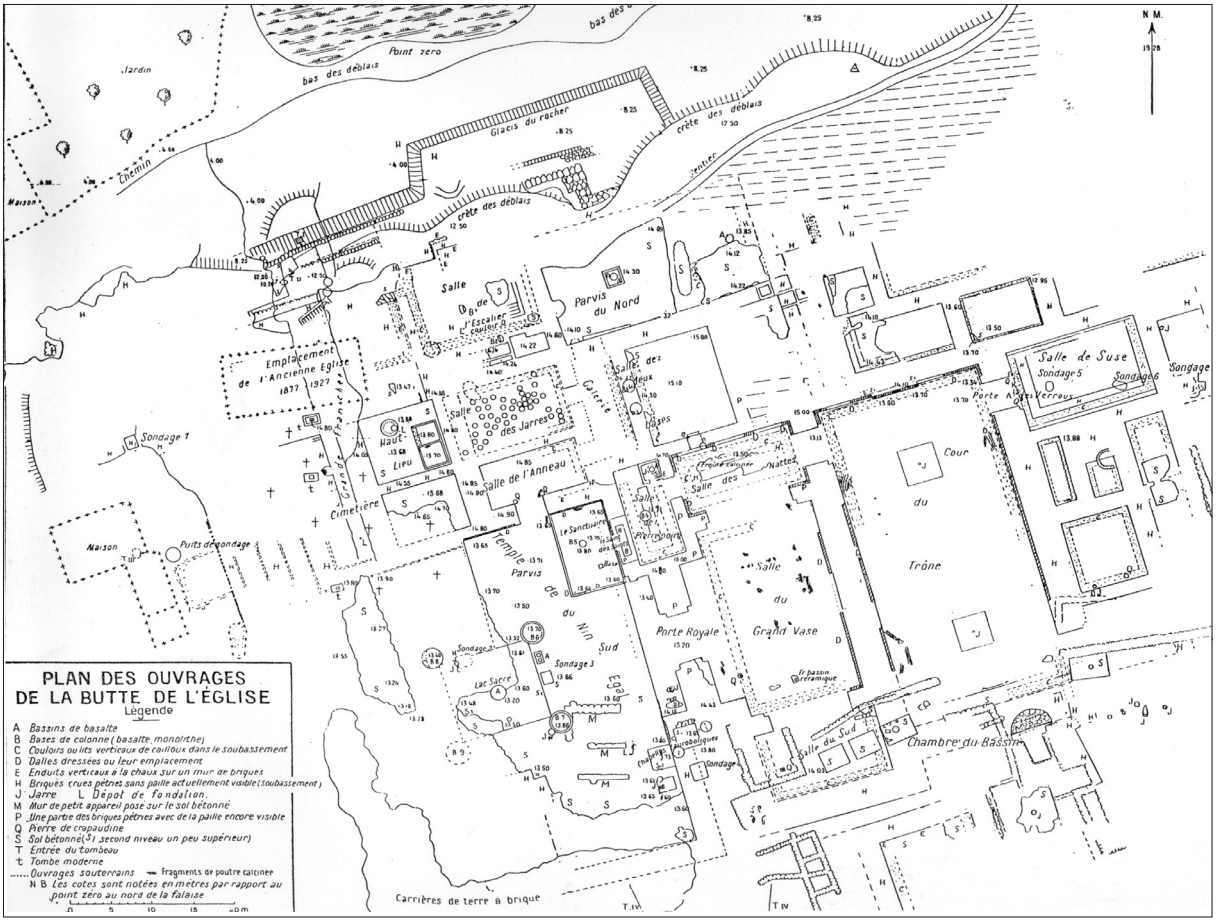


Fig. 1. The Royal Palace of Qatna: Published plan of du Mesnil du Buisson's Excavations from 1924 to 1929 on the 'Butte de l'Église' (after du Mesnil du Buisson 1935, pl. XVI).

1. The history of research of the Royal Palace of Qatna. A short outline

The identification of ancient Qatna with Tell Mishrifeh and the discovery and partial excavation of the Royal Palace of Qatna was accomplished by the Count Robert du Mesnil du Buisson who worked on the site from 1924 to 1929[2] (Fig. 1). He exposed the vast *Temple de Nin-Egal* (now Hall C), where he found the well-known sphinx of Ita[3] as well as the tablets with the inventories of the treasure of Nin-Egal and of the Gods of the King[4]. Du Mesnil du Buisson thought that this architectural unit was a temple attached to but functionally not part of the political character of the palace. To the north of the *Temple de Nin-Egal* he uncovered a room which he labeled *Haut-Lieu* (now Room F) interpreting it as a holy place for the worship of the godess Ashera and for a cult of betyles[5]. Tunnel excavations further to the north, close to where the palace terrace ended in the so-called *Falaise*, led him to the discovery of a subterranean stone staircase just below the modern village church[6]. For this reason, he had the church removed from this point and built a new church further south sponsored by his own means. However, for an unknown reason he did not continue to investigate the context of the mysterious staircase and stopped excavating it further. This was only to be done 71 years after he had left Mishrifeh, where the excavations led to the discovery of Room U and the palace well within (see below). At the edge of the steep slope of the *Falaise*, du Mesnil du Buisson discovered two interesting chamber-tombs, *Tombeaux I et II*, which were obviously intergrated into the terracing walls of the palace[7].

For du Mesnil du Buisson the palace proper primar-

[2] Du Mesnil du Buisson 1926; *id.* 1927a; *id.* 1927b; *id.* 1928; *id.* 1930; *id.* 1935.
[3] *Id.* 1928: 10-11, pls. VII, XII.
[4] Virolleaud 1930; Bottero 1949a; *id.* 1949b; Fales 2004.
[5] Du Mesnil du Buisson 1935: 97-111.
[6] *Id.* 1926: 321-322, figs. 26, 35, 38.
[7] *Id.* 1927a: 13-22, pls. VI, XIV.

ily consisted of two huge halls which he exposed to the east of the *Temple de Nin-Egal*: the *Salle du Grand Vase* (now Hall B) and the *Cour du Trône* (now Hall A)[8]. To the north of the *Cour du Trône* highly unclear structures had been recorded by the Count. This was just at the place where Corridor AQ leading down to the Royal Tombs (see below) was found during the new excavations. Further to the north, where the Royal Tombs were discovered in 2002, du Mesnil had not worked. This was probably due to the fact that the terrain was sloping and that there were cultivated fields in this area[9]. East of the *Cour du Trône* he uncovered the *Salle de Suse* (now Room T) where he discovered painted Early Bronze Age ceramics below the floor of the room[10]. As a result of du Mesnil du Buissons excavations the location, the general architectural outline, and the rough chronological position of the Royal Palace of Qatna were known. However, many questions remained unanswered: the border and the total surface of the palace were unclear; the layout of walls and foundations were only schematically indicated; the functions of the different rooms and parts of the building were often undetermined or not convincingly attributed. In addition, white, unexplored areas were present, which was especially striking in the northern part of the building – to the north of the *Haut-Lieu*, and in the northeastern part – to the north of the *Cour du Trône*. These areas in particular attracted attention for possible further excavations.

After the establishment of the international Syrian-Italian-German Mission at Tell Mishrifeh in 1999 excavations in the Royal Palace were resumed. They were explicitly initiated with the aim of gaining profound insight into the architecture, the chronology, the function, and the socio-political role of this building. The German team from the University of Tübingen (directed by Peter Pfälzner) focused on the western and northern parts of the palace (Operation G)[11] (Fig. 2), the Italian team (directed by Daniele Morandi Bonacossi) concentrated on the eastern part of the building (Operation H)[12], and the Syrian team (directed by Michel al-Maqdissi) joined the new excavations in the palace in 2003 exploring the southern half of the so-called *Cour du Trône* (Operation R)[13].

From 1999 to 2006 eight excavation campaigns have been carried out in the palace, accompanied by studies of materials from the palace and by restoration of important architectural features of the building[14]. The new excavations in the Royal Palace not only added valuable information to the knowledge retrieved from the older excavations but considerably increased the significance of the building to archaeology. This is due to new insights into techniques, architectural characteristics and innovations, the internal setting of rooms, the inventories, and, last but not least, by the surprising discoveries of the archive of King Idanda in Corridor AQ and the Royal Tombs below the foundations of the palace.

2. Building techniques, architectural symbolism and architectural ecology of the Royal Palace

The architecture of the Royal Palace of Qatna can be regarded as outstanding with respect to the architectural traditions of the second millennium BC in the Near East. This judgement is based on two main characteristics: Firstly, the spatial dimensions of rooms, and secondly, the magnitude and solidity of foundations. With regard to room sizes the most remarkable example is Hall C with an interior dimension of 36 by 36 m (Figs. 3 and 5). So far, this is the largest known covered hall in Bronze Age architecture of the whole Near East. Four columns once supported the roof. They are positioned in regular intervals from each other and from the surrounding walls. The wooden columns themselves have vanished, but three of the originally four heavy basalt column bases were still recorded by du Mesnil du Buisson. They measure approximately 2.4 m in diameter and have a height of nearly 60 cms[15]. Unfortunately, they were removed and destroyed once the former French excavations had ended, even though the Count had undertaken restoration works in Hall C (then labelled *Temple de Nin-Egal*) before he left. However, this regrettable loss opened the way for a careful investigation of the foundations of these columns (Fig. 4). They proved to be extremely bulky structures. We found a round, carefully excavated pit with a diameter of 3.5 m and a depth of 5 m below each place of a column base. The inside of these pits

[8] *Id.* 1935: 79-97.
[9] Compare *id.* 1928, pl. II and pl. X.4 (background).
[10] *Id.* 1935: 92, pl. XXV.2.
[11] Novák - Pfälzner 2000; *id.* 2001; *id.* 2002; *id.* 2003; *id.* 2005; al-Maqdissi - Dohmann-Pfälzner - Pfälzner - Suleiman 2003; Dohmann-Pfälzner - Pfälzner 2006.
[12] Barro 2002; *id.* 2003; *id.* 2004; al-Maqdissi - Morandi Bonacossi 2005: 22-25.
[13] Al-Maqdissi 2003b.
[14] Restoration work in Operation G, in the Royal Palace is sponsored by the German Foreign Ministery Cultural Aid Programme in addition to private sponsors.
[15] See du Mesnil du Buisson 1935: pl. XVII.3.

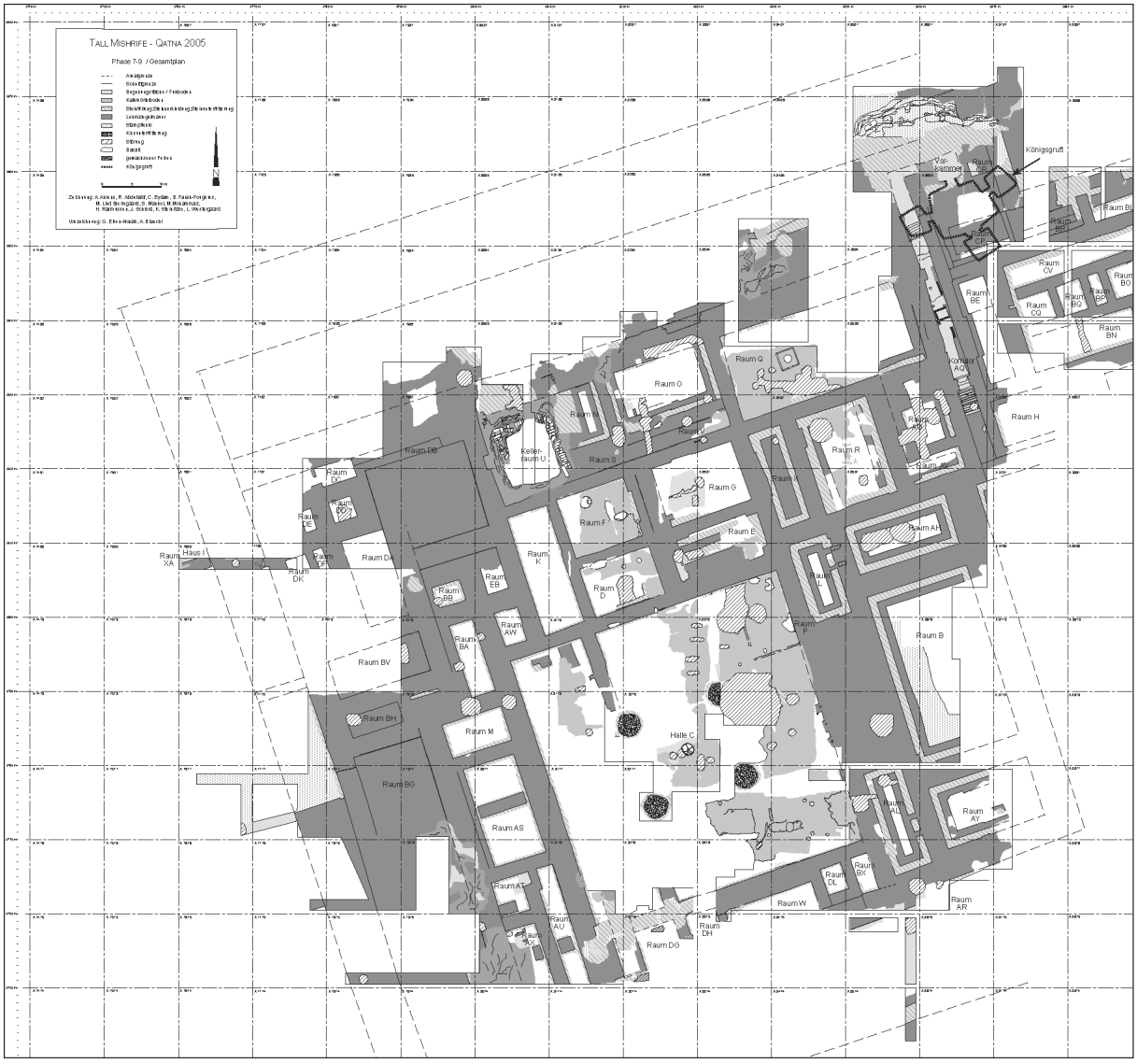


Fig. 2. The Royal Palace of Qatna: Plan of the structures excavated from 1999-2005 in Operation G by the German-Syrian team.

was lined by a wall of large stones from bottom to the top. The interior of this circle of stones was then filled up with pure river pebbles which were carefully compacted at different levels. Several radial sloping passages were found around each pit, they facilitated transporting the earth out and bringing stones and pebbles in. The passages were refilled with earth at the end of the construction period. The basalt column bases were set up on this solid ground. This kind of foundation technique for columns is unparalleled in the Ancient Near East so far.

Wide monumental doorways to the north and east, and probably also to the south and west connected Hall C to other parts of the building. The most representative one was the eastern doorway, called *Porte Royale* by du Mesnil du Buisson. Its entrance was 6.0 m wide and the door was inserted into a broad niche 17.6 m in width. The niche existed on both sides of the *Porte Royale*, towards Hall C and Hall B. The western niche was additionally emphasized by a row of seven rectangular wooden posts, closing off the niche like a porticus (Fig. 6). How, and if, this colonnade was roofed is not clear. In comparison to the extraordinarily monumental arrangement of the *Porte Royale* at Qatna other representative internal passages in Near Eastern Palaces of the Bronze Age are rather modest. Even the monumental gateway from Courtyard 106 to the

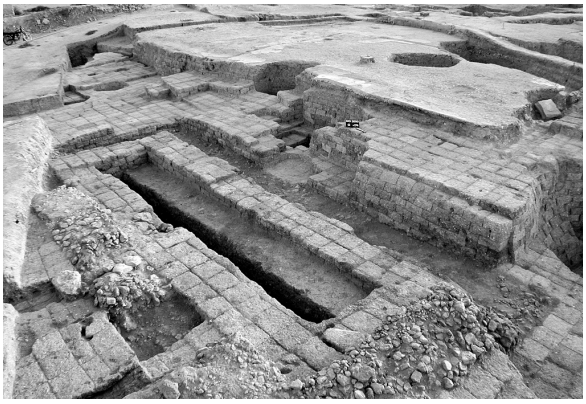


Fig. 3. Hall C: General view of the hall from north-east, with well preserved lime mortar floor, as well as foundations of Room L (in foreground).

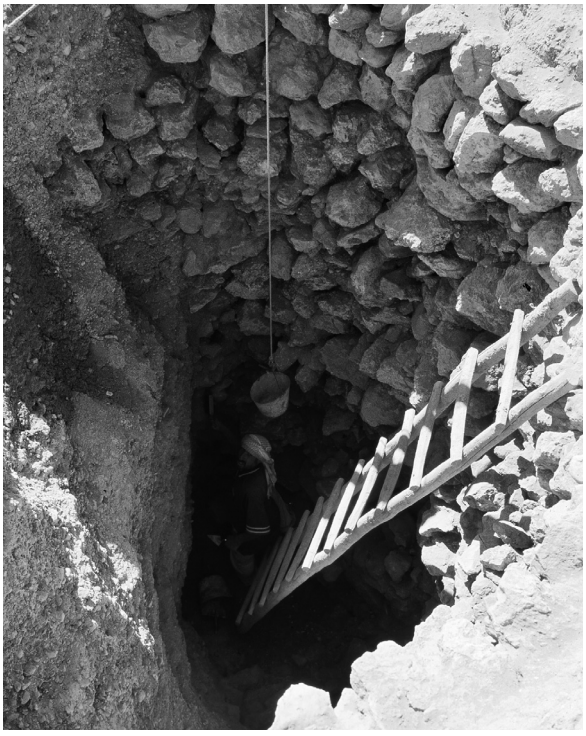


Fig. 4. Hall C: Foundation pit of the north-eastern column.

Throne Room 64 in the famous Palace of Mari is 'only' 3.1 m wide[16]. The comparison to the palace of Mari, which is so similar in layout to the palace of Qatna regarding the three-hall central representative unit[17], yields astonishing further insights. The huge Hall 65 at Mari, analogous in position to Hall A at Qatna, measures 11.7 x 26.3 m[18], i.e. 308 m^2, which is modest when compared to its counterpart at Qatna, Hall A (the so-called *Cour du Trône*) measuring 20 x 41 m, i.e. 820 m^2. The motivation behind this architectural desire for gigantism at Qatna is to be seen in the political realm. The rulers of Qatna wanted to symbolically demonstrate and visually communicate their political power by an outstanding monumentality in palace architecture. This fits to the historical situation where the kingdom of Qatna controlled large parts of central, western and southern Syria in the Middle Bronze Age and when it was, besides Aleppo/Yamkhad, the most powerful state in Syria[19]. As could be independently ascertained by our chronological studies (see below) the time of construction of the palace and the time of the political apogee of Qatna coincide.

The prestigious palace at Mari was well known among Syrian royalties in the Middle Bronze Age[20] and this made it especially desirable for the rulers of Qatna to outrival that building by pure dimensions. This building concept inevitably resulted in a high demand of building materials. Sun dried mud bricks, stones and wood were the most abundantly utilized materials. Stones were mainly restricted to parts of the foundation walls where big un-worked lime-stones and very few basalt-stones formed a bed for the mud brick foundation walls. Huge stone boulders were also used to erect the southern und eastern wall of the ante-chamber of the Royal Tombs. These lime-stones seem to have been quarried nearby on the calcareous ridges between the local wadis. Sun dried mud bricks were used in innumerable quantities. Both subterranean foundation walls and above-ground room walls were generally constructed of this material. It is an ecologically inoffensive and economically principally cheap material, which only needs a vast open area for cutting and drying the bricks in the sun. In the first instance, however, it needs an enormous labour force to produce and transport millions of bricks. In addition, huge quantities of straw and a constant supply of water are necessary. The third major building component is wood which is the most valuable of the utilised materials. As has been determined by Otto Cichocki from the Dendrolab of the Vienna Institute for Archaeological Science on the basis of

[16] Parrot 1958: 104.
[17] See Novák - Pfälzner 2000: 262-264.
[18] Parrot 1958: 111.
[19] See Klengel 2000: 243 ff.
[20] Compare, for example, a letter to Zimrilim, found at Mari, saying that a 'man' (most probably the King) of Ugarit had the desire to see the famous Palace of Mari; see Klengel 1992: 78.

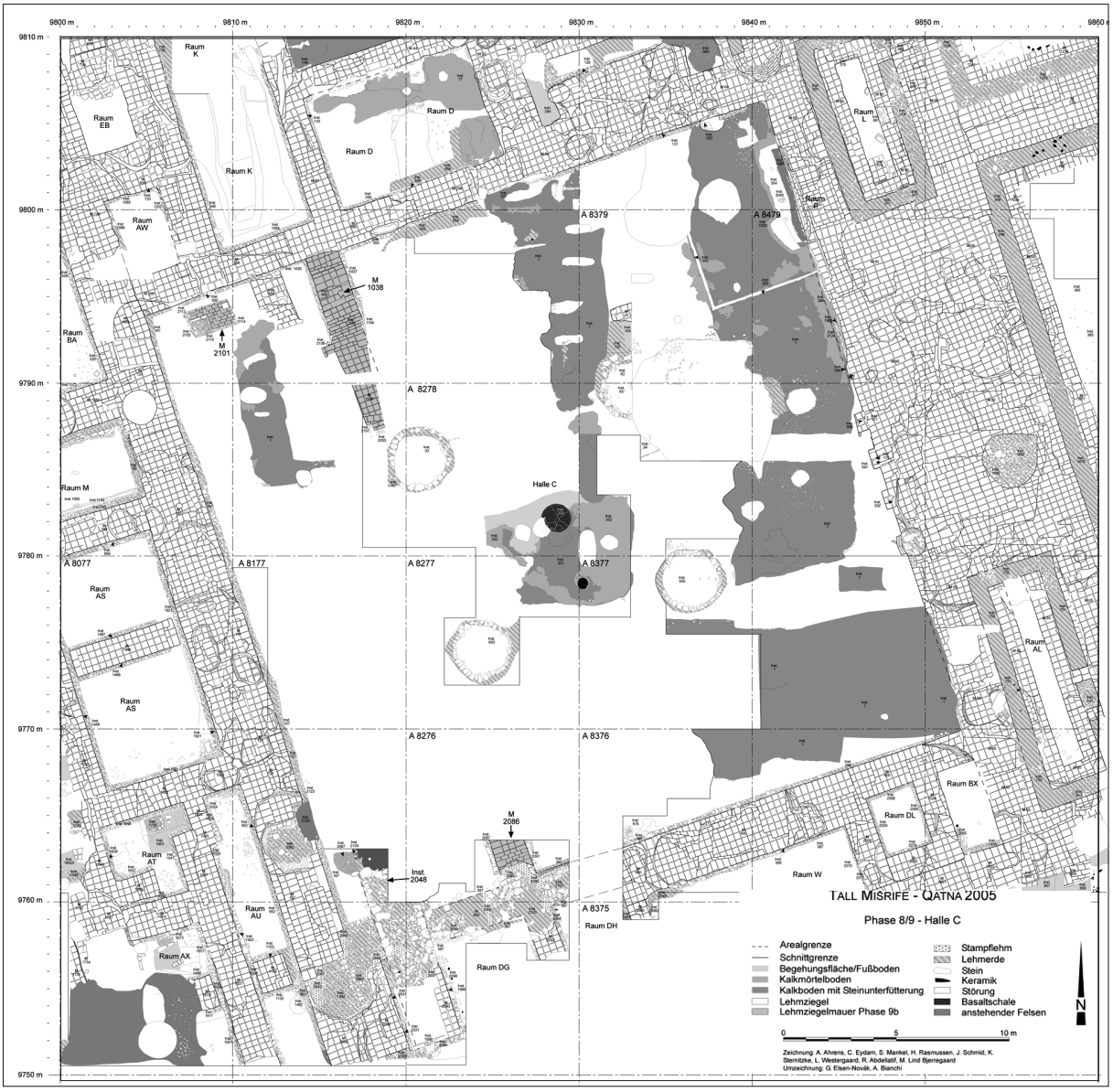


Fig. 5. Hall C: The foundations of the hall and the surrounding rooms on the basis of the excavations 1999-2005; foundations of the original planning phase (Phase 9b) are in grey and the modified foundation layout (Phase 9a) is in white.

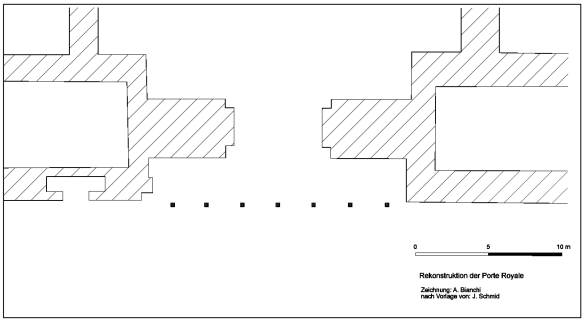


Fig. 6. Hall C: Schematic plan of the *Porte Royale* connecting Halls C and B as reconstructed by Jochen Schmid on the basis of the excavations by du Mesnil du Buisson 1924-1929 and the new excavations 1999-2005.

numerous samples from Operation G cedar was used as the nearly exclusive construction timber in the palace of Qatna. Cedar wood must have been brought to Qatna from the nearby Lebanon Mountains (distance approx. 80 kms) or the Syrian coastal mountains (an-Nusariyeh Range) (distance approx. 60 kms). These regions were definitely under control of the Qatna Kingdom, not only in the Middle Bronze Age but still in the Late Bronze Age, as is demonstrated by a 14th century BC legal document from the 'Archive of Idanda' mentioning King Adad-Nirari of Qatna as being in command of chariot-archers in the city of Tukad/t

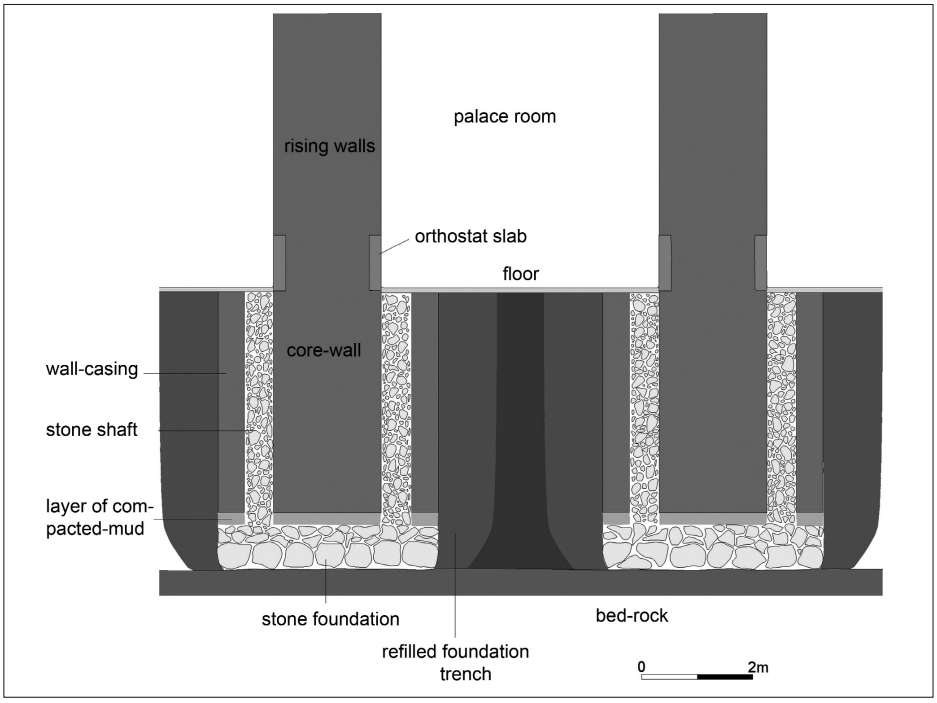


Fig. 7. The Royal Palace of Qatna: Schematic idealised section of a subterranean foundation wall of the palace with a 'couloir-type' stone alignment.

in the Lebanon Mountains[21]. Cedar wood was – most probably – used for the columns of Hall C and other rooms (Rooms X and O) and for the ceilings of most of the more than 80 palace rooms which caused quite a substantial demand of timber. The transport of cedar wood down from the mountains to Qatna on animals or animal-drawn chariots was a labour intensive effort.

In conclusion, the 'architectural ecology' – meaning the interconnection of architecture and ecology – of the palace construction was nearly exclusively based upon local or regional resources with extremely labour-intensive manufacture or procuration.

The foundation system of the Royal Palace was another contribution to ecology. Foundation trenches were dug through all levels of previous occupations at the site in the Early Bronze Age III and IV and the Middle Bronze Age I periods. This was done in order to base the palace directly on natural bedrock. While cultural reasons for this principle might not be excluded, it can be assumed that the crucial factor for this architectural decision was the fact that the building was located close to the edge of a steep natural cliff which falls sharply for more than 10 m to the Lower City. The depth of foundation trenches varies between 4 and 6 m depending on the level of the bedrock below the projected floor level of the palace[22]. A bed of stones served to protect the mud brick foundation walls from humidity contained in the soft, porous, calcareous bedrock (Fig. 7). The stone layer was covered by a thin layer of mud mortar and on this surface the foundations walls of mud bricks were erected. They were brought up to the level of the palace floors, where the barely thinner rising walls of the rooms were immediately superimposed on the foundation without any dividing layer. For this reason, the plan of foundation walls (Fig. 2) – which is the only structural part of the palace that survived through the times due to erosion, excavation and occupation – almost perfectly matches the outline of the former rising palace walls. The foundations were further protected against humidity by stone alignments along both faces of the foundation walls. They occur in different thicknesses. The broadest type, referred to by du Mesnil du Buisson as *Couloirs*[23], is 0.8 to 1 m wide. This type has an additional mud brick wall on the other side of the stones, so that the stones could be filled in between the foundation wall proper and the

[21] See Richter, this volume.

[22] See Novák 2006.

[23] Du Mesnil du Buisson 1926: 314-315, figs. 27-30, pl. LIX.1. Du Mesnil (*ibid.*) did not present a proposal for a possible function of the *couloirs*.

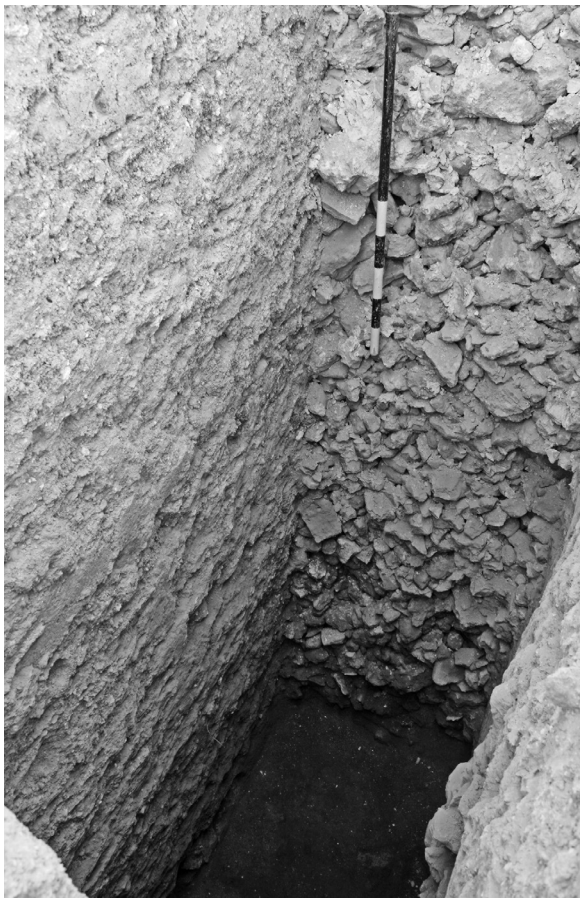


Fig. 8. Room Q: The southern subterranean foundation wall (left) of the room with a 'couloir-type' stone alignment (back) and a retaining wall (right).



Fig. 9. Room O: The northern mud brick foundation wall resting on a bed of large stones laid out on the natural bedrock, as well as a 'couloir-type' stone alignment of the western foundation wall of the room in section.

enclosing wall (Figs. 8 and 9). This technique prevented the lateral spread of soil humidity and thus protected the sides of the foundation walls from weakening through direct contact with wet soil[24]. This humidity protection system and the consequent bed-rock basing of the palace's substructures are another distinctive and innovative feature of the Royal Palace of Qatna unparalleled in other Ancient Near Eastern palaces. These characteristics give the building an outstanding significance in the history of Ancient Oriental architecture.

3. The chronology of the Royal Palace

Du Mesnil du Buisson had argued that the first phase of the building which he designated as *palais primitif* in connection with the *Temple de Nin-Egal* and the *Haut-Lieu* goes back to the end of the third or the beginning of the second millennium BC[25]. A second phase in which the palace was enlarged and the *Temple de Nin-Egal* was rearranged was dated by him to the mid-second millennium, at the turn of the Middle to the Late Bronze Age. The destruction of the palace was attributed by du Mesnil du Buisson to the Hittite king Shuppiluliuma I which was, according to general opinion in those days, placed towards 1380/1385. One of the main chronological results of the renewed excavations in the Royal Palace is that a distinction of two principal building phases of the palace is not valid. The second major outcome of the new research in chronological terms is that a destruction of the palace during the time of Shuppiluliuma I could be confirmed[26].

The intensive study of the foundations of the building clearly demonstrates that the palace was in its largest parts constructed at one point of time with an overall architectural concept (Fig. 10). Unlike the palaces of Mari[27] or Ugarit[28] which show a gradual extension and agglutination in several stages, the palace of Qatna is the product of

[24] A possible further effect of the stone aligments for draining water from the rooms towards a subterranean bed of stones, as proposed by Novák (2006), is regarded as highly improbable by the present author.

[25] Du Mesnil du Buisson 1935: 39.

[26] Novák - Pfälzner 2003; Novák 2004.

[27] Parrot 1958: 6; Margueron 1982: 370-380.

[28] Schaeffer 1962: 9-15. For a more recent critical evaluation of the building history see Margueron 2004: 145.

QATNA ROYAL PALACE CHRONOLOGY (OPERATION G)				
PHASE	**QATNA ROYAL PALACE BUILDING HISTORY**	**INTERREGIONAL PERIODISATION**	**REGIONAL PERIODISATION**	**TIME**
G 4 - 1	Modern activities on palace area			1850 – 2006 A.D.
G 6 - 5	Post-palace structures	Iron Age II	Neo-Syrian II	900 - 700 B.C.
G 7 a	Post-destruction palace use	Late Bronze II B – Iron Age I A	Middle-Syrian II - III	1340 – 1120 B.C.
G 7 b	Later palace use destruction level	Late Bronze II A	Middle Syrian I B	1400 – 1340 B.C.
G 7 c	Later palace use, northern terrace renovation	Late Bronze I	Middle-Syrian I A	1550 – 1400 B.C.
G 8a	Early palace use, Porte Royale renovation II	Middle Bronze II B	Old-Syrian II B	1700/ 1650 – 1550 B.C.
G 8b	Early palace use, Porte Royale renovation I			
G 8c	Early palace use, lime plaster floors			
G 9 a	Executed palace plan	Middle Bronze II A	Old-Syrian II A	1800 – 1700/ 1650 B.C.
G 9 b	Original palace plan			
G 10	Pre-palace structures	Middle Bronze I	Old-Syrian I	2000 – 1800 B.C.
G 11 - 13	Early Syrian settlement	Early Bronze III – IV B	Early Syrian III - IV	2500 – 2000 B.C.

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Fig. 10. Royal Palace of Qatna: Chronology of the construction and use of the palace as defined in Operation G.

consistent planning and contiguous execution. This construction phase is labelled Phase G 9[29]. The only clearly later addition with regards to the layout of rooms and the total built area is the southeastern annex, investigated by the Italian-Syrian team in Operation H[30]. This is dated to the Late Bronze Age (phase G/H 7).

The question of the date of the main construction phase (Phase G 9) was more difficult to answer due to the long use and continuity of the building. Therefore, the German team dedicated much effort to retrieving chronological indicators for the construction period. As a result of these studies, a construction date in the Middle Bronze II A period, most probably in the time of the Mari archives (eighteenth/seventeenth century BC)[31] can safely be attested. This conclusion is based on several independent arguments:

I. The intensive study and quantitative analysis of all ceramic assemblages retrieved from original fills of foundation trenches all over the building in Operation G always shows a mixture of Early Bronze and Middle Bronze Age materials. This is due to the fact that invasive digging work was carried out during the construction of the palace bringing up older material and mixing it with (then) contemporary material. Principally, it can be argued that the typologically youngest pottery in each assemblage is in date very close to the time of construction. This is based on the theoretical assumption that, inevitably, contemporary pottery fragments will always be a result of any human activity, as pottery was utilized (and broken) in nearly all aspects of human life during these periods. It could

[29] G stands for Operation G; level G 9 is contemporary with level H 9 in the Italian-Syrian Operation H (see Barro 2002: 112), because the sequences of the two areas have been correlated (cf. Novák - Pfälzner 2002b: 77, fig. 67).

[30] Barro 2003: 87; al-Maqdissi - Morandi Bonacossi 2005: 46-47.

[31] The duration of the Mari archives can be roughly dated to the time of 1750-1700 if the Lower Chronology is applied (or 1810-1760, if the Middle Chronology is used).

be observed that in all pottery assemblages from the foundation trenches there are generally few Early Bronze III sherds, but many Early Bronze IV, Middle Bronze I and Middle Bronze II sherds. In some of the pottery lots MB I sherds together with MB II sherds are dominant, while in others there is a preponderance of Early Bronze IV combined with Middle Bronze II material. But not one Late Bronze Age pottery specimen has been found in the innumerable foundation trenches excavated in the wide-stretched area of Operation G in the palace. Therefore, a construction of the palace during the Late Bronze Age can virtually be excluded (except for minor repair works)[32]. The construction of the palace has to be dated to the Middle Bronze II period.

II. The foundation trenches of the palace cut through older occupation levels. These are nearly always settlement levels of the Early Bronze IV period, superimposing Early Bronze III accumulations. At some restricted places the Early Bronze IV levels are themselves superimposed by Middle Bronze Age I accumulations, either as single walls[33], as graves[34] or as storage pits[35]. No Middle Bronze Age II depositions could be observed that had been cut by the construction activities of the palace builders or were covered by palace structures. This proves that building activities for the palace must have began rather early in the Middle Bronze Age II period, before any other substantial building work was carried out on the same place during this period.

III. Occupational depositions on palace floors from its early period of use are non existent. This is due to the continual reuse of the building over a long period of time up to the second half of the fourteenth century BC An occupation floor of the Middle Bronze II period could be identified at only one place. It is an outside floor abutting the western face of the western outer wall of the palace (Area BW)[36]. In the deposit on this floor pottery, terracotta figurines and seal impressions were recovered which in their totality date to the Middle Bronze II period or older. The pottery repertoire includes significant Middle Bronze II types and some earlier sherds (Fig. 11)[37]. This proves that the Royal Palace must have already existed and been in use during this time in the Middle Bronze Age II period when this floor was used.

IV. The typological similarities of the plan of the Royal Palace of Qatna and the Palace of Zimrilim at Mari (Fig. 12) are so striking that a close temporal relation must have existed. This resemblance is based on the arrangement and relational dimensions of the central representative unit. The tripartite central unit consists of three successive spacious areas – Halls C, B, and A at Qatna, and Court 106, Hall 64, and Hall 65 at Mari. The first, square unit – at Qatna a covered hall (C), at Mari an open courtyard (106) – is connected to a broad rectangular hall (B at Qatna, 64 at Mari) through a wide representational gateway located in the middle axis of both rooms. Behind the second hall is another, even larger broad rectangular hall (A at Qatna, 65 at Mari), which is, however, not accessible through a door in the same axis, but through two doors at the upper and lower end of the long dividing wall between the two rooms. The analogy between the two buildings even goes so far as to concern the interior arrangement of the third hall. It is equipped at both places in a virtually identical way with two square narrow platforms arranged in the middle axis of the long side of the room. Such close parallels are not explainable except by assuming that the one building served as a model for the second building. But which of the two is the older building? As the Qatna palace outmatches nearly all dimensions of the central representative unit at Mari it can be argued that it was built later than Mari. It becomes obvious that one did not just want to duplicate but to surpass the Mari central unit by room dimensions as a result of a status-oriented goal of the building programme at Qatna. This principle was only effective if one accepts the temporal posteriority of Qatna. As the Mari palace, on the other hand, was destroyed by Hammurabi in 1695 according to the Lower Chronology (or in 1759, according to the Middle

[32] See a differing opinion by al-Maqdissi (2003b) proposing a date in the Late Bronze Age. Morandi Bonacossi (in: al-Maqdissi - Morandi Bonacossi 2005: 23, 45; Morandi Bonacossi - Eidem 2006: 43, 53; Morandi Bonacossi 2007; Barro 2003: 92) suggests a date for the palace construction at the end of the MB II or the beginning of the LB I period, which seems, based on stratigraphical and historical considerations, to be rather improbable to the present author.

[33] Below Room M and Room BL (Operation G); see Novák - Pfälzner 2005, 62-63, fig. 4.

[34] Below Room O (Operation G) and in the area of Operation H (see al-Maqdissi - Morandi Bonacossi 2005: 22).

[35] Below Hall C (Operation G).

[36] Novák - Pfälzner 2005: 72-74, figs. 13-14.

[37] Paoletti 2005: 79-89, figs. 1-5.

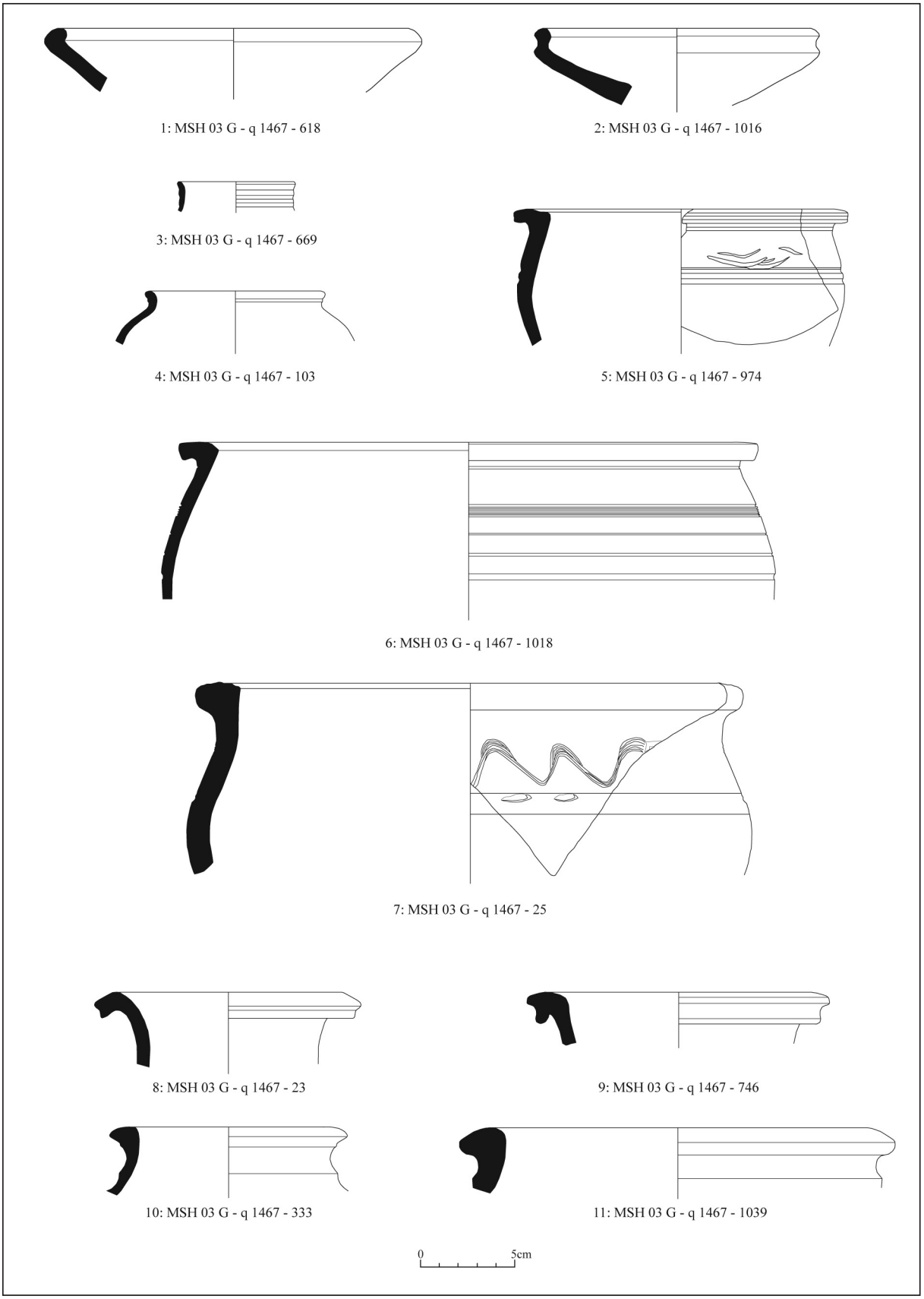


Fig. 11. Area BW: Middle Bronze Age pottery deposited on a Phase G 8 occupation floor at the western side of the palace south of the ramp.

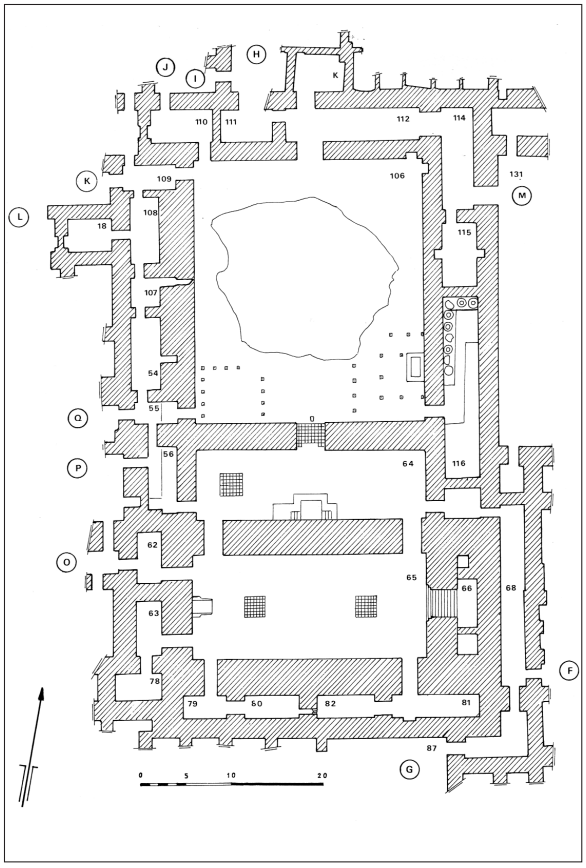


Fig. 12. The Royal Palace of Mari: Plan of the central representative unit with Courtyard 106 and Rooms 64 and 65 (after Margueron 1982).

Chronology)[38] the visual contemplation of its architecture was not possible anymore thereafter, which is a *terminus ante quem* for the Royal Palace of Qatna. For this reason, the planning and construction start for the Qatna Palace should be dated to before 1695. Thus, the building process has to be attributed to the Middle Bronze II A period.

V. As has been argued above the construction of the Royal Palace of Qatna was an extremely labour intensive effort which needed a determined mobilisation of resources and human labour. Such mobilisation requires a strong and powerful central authority. The most plausible period for the existence of such determined and effective authority is the time of the powerful rulers Ishkhi-Addu (ca. 1750-1730)[39] and Amut-pi´el of Qatna (ca. 1720-1700)[40], contemporaries of Shamshi-Addu of Assur and Yasmah-Addu, and later on Zimrilim of Mari and Hammurabi. In this time Qatna reached its greatest power as a super-regional force in Syria, a rival of Aleppo/Yamkhad and playing an international role on the same level as Mari and Assur[41]. This is exactly the period when such an immense building project could be initiated and shouldered. In addition, the clear intention to out-rule Mari symbolically, so visible in the Qatna Palace, hint at a point of time when Qatna was in direct contact (and competition) with Mari, which is the Shamshi-Addu period. These considerations narrow the construction period for the Royal Palace of Qatna down to the time of Ishkhi-Addu and Amut-pi´el and their immediate successors (eighteenth-seventeenth century BC).

Having established a date for the planning and execution of the ambitious building project principally in the Middle Bronze II A period, further stratigraphical analysis throws light on the duration and operational sequence of construction. The construction phase G 9 can be subdivided into two clearly distinguishable successive stages. The first phase, G 9b, is characterized by the creation of the general layout of most of the foundations including the northern boundary wall. In a second stage (Phase G 9a) modifications of the foundations were made, which are most articulated in the abandonment of some of the already erected foundation walls: in Hall C, in Rooms BM and BH, and with regard to parts of the northern boundary wall. New foundation walls with different room dimensions replace these abandoned foundations (Fig. 13). The western limit of the palace is removed further to the west by the addition of a new line of foundations. Hall C is transferred at this stage from a projected rectangular courtyard into a square, roofed hall with internal columns. The corridor leading to the Royal Tombs is inserted in Phase G 9a and the Royal Tombs are added to the

[38] See Charpin - Ziegler 2003: 242-246, 262.

[39] Rough estimation for the reign of Ishkhi-Addu referig to his contemporaries Shamshi-Addu and Yasmakh-Addu (compare Charpin - Ziegler 2003) on the basis of the (more probable) Lower Chronology; if the Middle Chronologie would be applied, the approximate dates for Ishkhi-Addu would be 1810-1790.

[40] Rough estimation for the reign of Amut-pi´el refering to his contemporaries Zimrilim and Hammurabi (compare Charpin - Ziegler 2003) including the rest of the reign of Shamshi-Addu on the basis of the (more probable) Lower Chronology; if the Middle Chronologie would be applied, the approximate dates for Amut-pi´el would be 1780-1760.

[41] Klengel 2000: 241-247; Charpin - Ziegler 2003: 86 ff.



Fig. 13. Unfinished foundation walls of Phase G 9b below Courtyard BM surrounded by the Phase G 9a foundations of BM.

plan. The large room or courtyard BM is erected replacing a line of projected smaller rooms.
The modifications were already carried out at a point when the foundations had not yet been finished (Fig. 14). There was, furthermore, no pause in the construction process before and during the execution of the modifications of foundations. This is visible in the way the foundations were left unfinished in the middle of their construction process with bricks that had been laid freshly – and that were not yet fixed in the wall by completely dried mortar – being removed for reuse in the new foundation walls. Additionally, the unfinished foundations show no traces of erosion indicating that the new foundations were quickly built on the older ones and the foundations trenches were immediately backfilled thereafter[42]. Thus, both constructions stages G 9b and 9a are close to each other in time within the Middle Bronze II A period.
How long this building process lasted in total is difficult to estimate. One can easily imagine that this could have taken 50 to 100 years taking the immense dimensions of the building and the huge quantities of building materials into account. This assumption is supported by the discovery of a small cooking installation within the foundations of Room AT indicating that the workmen probably lived in the building under construction for a while.
Phase G 8 is the first phase of actual use of the finished building. It spans the time from the

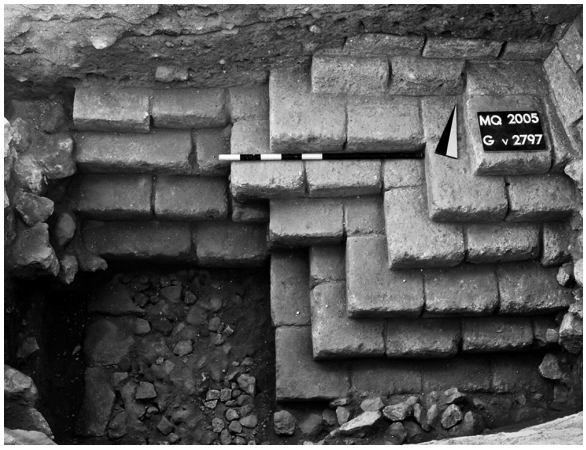


Fig. 14. Unfinished foundation wall of Phase G 9b below Hall C.

advanced Middle Bronze II A (ca. 1750-1700) to the MB II B period (ca. 1700-1550 B.C). Except for the deposition on the outside floor in Area BW, mentioned above, no accumulation of materials from this period has been preserved due to an uninterrupted use of floors in subsequent periods connected with intensive cleaning. It can be assumed, however, that the very carefully installed and extremely hard and stable lime plaster floors that are partially preserved until today are part of the original outfit of the finished palace and therefore date to this phase G 8. Minor reparation activ-

[42] Novák - Pfälzner 2005: 66-67, fig. 7.

ities can be attributed to this time. Most remarkable among this is a renovation trench along the eastern wall of Hall C. It was dug in order to remove the existing standard stone alignment along this foundation wall in order to replace it with mud brick postholes for the seven wooden posts in front of the *Porte Royale* (see above)[43]. This renovation trench was reopened a second time for another purpose, probably for removing the posts again (Fig. 10). The fill of this trench contains Middle Bronze Age II pottery and fragments of a door sealing with the impression of the seal of Ishkhi-Addu[44]. The fragmented door sealing, of which 16 pieces were found at this place, seems to have been freshly broken at the time when the renovation work was carried out. This points to the possibility that the trench was dug and refilled in the time of Ishkhi-Addu (Middle Bronze II A), but it is also possible that the seal was still in use under his successors, so that this incident could have happened later, but no later than the Middle Bronze II B period, because the door sealing fragments were exclusively associated with Middle Bronze II (and earlier) pottery sherds in the fill of the renovation trench[45]. For this reason, the two discernable stages of the renovation trench define the two sub-phases 8b and 8a of Phase G 8, while the original installation of the palace floor (which was cut by the two renovation trenches and twice repaired) is attributed to an initial sub-phase 8c.

Phase G 7 reflects the Late Bronze Age use of the palace. The division into 3 sub-phases has to be tentative. The oldest one, Phase G 7c, is preliminarily defined on the basis of only very restricted ceramic evidence coming from a secondary terracing wall north of the northern boundary wall of the palace. This phase is dated to the Late Bronze I period, for which the term 'Middle-Syrian I A' is to be introduced here[46].

Phase G 7b provides the most abundant material from the Royal Palace of Qatna, recovered in nearly all undisturbed contexts of the building: in the palace well, the corridor of the tomb complex, and in the Royal Tombs, in Room G (*Salle des Jarres*), in the cellar-room Room DK (see below), and in many contexts already excavated by du Mesnil du Buisson, especially in the *Temple de Nin-Egal* (Hall C). It represents the palace-inventory which was demolished and left behind by the invaders at the time of the palace's destruction. Well preserved pottery is associated with ashes, burnt wood and mud brick collapse indicating the violent demolition of the palace. This event can be attributed to the time of the Hittite ruler Shuppiluliuma I. Du Mesnil du Buisson[47] had already tentatively established this chronological correlation in 1935 but this opinion had to be regarded with scepticism due to the lack of direct archaeological evidence. Now, after the discovery in 2002 of the cuneiform tablets of the chancellery of King Idanda (or Idadda) within the destruction debris of Corridor AK this assumption could finally be proven. The texts clearly refer to the wars of King Shuppililiuma I in Syria and were obviously sent to Qatna shortly before the destruction of the palace[48]. They were kept together with other contemporary documents in what must have been the royal chancellery for ongoing, 'daily' correspondence and procedures of the time – as Richter[49] convincingly argues. They thus constitute a perfect and precise dating device for the destruction debris in which they are embedded. Having thus assigned the date of destruction to the time of Shuppiluliuma I (ca. 1355-1320)[50], henceforth there can be a discussion on whether Shuppiluliuma himself – as Pfälzner argues[51] – or enemies of the Hittites – as Richter is convinced[52] – were responsible for the fatal attack on the Royal Palace of Qatna. It has to be pointed out that this does not mean that the whole city was destroyed in this event, because until now no comparable destruction debris was found in other contemporary buildings on Tell Mishrifeh[53]. However, the political importance of Late Bronze Age Qatna must have come to an end with this destruction of the governmental seat of the Qatna kingdom.

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43 See Novák - Pfälzner 2002: 216-217, fig. 6; Dohmann-Pfälzner - Pfälzner 2006: 145-149, fig. 13.

44 This seal was first identified by Morandi Bonacossi - Eidem 2006 on the basis of impressions of the same seal found in Operation H; for the impressions of the Ishkhi-Addu seal found in Operation G, see Elsen-Novák 2002: 258-261, fig. 2; Dohmann-Pfälzner - Pfälzner 2006: fig. 11.

45 The pottery is presented in: Dohmann-Pfälzner - Pfälzner 2006: fig. 10.

46 Following a chronological scheme proposed by Pfälzner (in press) in the second volume of «Céramique de l'âge du bronze en Syrie».

47 Du Mesnil du Buisson 1935: 33-34.

48 See argumentation by Richter 2002: 612; *id.* 2003: 178-180.

49 Richter 2003: 168-171.

50 Dates following Starke 2002: 314.

51 Pfälzner, «Qatna, The Hittites and Egypt: a new controversy», lecture presented at London on 14 July 2005.

52 Richter 2002: 612 ff.

53 See, for example, the large monumental Late Bronze Age building in Operation C (al-Maqdissi 2003a: 235-236).

ABSOLUTE DATE (B.C.)	PERIOD	WEST-SYRIA PERIODISATION	Nebi Mend	Afis	Amuq	Qatna	JAZIRAH PERIODISATION	JAZIRAH CERAMIC TRADITION
1550 – 1500	LB I A	Middle-Syrian I A	F	E 14	Alalakh V - III	G 7c (Tombeau II)	Middle-Jazirah I A	Early Mittani pottery tradition
1500 – 1400	LB I B		E					
1400 – 1340	LB II A	Middle-Syrian I B	D		Alalakh II	G 7b (destruction 1340 B.C.)	Middle-Jazirah I B	Late Mittani pottery tradition
1340 – 1270		Middle-Syrian II A	C			G 7a (Area BU)		
1270 – 1200	LB II B	Middle-Syrian II B	B A	E 10 E 9c	Alalakh I		Middle-Jazirah II A	Middle Assyrian pottery tradition, phase mA I
1200 – 1120	Iron I A	Middle-Syrian III		E 9 b E 9 a			Middle-Jazirah II B	Middle Assyrian pottery tradition, phase mA II
1120 – 1050	Iron I B						Middle-Jazirah III	Terminal Middle Assyrian pottery tradition, phase mA III

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Fig. 15. A new proposal for a terminology of the chronology of Late Bronze Age Western Syria, with a comparative correlation of the Middle-Syrian phases of the Royal Palace of Qatna.

Few traces are available in the palace of a post-destruction-reuse of the building during the Late Bronze Age. This phase, provisionally labelled phase G 7a, is characterized by pottery which seems to date to the period Middle-Syrian II (1340-1200 BC), or even Middle-Syrian III (1200-1120 BC). This periods correspond to the Late Bronze Age II A (1340-1270 B.C), the Late Bronze Age II B (1270-1200 BC) and the Iron Age I A (1200-1120 BC) (Fig. 15). More material from these deposits has still to be retrieved before deeper insights into this latest use of the palace can be attained.

The area of the palace is transformed into a sector of houses, domestic installations, storage pits, and handicraft installations in Iron Age II (900-700 BC) (Phases G 6-5)[54]. These structures cut – with very few exceptions – into the walls, floors and foundations of the ruined Bronze Age palace. This clearly indicates that both architecture and function of this area had radically changed.

4. The functional reconstruction of the Royal Palace

The basic problem for the functional reconstruction of the Royal Palace of Qatna is the fact that only foundations and floors survived, while rising walls, doors, installations, and inventories have largely been lost. Exceptions can be found in inventories preserved in subterranean rooms such as Corridor AQ, the Palace Well (Room U), and the Royal Tombs, in addition to contexts that had been recorded by du Mesnil du Buisson. Furthermore, most of the rising walls and doors that had still been observed by the Count in the 1920s were destroyed after 1929, when the remaining structures of the palace were torn down by the inhabitants of the modern village in order to construct new houses on the abandoned excavation field.

Based on the plan of the foundations (Fig. 2) and using additional information from the documented features of the old excavations, combined with a thorough study and re-analysis during and after the new excavations, a reconstructed floor plan of the Royal Palace of Qatna can be compiled (Fig. 16). It combines the foundations and features exposed in the German-Syrian Operation G (areas to the west and north-west of Hall A), the Italian-Syrian Operation H (northern part of Hall A and area to the east, south-east and north-east), and the Syrian Operation R (southern half of Hall A).

The main entrance to the palace was most probably from the west. Here, a platform-like accumulation of hard compacted mud (*pisé*) with surfaces sloping slightly to the west might have served as an access ramp from the lower ground west of the palace. This ramp is inserted between two very thick walls forming the western border of the palace. These walls were set against a much thin-

[54] Well attested in Operations G (Novák - Pfälzner 2002b: 92-93) and H (Barro 2002: 119-122; *id.* 2003: 92-94), as well as in du Mesnil's excavations (du Mesnil du Buisson 1935: 123-132).

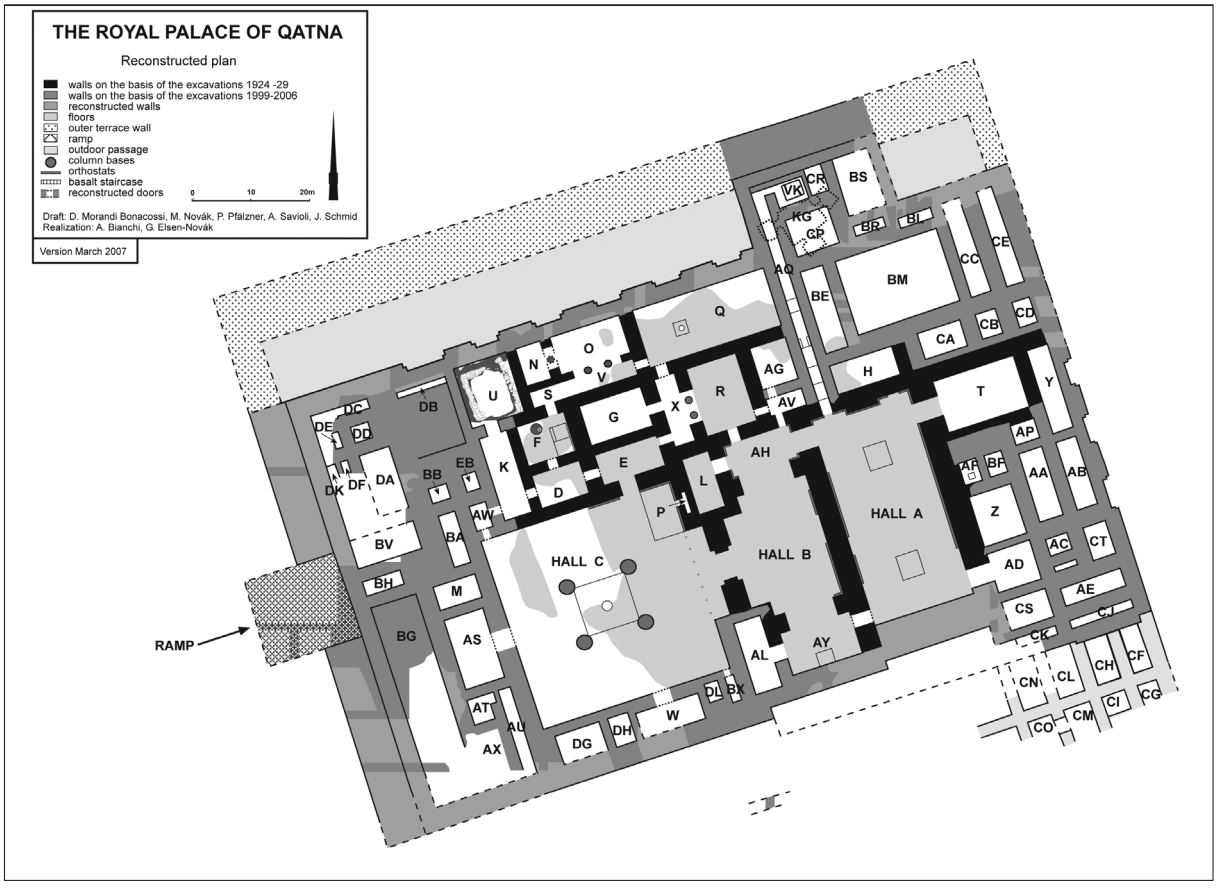


Fig. 16. The Royal Palace of Qatna: reconstructed floor plan (version of march 2007) based on the results of excavations in Operation G (after P. Pfälzner, M. Novák, J. Schmid), Operation H (after D. Morandi Bonacossi, A. Savioli) and Operation R (after M. al-Maqdissi), as well as on the plan by du Mesnil du Buisson (1935, Pl. XVI).

ner but obviously continuous, long wall that constitutes the western border of the westernmost row of rooms of the palace. The possible entrance, not directly traceable due to the fact that only foundations of walls survived, would have reached the palace through the small Room BH. Its orientation, which is perpendicular to the assumed entrance, and its minor size, however, still remain to be explained. There must have been a way leading from Room BH to Room AS, which is situated in front of Hall C, but the passages between the rooms are unclear. Room AS has its middle axis in line with that of the Hall C and must have, therefore, served as an ante-room to Hall C. A wide doorway – similar to the one leading from the north into Court 106 in the Mari palace – can be reconstructed between Room AS and Hall C because the foundation wall between the two rooms is broadened. This entrance would lie on exactly the same axis as the *Porte Royale* on the opposite side of Hall C and would have allowed a large number of people to enter into the hall.

Hall C, with its four columns in the center (see above), is interpreted as the main audience and assembly hall of the palace. This is based on the fact that it is the largest room of the building and that a great effort has been undertaken in order to close it from the open air (Phase G 9a; see above). The room, although being square in shape, is dominantly oriented along the east-western axis which is defined by the (assumed) entrance door from Room AS, the axis between two pairs of columns, the basalt basin in the centre of the hall, and the *Porte Royale* on the east side of the hall giving access into Hall B.

The mentioned basalt basin, 1.75 m in diameter and 45 cm deep, was interpreted by du Mesnil du Buisson as a *Lac sacré* for holy water[55]. A use for water or other liquids, however, can be excluded due to the lack of an outlet of this immobile instal-

[55] Du Mesnil du Buisson 1935: 75-77.



Fig. 17. Hall C: Basalt basin in the center of the hall which was presumably used as a coal basin within a rectangular fire place.



Fig. 18. Hall C: The enclosed area in the north-eastern corner of the hall in front of Room P, which is identified as a sanctuary for Belet-ekallim.

lation. In contrast, it can more convincingly be reconstructed as having been used as a coal bassin of a huge rectangular fire place between the four central columns of the hall (Fig. 17). The fire place consists of a lime mortar plastered platform 11 by 10 m in size and elevated only some 10 cm above the surrounding floor of Hall C. The platform is slightly sloping towards the basalt basin perfectly inserted at its centre with its rim not sticking up into the surface of the platform. The coal could thus have been collected and contained in this central part of the installation. It is a gigantic version of a common hearth type known in Syria since the Early Bronze Age consisting of a flat extended platform with a depression in its centre arranged in the middle of a room[56]. This arrangement of a four columned hall with a monumental hearth in the middle is strongly reminiscent of the interior arrangement of Mycenaean megarons in the Aegean, like in the palaces of Tiryns or, most notably, of Pylos with its monumental round hearth surrounded by four columns[57]. The preserved examples in the west date to the Late Bronze Age, as in the case of Pylos which is attributed to the late Helladic III A period (around 1300 BC)[58]. As the example from Qatna shows, this type of interior arrangement is much older in the Near East. Here, the four-column arrangement can clearly be dated to the Middle Bronze Age II period (building phase G 9a) proving that this type originated in the East and was developed for representative palace architecture.

In the northeastern corner of Hall C a small door leads into the tiny Room P (the *Saint des Saints* of du Mesnil du Buisson) which can be identified as a palace sanctuary for the goddess Belet-Ekallim[59]. A rectangular area in front of Room P which fills out the northeastern corner of Hall C was enclosed, on the two sides facing the interior of the hall, by a narrow gap in the floor where, most probably, there used to be a wooden threshold (Fig. 18). This delineation by a flat threshold visually and symbolically separated the area in front of Room P, the probable sanctuary of Belet-Ekallim, from the rest of Hall C. It thus might have formed a kind of demarcation line between the political space of Hall C and the sacred realm of the palace chapel. Within the chapel (Room P) precious objects and the inventory texts of the Belet-Ekallim sanctuary must have been kept which du Mesnil du Buisson found scattered on the floor within the enclosure in front of Room P[60].

Just beside the holy enclosure a wide doorway leads into Room E (du Mesnil's *Salle de l'Anneau*). This room seems to have served as a distribution point for the circulation in the northern part of the palace. From here, access was gained through Room D to Room F, the famous *Haut-Lieu* of du Mesnil du Buisson[61]. Based on his discovery of internal enclosures, wood remains and what he thought to be altars and an ablution basin he inter-

[56] Compare Pfälzner 2001: 149-153; Dohmann-Pfälzner - Pfälzner 2002: 6, pl. 1 b.
[57] Buchholz - Karegeorghis 1971: figs. 122, 123a; Preziosi - Hitchcock 1999: 156, fig. 97
[58] Preziosi - Hitchcock 1999: 156.
[59] Novák - Pfälzner 2002a: 216, footnote 20.
[60] Du Mesnil du Buisson 1928: 9 ff., pl. VII.
[61] Du Mesnil du Buisson 1935: 97-111.

preted this room as a sanctuary for Ashera and for a cult of betyls. In contrast to du Mesnil's ideas the re-excavation and re-study of Room F led to the conclusion that it probably served as a bathroom[62]. The 'betyls' turned out to consist of baked bricks and probably functioned as bases for a bench or even a toilet. What he assumed to be the 'hole of the tree of Ashera' can be explained as a drainage pit for waste water, and the so-called 'ablution basin' might have functioned as a bath tub (Fig. 19). The direct proximity of Room F to the palace well (Room U) supports this functional reconstruction, as it would have assured a direct and easy supply of fresh water for the bathroom.

The well house (Room U) was accessible through the elongated Corridor K. which could have housed either a wooden staircase or a mud ramp. This is indicated by the remains of the threshold of a door found at the northern end of Room K at a level much deeper than the surrounding rooms, forming a subterranean entrance into the well house. From here, a connection – perhaps in the form of a destroyed wooden gallery – must have existed to reach the southeastern corner of the well house, where the stone staircase began that was leading down into the shaft of the well (see below).

The well house was thus firmly incorporated into the functional and architectural structure of the palace and must have been the only water supply for the whole building. Room AW probably directly connected the well house through Corridor K with Hall C, thus ensuring direct water supply ways for the activities in this hall. To the west of this area, beyond a vast, so far unexplainable platform of mud bricks, several smaller rooms (DK, DF, DE, DD, DC) are located which have subterranean floors but no direct accessibility through a door or staircase. They were filled with Phase G 7b (Late Bronze Age II A) destruction debris indicating that they had been in use as subterranean rooms until the last phase of the palace. They were probably accessible by removable ladders and can be interpreted as cellar-like store rooms. The debris in these rooms, which definitely had fallen down from the ground floor of the palace, contained masses of flat bowls and large quantities of animal bones. This hints at the possibility, that the northwestern quarter of the palace was a kitchen area.

From Room E north of Hall C not only the northwestern sector of the palace was accessible but also

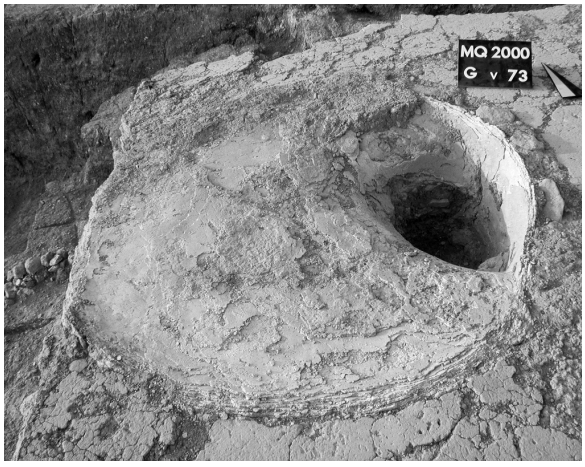


Fig. 19. Room F: Lime plastered water basin identified as a bath tub.

a network of functionally diverse rooms to the north and the north-east. Room G (the so-called *Salle des Jarres* of du Mesnil du Buisson) still contained abundant remains of large-sized storage vessels when it was archaeologically excavated for a second time in 2000 after their first exposure by the French excavator (Fig. 20). They definitively prove the exclusive function of this room as a high-capacity storage room. As it is surrounded on all sides by non-storage areas it can be regarded as an isolated place for the storage of specific items, for example particularly precious or rare wares, or of goods which were consumed in large quantities during the receptions in the nearby central representative unit of the palace. Room G can, therefore, be designated as a special-purpose storage area.

Room R seems to have been an open courtyard, which is important to mention, since there is a striking rareness of courtyards in the Royal Palace of Qatna. Only two other courtyards (Rooms O and BM; see below) are tentatively designated as such. Hence, the limited number and sizes of courtyards can be regarded as a characteristic feature of the architectural and functional structure of the Royal Palace. Courtyard R has the most central position of the (possibly) existing courtyards. A wide opening in the western wall with two columns, the remains of which were still observed by du Mesnil du Buisson[63], fulfilled the task of

[62] Novák - Pfälzner 2001: 174-176; Novák - Pfälzner 2002b: 85-86.

[63] Du Mesnil du Buisson 1928: 15, pl. IV.1bis (base 3); *id.* 1935: pl. XVI.

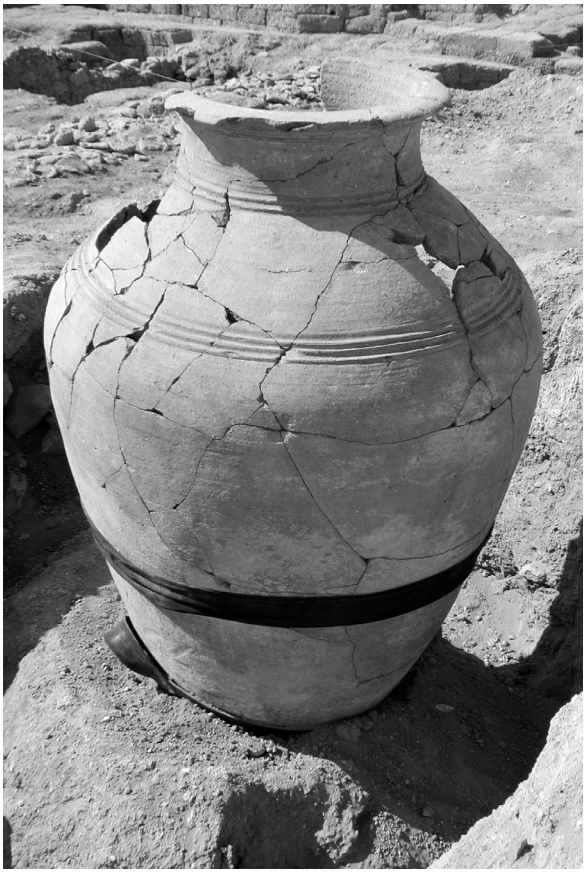


Fig. 20. Room G: Storage jar inserted into the clay floor of the room.

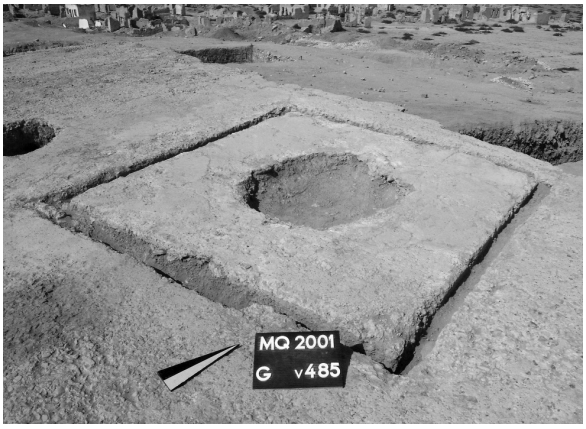


Fig. 21. Room Q: Lime mortar floor with remains of a hearth consisting of a rectangular enclosure and a central round basalt basin which was robbed after 1929.

bringing light into Room X and from there into the adjoining rooms. Furthermore, the 'two-column court façade' is a prominent architectural feature for Syrian palace architecture in the second millennium B.C While several examples in the palaces of Ugarit[64] and Ibn Hani[65] are Late Bronze Age in date, this distinctive feature is already known from the Middle Bronze Age Palace Q at Ebla[66] and, slightly modified with four columns, from the Level VII palace at Alalakh[67]. Clearly, the 'two-column court façade' being very popular in the Late Bronze Age was developed in the Middle Bronze Age in Syria, for which the example of Room X at Qatna is another piece of evidence.

Room X thus was a porticus-type of semi-open room giving access to Hall C through Room E, to the special-purpose storage room G, and to the large Hall Q in the north. This hall is characterised by a markedly higher floor level compared to the rooms south of it. It is equipped with an extremely hard lime mortar floor containing a high amount of pebbles and, most strikingly, with a rectangular installation in the middle axis of the room. The latter consisted of a round, shallow basalt basin in its centre, nowadays lost but documented by du Mesnil du Buisson[68]. This is surrounded on four sides by a rectangular cut in the lime floor (Fig. 21). A low threshold of wood or baked bricks must once have been inserted in this cut in order to separate the inside of the installation from the surrounding floor of the room. In analogy to the much larger, but principally similar installation in Hall C this arrangement is identified as a hearth. The fire place was contained inside the low enclosure, while the coal was collected and contained in the basalt basin in the middle. With regard to the elongated shape and the symmetry of the rooms a second similar hearth can be reconstructed in the eastern half of the room situated, as the first one, on the east-western middle axis of the room. The fact that one room contained two hearthes indicated that this room might have been used for gatherings and receptions, in a more private atmosphere than in the huge Audience Hall C. This is based on the assumption that hearths in general constitute both a social focus and a warm sitting place throughout Ancient Near Eastern societies[69]. This functional interpretation coincides with the slightly elevated floor level of Room Q. Its position

64 Margueron 2004: 144, 147.
65 Bounni - Lagarce 2004: 57.
66 Matthiae - Pinnock - Scandone Matthiae 1995: 176.
67 Woolley 1955: 100, fig. 37.
68 Du Mesnil du Buisson 1928: 16, fig. 9, Pls. XI.6, XV.1 (*pierre* 15).
69 Pfälzner 2001: 149-150.

at the northern edge of the palace terrace (from where one nowadays has a spectacular view over the Lower City, the northern city gate, and the surrounding landscape) possibly indicates a function as representative surveillance point of the city and its environment, which might have added to the importance of the room. However, this idea is purely hypothetical.

Access was most probably gained from Room Q to Corridor V/S linking Rooms Q and F. This corridor opened towards what was probably a small courtyard (O) within the northern row of rooms. On the basis of information given by du Mesnil du Buisson it is possible to reconstruct another façade with two columns in this courtyard, situated on the south side of the room and oriented towards Corridor V. A floor drawing by du Mesnil du Buisson[70] indicates two column bases (*bases 1 et 2*), both displaced by the inhabitants but originally aligned along the south wall of Courtyard O (*Salle de l'Escalier*)[71]. A further strong piece of evidence for the reconstruction of a wide door with columns is the fact that the lime mortar floor of Room S extends nearly as far north as the southern border of the *couloir* within Courtyard O[72]. This proves that there could not have been a dividing wall between Rooms V and O here, close to the columns. Two meters to the east a rectangular recess of the same floor indicates the place where the wide opening ended and the bordering wall started. This open colonnade is the main argument for the identification of Room O as an open courtyard because colonnades fulfil the function to light up the adjoining rooms[73]. Whether there was another wide opening with a single column from Courtyard O to Room N in the west is mere speculation.

Room N was originally decorated with wall paintings in Aegean style dating to the Late Bronze Age I or II A period[74]. The reconstructable scenes show a miniature landscape with palm trees, rocks and grass encompassed in trapezoid panels bordered by spiral and other friezes. A water landscape with turtles, fishes and a crab is represented in another scene[75] (Fig. 22). Constance von Rüden suggested to reconstruct the paintings as having been attached to the western and southern walls of Room N. As the room is situated immediately to the east of the palace well (see below) a symbolic connection of the water and garden scenes depicted on the drawings and the actual water source might have existed. Presumably, this points to a cultic function of Room N.



Fig. 22. Room N: Fragment of a wall painting showing two turtles; discovered in the debris of the well-shaft (Room U) but originating from Room N.

This idea is supported further by the fact that an important religious figurine seems to have been found close by. It is the famous bronze figurine of a seated deity, now kept at the Louvre[76] (Fig. 23).

[70] Du Mesnil du Buisson 1928: pl. II.

[71] *Id.* 1928: 15, Pls. II; IV.1bis; *id.* 1935: 96, Pls. XVII3; XXII.7.

[72] *Id.* 1928, pl. II.

[73] The 'staircase' mentioned by du Mesnil du Buisson as being located in the southeastern corner of Room O (1935, 97, pl. XVI), which was the reason for naming the room *Salle de l'Escalier*, could not be found again during the new excavations. On the basis of du Mesnil's description one can assume that it was as a sub-floor staircase which must have been covered by the floor of the room later on and no longer have been visible during the use of the palace. In analogy to simlar features detected in other parts of the palace (Hall C) during the new excavations, the 'staircase' could either have been used as a service staircase only during the construction time of the palace or it constitutes the rest of an abandoned stepped foundation wall belonging to the first planning phase G 9b of the palace.

[74] See unpublished PhD. thesis of 2006 by Constance von Rüden, «Die Wandmalereien von Tall Mišrife/Qatna im Kontext interregionaler Kommunikation».

[75] Preliminarily published in Novák - Pfälzner 2001: 183-184; *id.* 2002a: 226-231; *id.* 2002b: 95.

[76] Orthmann 1975: pl. 399.

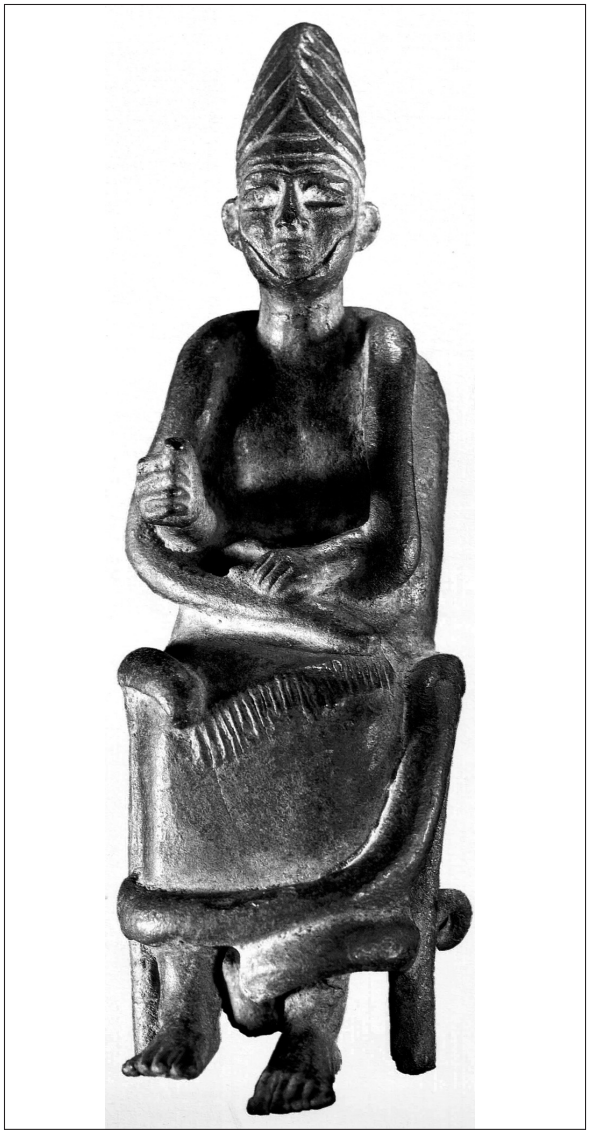


Fig. 23. Louvre (Paris): Seated deity that is said to have been found in the northern part of the Royal Palace of Qatna (in the area of Rooms N, O and S), at the turn of the nineteenth to the twentieth century AD.

This discovery was made in the early days of research at Qatna, even before the excavations by du Mesnil du Buisson had started, thus unfortunately leaving the exact finding place vague. As has been recorded by R.P. Ronzevalle[77] the figurine was found in close proximity to the well known colossal head of basalt kept in the National Museum of Aleppo which was already found in 1894, but for which a specific find-spot has been passed down in du Mesnil's publications[78]. This place corresponds to what is now known to be the corner between Rooms O, N, and S. Thus, the figurine might formerly have been associated with the area of Room N, Courtyard O, or Corridor S[79]. While the colossal basalt head is Aramaean in style and dates to the Iron Age II period, the bronze figurine is Old-Syrian in style[80] and thus contemporary to the palace use. It may, therefore, have played a cultic role in Room N or the adjoining areas.

Coming back to Hall C, the major internal passage within the palace leads through the *Porte Royale* into Hall B. This hall was denominated by du Mesnil du Buisson *Salle du Grand Vase* without allocating it a specific function. According to the concept of the *Thronsaal-Festsaal-Gruppe* formulated by Ernst Heinrich[81], Hall B represents the first of the two functionally distinct units of this palace scheme, thus being the Throne Room. This idea is perfectly supported by the discovery in 2003 of a low platform at the southern end of Hall B (Annex AY)[82], that had escaped the attention of du Mesnil du Buisson. It can be interpreted as a throne podium. It is situated in a central position at the short side of the hall which would have come into view after a right angle turn when entering into the hall through the *Porte Royale*. Its position is unlike the one of the throne podium in Hall 64 at Mari situated on the long side of the room opposite to the main entrance. However, it can not be excluded that also at Qatna another throne platform existed at this position opposite to the *Porte Royale* where there is an interruption in the line of orthostats visible on the old plan of du Mesnil du Buisson (Fig. 1)[83].

As a consequence, Hall A, the room situated behind the Throne Room Hall B and being – as at Mari – larger than the first room, must have had a different function. It was labelled *Cour du Trône* by du Mesnil du Buisson[84], in the same way as, 5 years later, Parrot identified Hall 65 at Mari first as *Grande*

77 Cited in du Mesnil du Buisson 1935: 5, 111.

78 See du Mesnil du Buisson 1935: 5, 110-111. The place where the colossal basalt head supposedly was found is indicated on a plan presented by du Mesnil du Buisson (1926: 312-313, figs. 26, 30).

79 Du Mesnil du Buisson (1935: 110-111) wanted to see a connection between the figurine and the colossal head, which he had believed to date to the sixteenth or fifteenth century BC – and the *Haut-Lieu* (Room F), based on his assumption that this room was a sanctuary.

80 Matthiae, in: Orthmann 1975: 478.

81 Heinrich 1984: 74.

82 Novák - Pfälzner 2005: 67, fig. 8.

83 Du Mesnil du Buisson 1935: pl. XVI.

84 Du Mesnil du Buisson 1930: 147.



Fig. 24. Cuneiform tablets found in Corridor AQ with the ceramic bowl in which the tablets had originally been stored in Room AQ_2 above the corridor.

Cour[85], later on as *Salle du Trone*[86]. Applying the concept of Heinrich, however, it has to be identified as the Ceremonial Hall (*Festsaal*), like the one with the same position at Mari. As far as Hall 65 at Mari is concerned Durand, on the basis of textual evidence from the Mari archives, came to the conclusion that it functioned as a room for religious ceremonies, particularly focusing on the *kispu*-rituals in connection with the ancestor cult at Mari[87]. The same might hold true for Hall A at Qatna, especially when one takes into account that Corridor AQ leading to the Royal Hypogeum must have been accessible from Hall A. This is indicated by the fact that there was an interruption of the stone orthostats at the northern wall of Hall A – indicated in du Mesnil du Buissons plan (Fig. 1)[88] – at exactly the position where the Corridor AQ has its southern end. The direct connection between the Ceremonial Hall and the Royal tomb complex with its ancestor cult activities leads to the conclusion that Hall A might have been used for the more public parts of ancestor rituals and ceremonies[89]. Hall A can thus be identified as an 'Ancestral Ceremonial Hall'.

Corridor AQ led to the Royal Tombs which were located far below the foundations of the palace. The corridor was covered with a ceiling that was installed well below the floor level of the surrounding rooms. Thus, it remains an open question whether there was a similar corridor-like room on top of it on the ground floor level of the palace. Definitely, the royal scribal office must have been located somewhere above Corridor AQ – as Thomas Richter argues – as the cuneiform texts attributed to such an office of daily administrative activities were found within the debris that had fallen into the subterranean corridor. The tablets had been stored in open bowls within the former above-ground office room (Fig. 24)[90]. The exact position of this office room is difficult to determine. As the largest quantity of clay tablets

[85] Parrot 1936: 19.
[86] Parrot 1958: 111.
[87] Durand 1987: 107-109.
[88] Du Mesnil du Buisson 1935: pl. XVI. The lack of an orthostate indicating a possible door is furthermore supported by a fotograph published by du Mesnil du Buisson (1935, pl. XIX.1). The existence of an opening in the wall at this place must have also been the reason why du Mesnil had laid out the rails for the wagons to transport the earth at just this point through the northern wall of Hall A (see the same photo).
[89] Pfälzner 2005a.
[90] Novák - Pfälzner 2003: 151, fig. 15.

was found in the middle part of the corridor between the first and the second internal door and close to the western wall, i.e. below the dividing wall with Room Q, the office could have probably been installed in the narrow corridor-like room AQ_2 above Corridor AQ. This would, however, have been rather unpractical for such an official place due to the format of the room. The narrow room AQ_2, therefore, could have once been connected to Room AG in the west as kind of an appendix. Room AG is a much more plausible candidate for the royal scribal office with regard to its size and position. This would mean that the administrative activities took place in Room AG while the tablets were stored in the appendix AQ_2. Room AG was accessible, and – if our reconstruction of doorways is correct – also controllable, from the small anteroom AV. This room had a connection both to the Throne Room (Hall B)[91] and to Courtyard R, from which the special purpose storage room G could be reached. The possible AV-AG-AQ_2 administrative unit was, consequently, very well positioned with regard to important political and economical activities of the palace.

The northeastern quarter of the palace is dominated by a large space (Room BM) which is interpreted as a courtyard which is surrounded on all sides by smaller rooms. This arrangement follows the widespread Mesopotamian court-house principle or *Hürdenhaus*-scheme that is often included as an architectural sub-unit reserved for residential purposes in palace architecture[92]. Based on this theoretical consideration it can be argued that this was the main residential unit of the Royal Palace of Qatna reserved for the king. In addition, the location of this unit immediately above the subterranean Royal Tombs which symbolize the abode of the dead kings is another strong argument for the interpretation of these rooms as the residence of the living king. The residential unit may well have comprised two storeys that both surrounded the central courtyard, thus increasing the available space for the various functions associated with it. The largest room bordering courtyard BM is Room CP. Therefore, it can be interpreted as probably being the main living room of the king. This hypothesis is further supported by the fact that it is situated directly above the main chamber and the equally important southern chamber (see below) of the Royal Tombs.

The connection of the residential unit to the central representative part of the Royal Palace was most probably through Room T. This is the only large room within a network of smaller rooms to the east of Hall A. They all have been, like the northern part of Hall A, excavated by the Italian-Syrian team and are identified by Daniele Morandi Bonacossi as magazines[93]. The main storage facilities of the Royal Palace were thus located in the southeastern quarter of the building.

In conclusion, a clear structuring of the Royal Palace of Qatna consisting of several distinctive functional units can be identified on the basis of the presented considerations. These large functional units are: the monumental three-room unit for representation, audience, and assembly in the centre of the palace that takes up – as in the case of the Mari palace – the largest part of the building; the entrance area in the west; the service unit consisting of kitchens, water supply, and bath in the north-west; the interior reception suite (Room Q) at the northern border of the palace; the administrative and scribal quarter (Rooms G-R-AG-AQ_2) in the centre north; the royal residential unit in the northeastern part; finally the storage wing in the east and south-east of the palace.

5. The palace water supply

One of the most unusual features of the Royal Palace of Qatna is the palace well (Room U) in the northwestern part of the building. It was obviously the only internal water supply for the whole building and as such played a central role in the functioning of the palace. The subterranean room was accessed from the western and central parts of the palace through the corridor-like Room K which contained a ramp staircase (see above). The northwestern area, which probably contained kitchens, was connected via the small Room AW, through which the well was also accessible from Hall C. Through Rooms D and E one could reach the bathroom F and the central and northern wings of the palace. Only the eastern storage wing and the residential wing in the north-east seem to have been located in significant distance to the palace well. However, even these areas must have received their supply of fresh water from Room U as no closer alternative well was present.

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[91] This door was observed and recorded by du Mesnil du Buisson (1935: pl. XXII.11).

[92] Heinrich 1984: 69, 78-79.

[93] Barro 2003: 84-86; al-Maqdissi - Morandi Bonacossi 2005: 24.

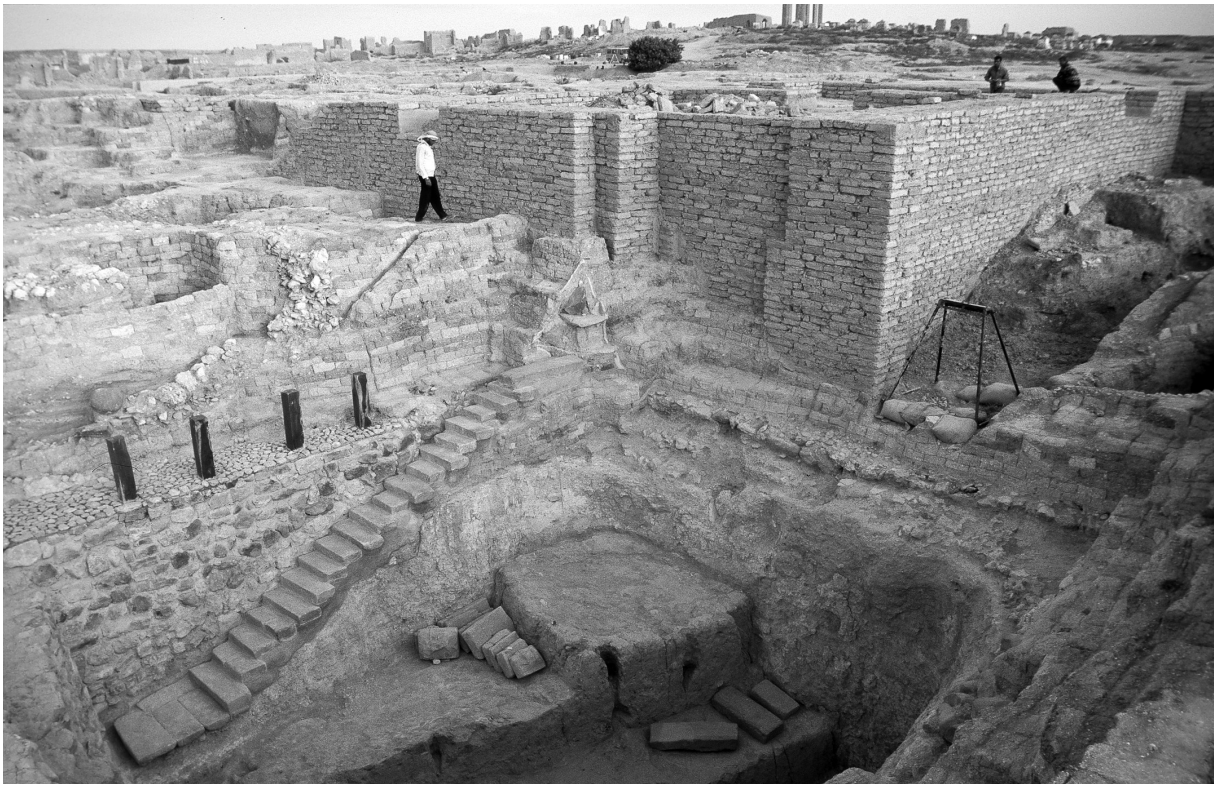


Fig. 25. Palace well (Room U): The well house surrounded by the foundations of Rooms F and K after restoration of the foundation walls in 2004.



Fig. 26. Palace well (Room U): The basalt staircase descending into the shaft of the well after restoration in 2005.



Fig. 27. Palace well (Room U): Basalt basin with half-pipe spout found on the western staircase of the well (*in situ*).



Fig. 28. Palace well (Room U): Humid, uncharred wooden beams resting in wet soil in the lower fill of the well-shaft.

Because of this major importance of the well for the whole palace it was constructed exceptionally large in size and was given an extraordinary architectural design unparalleled in other palaces of Syria and Mesopotamia. Room U is surrounded on all sides by high, free standing mud brick walls which also functioned as sub-floor foundation walls of the surrounding rooms to the east, south and west. On the north-side the well house was confined by the northern outer wall of the palace (Fig. 25).

All four enclosing walls of the 11 by 12.5 m large well house were erected directly on the natural bedrock, approximately 4 m below the preserved floor of the adjoining Room F. Starting from the surface of the bedrock a deep shaft was dug vertically into the ground in order to reach a subterranean water course. The shaft measures 9 by 9 m in area (in its upper part) and is carefully executed in nearly square shape and with vertical walls. Even after seven years of excavating the well (2000-2006) the bottom of the shaft has still not been reached[94]. However, it is expected to lie approximately 20 m below the former palace floors as preserved in Room F. The bottom of the shaft could be reached by a staircase of basalt slabs (Fig. 26).

The elongated slabs are carefully carved and have been installed on top of a gradually sloping projection of the rock that had been intentionally spared out during the digging of the shaft. The staircase starts at the top of the southeastern corner of the shaft, first runs parallel to the east face of the shaft, then after a right angle turn runs along the north face, followed up by the western face after another turn. The fourth and lowest flight of steps started to appear in 2006 on the southern face of the shaft, located deep below the entry into the well house through a doorway in the northern wall of Room K. The only possible connection from this door in the middle of the south side of the well house to the beginning of the staircase in the southeastern corner must have been a kind of wooden gallery along the southern edge of the shaft. Of this, however, no traces remain.

A round megalithic basalt basin with a long, half-pipe-shaped spout that was found secondarily deposited on the lower end of the western flight of stairs throws light on the kind of installations that can be expected at the bottom of the well shaft (Fig. 27). There, a natural spring can be anticipated the water of which must have somehow been gathered. The basalt basin was probably used for such a purpose, with the water being collected in the basin and from there conducted through the half-pipe spout. Probably more than one such basalt half-pipes existed, because the spout on the bassin shows a flute at its end to which a similar half-pipe with a fitting flute could have been attached to prolong it.

Similar wells of comparable size and layout are only known from Palestine: first of all the very similar well at Hazor[95] and, with a lesser degree of comparability, the well at Megiddo[96]. The Hazor well also has a wide rectangular shaft and a carefully installed staircase leading down to the bottom. Its layout is very much the same as in Qatna,

[94] Novák - Pfälzner 2001: 177-179, figs. 11-14; *id.* 2002a: 221-225, figs. 10-12; *id.* 2003: 138, figs. 3-4; *id.* 2005: 69-71, figs. 10-12; Dohmann-Pfälzner - Pfälzner 2006: 152-159, figs. 16-21.

[95] Hazor: Yadin 1972; *id.* 1975.

[96] Megiddo: Lamon 1935.



Fig. 29. The Royal Hypogeum: Corridor AQ leading to the royal tomb chambers (on the right), the northern terrace wall of the palace (in foreground) and the top side of ante-chamber (to the left).

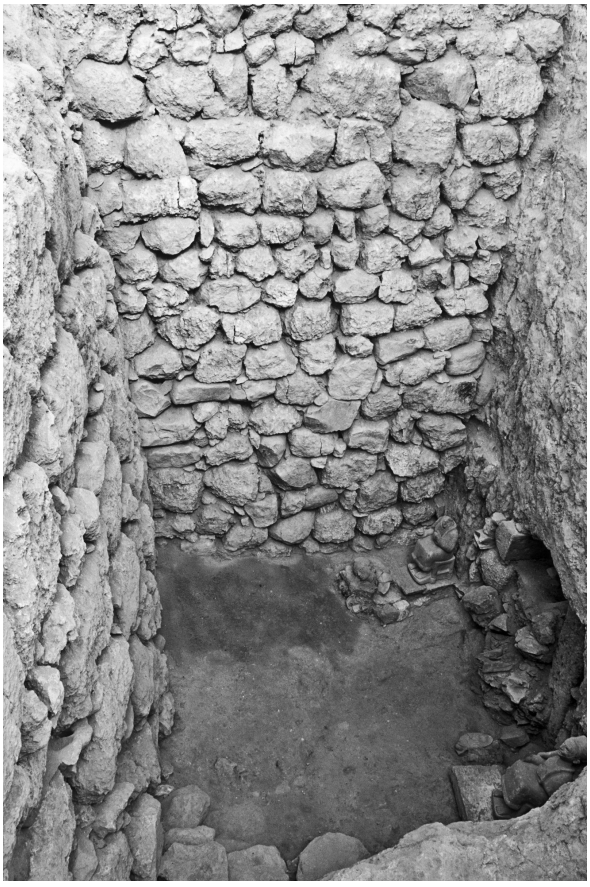


Fig. 30. The Royal Hypogeum: The ante-chamber (VK), seen from the end of Corridor AQ.

a fact that points strongly to a similarity in date. As the Qatna well is clearly attributed to Phase G 9, which is the original building phase of the palace (Fig. 10), it can be dated to the Middle Bronze Age II A. It was uninterruptedly in use – as the palace as a whole – down to the Late Bronze Age when the staircase was repaired[97]. Despite different dating proposals given by the excavators of the two sites in Palestine, the same construction date might be assigned to the well of Hazor and probably even to the one at Megiddo based on their formal analogy to the Qatna palace well. They could have been used continuously for a comparable or even longer span of time.

The fill of the shaft of the Qatna palace well contains a variety of highly interesting objects. Principally, it is filled up with destruction debris of the palace, datable to Phase G 7b (fourteenth century BC). The debris must come from the surrounding rooms and from the ceiling of the well house itself, probably even from a (hypothetical) room above the well house on the ground floor level of the palace. In the upper part of the fill more than 3000 fragments of colourful wall paintings were retrieved. They could be assigned to the western and southern walls

[97] Dohmann-Pfälzner - Pfälzner 2006: 152 ff., fig. 20.

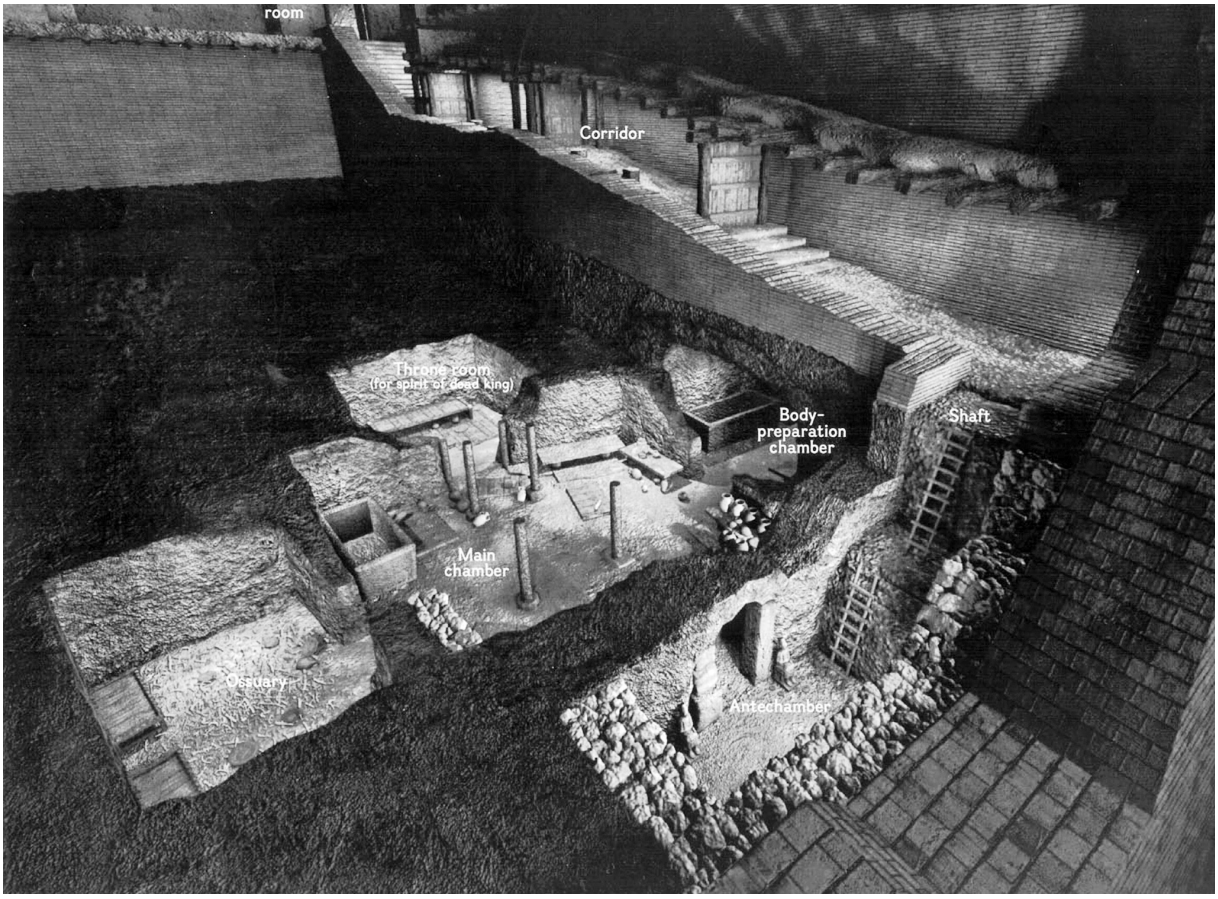


Fig. 31. The Royal Hypogeum: Reconstruction drawing of the tomb complex (art by Robert Kinkead) (courtesy of National Geographic Magazine).

of Room N which is situated to the east of the well house (see above). These walls collapsed and fell into the shaft. Associated with the Late Bronze Age wall painting fragments several seal impressions and two round cuneiform tablets, all dating to the Middle Bronze Age, were discovered in the debris. This demonstrates that room inventories covering a remarkable span of time were present in the palace at the time of its final destruction at around 1340 BC.
Further down in the shaft charred remains of wood became more and more numerous, often in the form of well preserved beams. They must mainly come from the ceiling of the well house. At a lower level (approximately starting at 14 m below the palace floors) wet deposits started to appear which offer ideal conditions for the preservation of un-charred wood. Roof beams in a perfect state of preservation and thin laths, both unburnt, have been found and are to be excavated. With these, attempts at reconstructing the roof can be made (Fig. 28). Many more wet wood finds – and probably other kinds of well preserved organic materials – are to be expected during the future excavation seasons in the well shaft.

6. The Royal Hypogeum and its inventory

The discovery of the Royal Hypogeum below the palace in the season of 2002 in Operation G was one of the most surprising results of the renewed excavations in the Royal Palace of Qatna. It was unexpected because no indications for such a structure had been observed by du Mesnil du Buisson and no similar complexes were known from other Bronze Age palaces which would have suggested such a feature at this point.
The Royal Tomb consists of four chambers that were cut into the rock deep below the foundations of the palace. They were constructed at a place where the bedrock below the palace ends abruptly in a rather sharp and steep cliff (the so-called *Falaise* of du Mesnil du Buisson) that rises some 10 m over the surrounding flat area of the Lower City, so that digging could be carried out from the side of the

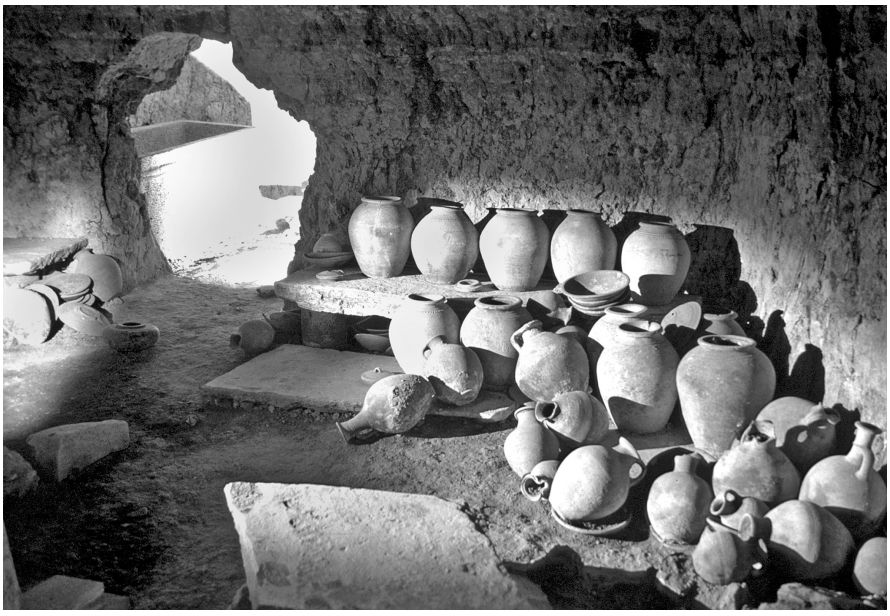


Fig. 32. The Royal Hypogeum: View into the main grave chamber.

rock instead of from above. This position of the tomb at the edge of the cliff aligns with the northern end of the palace. For this reason, the grave complex pokes out of the rectangular shape of the palace. Only the monumental outer terracing wall in the north encloses the grave complex and conceals it behind a mass of *pisé* and mud-brick (Fig. 16). While rooms of the palace ground floor were built on top of the subterranean tomb chambers there seems to have existed an open area or 'esplanade' to both sides of the projecting grave complex and inside the outer terracing wall.

The cliff had already been in use as a burial site in earlier times, i.e. the Middle Bronze I period, as has been demonstrated by the well preserved *Tombeau I* excavated by du Mesnil du Buisson[98]. Accordingly, the decision to place the Royal Tombs at the northern edge of the palace was dictated not only by the practical reasons of an easier execution of construction works at the edge of the cliff but also by symbolic considerations of remaining in close proximity to the traditional burial ground of the elite of Qatna.

Due to the remote position of the Royal Tombs with regard to the central representative unit of the palace a long corridor (AQ) had to be built in order to connect the two areas directly. Both the corridor and the grave complex were constructed in Phase G 9a during the MB II A period (Fig. 10). Consequently, the grave complex was part of the modified execution plan of the palace (see above). It was erected in one go as a homogenous unit consisting of the corridor and the ante-chamber, both built with free-standing walls, and four grave chambers cut into the rock.

The corridor starting in Hall A (see above) leads over a flight of steps downwards to a first internal wooden door of which the wooden anchoring in both sides of the corridor walls were still preserved in charred form. There was a second and a third door along the 40 m long straight course of the corridor. This proves that the grave complex could be carefully locked and that descending to the grave chambers meant perambulating through a sequence of four successive doors (including the front door from Hall A) before climbing down into the ante-chamber. Shortly before reaching the ante-chamber and immediately in front of the outer terracing wall of the palace the corridor turned at a right angle to the east (Fig. 29).

Here, it stopped abruptly at the upper edge of the 5 by 4 m wide ante-chamber whose floor lies approximately 5 m deeper than the corridor floor (Fig. 30).

Climbing down could only have been possible by using wooden ladders which could have been inserted and removed when required (Fig. 31). The ante-chamber was enclosed on the north and east sides with a wall of huge stone boulders, while

[98] Du Mesnil du Buisson 1927a: 13 ff.

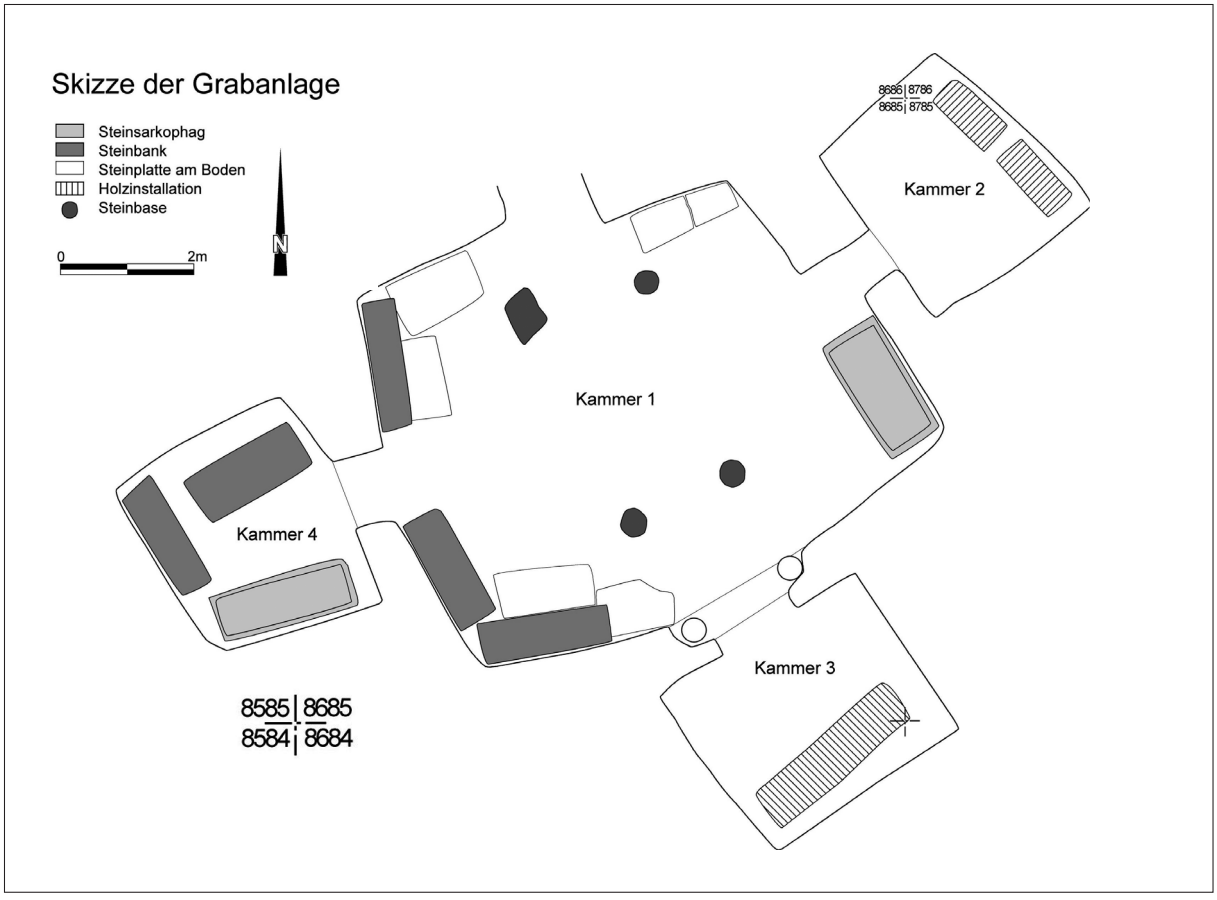


Fig. 33. The Royal Hypogeum: Schematic plan of the four rock-cut grave chambers.

the south and west sides were formed by the straightened and smoothed rock cliff.

At the bottom of the ante-chamber two ancestor statues of basalt flanked the door that leads into the inner rock-cut chambers. The approximately 80 cm high sitting statues were found in their original position and functional context with offering bowl deposited in front of them. This indicates that the ante-chamber functioned as an ancestor worship room.

The passage between the ancestor statues lead into the main chamber of the tomb, which is surrounded in a trefoil arrangement to the east, south and west by smaller side chambers (Figs. 31 and 33).

The main chamber contained a basalt sarcophagus without a lid in which – besides pottery vessels and an ivory sceptre – bones of three different individuals were found. This evidence, together with many more bones in other parts of the chambers, indicates that the grave was a collective burial place for the royal dynasty of Qatna in the Late Bronze Age[99]. Four wooden biers in the main chamber functioned as additional burial places for individuals that were accompanied by particularly rich grave goods. Among them were abundant amounts of gold and precious stone beads, together with a gold broach with carnelian and lapis-lazuli inlays (Fig. 36), several golden plaques with figurative relief decoration, a modelled gold hand, a lion head of amber (Fig. 35), a gold-on-silver foil quiver sheet decorated with hunting scenes in relief, and many more remarkable objects[100].

We can assume that the inventory of the four grave chambers roughly reflects what might have been the last 50 years of use of the burial place, which existed – like the palace – altogether for a period of 300-350 years. The grave inventory of more than 2000 objects at first glance gives a chaotic impression but

[99] See Witzel - Kreutz, this volume.

[100] See al-Maqdissi - Dohmann-Pfälzner - Pfälzner - Suleiman 2003: 211-218. For the amber lion head see Mukherjee *et al.* (in press).



Fig. 34. The Royal Hypogeum: Computer reconstruction of the burial table arrangement in the western side-chamber (courtesy Story House Productions, Berlin).

can be interpreted as an assemblage reflecting a variety of different activities referring to burial practices and the cult of the dead. Most objects were left behind at the place they had been in use at the end of the active use of the grave complex, so that a detailed activity area analysis can be carried out.

Storage vessels standing together with medium-sized bottles and many flat bowls in the northwestern corner of the main chamber must have contained foodstuff as a supply for the dead (Fig. 32). This practice is known as *kispu* in the Ancient Orient[101]. Obviously, the living came into the grave chambers to dine with the dead, which is demonstrated by stone benches along the south and west wall of the main chamber and by numerous animal bones discarded below the benches. The architectural arrangement of the main chamber is characterized by four columns that supported the roof which can be reconstructed according to four stone column bases on the floor of the chamber. This is strikingly reminiscent in its layout of Hall C in the palace above. As this hall is identified as the assembly hall in the palace of the living, the main chamber of the grave can accordingly be qualified as the assembly hall of the dead together with their living descendants.

From the main chamber there is a broad entrance, originally framed by two other columns, into the southern side chamber. Here, no burials were encountered. Instead, there was a careful arrangement of calcite vessels along the eastern wall, and a wooden bed or bench standing near the southern wall, on which the golden duck-heads had been placed. In front of the bed was a group of pottery vessels and animal bones, obviously presented as food-offerings as part of the *kispu*-ritual. This chamber can be qualified as the 'banqueting room' of the dead king. It is analogous in position to the Throne Room (Hall B) of the palace. Both are similarily located in a straight line behind the assembly room and both are accessible through a particularly wide and representative doorway: in the grave this is the wide doorway between the main and the southern chamber, in the palace it is the *Porte Royale* (see above). These observations demonstrate that the arrangement of the central representative unit of the palace (Halls C and B) is both formally and functionally strongly reflected in the main unit of the grave (main and south chamber). Thus, the grave is a 'palace of the dead kings' following the general model of the 'palace of the living kings'.

The western side-chamber, accessible through a narrow opening cut into the rock, contains a second sarcophagus of basalt, also without a lid. Here, the remains of at least two individuals can be determined by their preserved bones – including a rare skull. Pottery and calcite vessels, a golden bowl, and bronze objects complement the grave goods in the sarcophagus. A stone bench on which a wooden coffin with a burial was placed and covered with several layers of textiles was discovered in the same

[101] Tsukimoto 1985.

chamber, on the opposite side[102]. This is the only skeleton within the Royal Hypogeum of Qatna that was encountered in the correct anatomic order. A three-string necklace with different kinds of gold and stone beads was laid on the body of the female dead close to the waist.

The eastern side-chamber had yet another function. Here, masses of human bones mixed with equally numerous discarded animal bones were found deposited in a thick accumulation on the floor. Some ceramic offering bowls were put on top of this heap of bones. This room is designated the 'ossuary' of the Royal Hypogeum. The bones of the ancestors were brought here, to the eternal resting place, from the main and western chamber after the end of the ritual cycle.

In conclusion, the Royal Tomb Complex below the Royal Palace of Qatna was an area for multiple cultic activities. It is an important place for the royal ancestor cult as it is the location where the defunct of the royal family of both sexes and different age groups were buried. Furthermore, it is the lieu of a long, multi-stage burial process accompanied by rituals and re-depositions of human remains. Finally, it is the locality where the dead and the living members of the dynasty assembled for common meals.

7. Interdisciplinary investigations in the Royal Hypogeum

The well preserved grave inventories that were found in the four chambers of the Royal Hypogeum offer a broad perspective for interdisciplinary research involving a multitude of disciplines, particularly from the natural sciences. When combined, they offer the possibility of a micro-level environmental study. This is highly important for gaining new information on the specific local conditions within the given burial context. At the same time it helps to reach general conclusions with regard to the natural environment of Qatna in the second millennium BC, more specifically in the time of the fifteenth/fourteenth century BC.

Interdisciplinary work concentrated on the burial table in the western side chamber and on the floor depositions of the main chamber as well as the other chambers. A team from the University of Bristol (UK), directed by Richard Evershed with Anna Mukherjee and Matthew James as main researchers, is exploring the 'chemical map' of the grave floor where accumulations of particularly organic-rich material have been deposited[103].



Fig. 35. The Royal Hypogeum: Lion head miniature vessel made of Baltic amber.

Of special interest are lipids to be detected on the floor as well as in the pottery and stone vessels which help to determine vessel contents and substances deposited on the floor. Furthermore, special and rare materials could be identified by chemical analysis. At several places on the floor purple dye could be identified high-lightening the presence of this prestigious kind of coloured textile associated with the royal burials[104]. Equally interesting is the analytic result that the miniature lion-head vessel (Fig. 35) was made of Baltic amber, a material which must have been travelled by trade-route from the Northeastern European regions to Syria in the Late Bronze Age[105].

The anthropological study of human bones is carried out by Carsten Witzel whose primary task was to identify individuals, their age and sex, further to interpret the scatter of bones in three of the four grave chambers (apart from the southern chamber where no human bones have been found)[106]. Anthropological examination is accompanied by the archaeo-zoological study of the large quantity of animal bones found all over the tomb in different contexts. This is carried out by Emmanuelle Vila (Lyon)[107] with the main objective

[102] Dohmann-Pfälzner - Pfälzner 2006: 159-164, figs. 22-25.
[103] Cf. Mukherjee - James - Pfälzner - Evershed, this volume.
[104] See James *et al.* (in press).
[105] See Mukherjee *et al.* (in press); Dohmann-Pfälzner - Pfälzner 2006: 166-168.
[106] Cf. Witzel - Kreutz, this volume.
[107] Cf. Vila - Gourichon, this volume.

of identifying the functional context of the deposition of animal bones in the grave based on the distinction of the different animal species. This will help to figure out the nature of food offerings to the dead and the components of communal meals in the grave chambers. Archaeo-botanical analysis of materials from the Royal Hypogeum is focusing on seeds, studied by Simone Riehl (Tübingen)[108], and on charcoal, studied by Katleen Deckers (Tübingen). This will add valuable information on the components of food supply in the grave chambers, and on principles of the food producing economy of Late Bronze Age Qatna. The palaeo-botanical studies in combination with the archaeo-zoological studies will thus give clues to the condition and the ways exploitation of the environment around Qatna during the time of the burials in the Royal Tomb.

Micromorphological thin sections have been investigated by Christine Pümpin (Basel) and have lead to the conclusion that several successive floor levels and phases of use of the grave chambers existed[109]. They resulted in micro-depositions on the floor which are macroscopically indistinguishable. These observations led to a micro-stratigraphical excavation of the floor accumulations that started in the season of 2006.

Special attention was given to the interdisciplinary investigation of the burial table in the western side chamber, opposite to the second basalt sarcophagus, because of the skeleton that was found here in its original anatomic order (see above), but also because textile remains had been recognized macroscopically that were embedded in a complex cluster of organic and un-organic materials. Therefore, bio-molecular analysis by Richard Evershed and his group, botanical examinations by Simone Riehl, and anthropological research by Carsten Witzel were combined with an investigation of the textile remains carried out by Annemarie Stauffer from the University of Cologne. These investigations were carried out *in situ* during the 2004 and 2005 field seasons and were archaeologically coordinated by Heike Dohmann-Pfälzner. Annemarie Stauffer was able to distinguish seven distinct kinds of textiles with different weaving structure and different colouring[110]. They were deposited in different layers on the body of the deceased person on the burial table. The contextual study of the textiles from the burial table, which are now stored at the excavation-house of the German team at Mishrifeh, is being carried on since the season of 2006 by Nicole Reifarth and Giulia Baccelli.

The following reconstruction can be proposed as a preliminary result of the burial table investigations[111]: the deceased person, an elderly woman, was buried in a wooden coffin (Fig. 34). The coffin was separated from the stone table by a layer of gypsum. The dead body was covered by multiple layers of cloth and a twig was laid beside it. Most interestingly, Carsten Witzel could determine that the dead body must have been heated at a temperature of 200-250° C before the burial. This was most probably done for reasons of preservation and hygiene. More investigations will be needed to fully understand the processes and considerations behind this practice. Various lines of interdisciplinary studies have to be continued before final and completely interrelated results on all detectable characteristics of the materials from the Royal Hypogeum of Qatna can be reached.

8. Conclusion: Natural environment and the Royal Palace of Qatna

With regard to the overall topic of the present volume concerning the interrelation of settlement and environment at Tell Mishrifeh/Qatna, the Royal Palace excavations have produced valuable information in different respects.

I. An important consideration for the palace builders was the accessibility of fresh water on a permanent and reliable basis. For this purpose an enormous technical and organisational effort was made to gain access to ground water below the palace. An architecturally well designed and carefully executed huge shaft was dug within one of the palace rooms into the underlying bedrock in order to reach a subterranean water course. This demonstrates how crucial the concern for an independent water supply of the palace was. It has to be taken into account especially that one did not want to rely on the option of a possible Lower City well, even though it could have been located in close proximity to the palace and could have been dug out with much less effort, due to the ground water being much closer to the surface and easier to reach in the Lower City.

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[108] Cf. Riehl, this volume.

[109] Cf. Pümpin, this volume; compare also Dohmann-Pfälzner - Pfälzner 2006: 164-165, fig. 26.

[110] Dohmann-Pfälzner - Pfälzner 2006: 163-164, fig. 24.

[111] Dohmann-Pfälzner - Pfälzner 2006: 159-166.

II. The second environmental feature to which the palace builders paid tribute was the topography of the surrounding ground, and especially the local geology and geomorphology. A decision was made to build the palace on a high natural terrace of limestone which raised it above the surrounding city quarters considerably, in particular with regard to the Lower City in the north. The local topography was intentionally utilised to visually support the importance and power of the Royal Palace. Furthermore, all foundations were set on the bedrock, regardless of how many meters of natural and cultural accumulations had to be dug through. This can be explained, on one hand, as a method of guaranteeing utmost technical stability and durability of the building and, on the other hand and in consequence of the first aspect, as a means to symbolically enforcing the durability and stability of the palace and the Kingdom of Qatna. This consideration demonstrates the close interrelation between environment and politics.

III. Wood was a very rare and hence precious natural resource even in older periods of the Ancient Near East. On the back of this fact the extensive and, seemingly, nearly exclusive use of cedar wood for the roofing of the rooms in the Royal Palace of Qatna, that has been preliminarily detected through the wood analysis carried out by Otto Cichocki (Vienna)[112], is most remarkable. Cedar beams were found in the palace well, in Corridor AQ, and in rooms excavated by du Mesnil du Buisson[113]. This can best be explained by a direct access to, or control over, the natural habitat of cedar trees by the institutions of the Kingdom of Qatna in the Lebanon Mountains and/or the an-Nusariyeh Mountains. Such control could have been based on the regional power of the Qatna Kingdom. Wood was not only a building material to be used for one-self but must have also been one of the major export goods of Qatna, if one takes the regional influence of the kingdom into account. Here again, environment and politics combine, resulting in the political desire to gain control over cedar forest areas. This is reflected in the wish to excessively furnish the own palace with this precious resource for the sake of both architectural stability and political prestige.

IV. Plants and animals are a factor of the environment of Qatna which is influenced naturally as well as culturally. Our analysis of plant material and animal bones from the Royal Hypogeum and from deposits in the Royal Palace give us the opportunity to compare these two functionally different areas with regard to the kind of use of plant and animal resources. Furthermore, when combined the examinations have the potential to trace the activities of the palace household and the royal administration in the field of agriculture and animal husbandry. This data can be compared to animal and plant remains from other, functionally different, parts of the city of Qatna and from different periods of the occupational history of Qatna, allowing us to generate a general picture of the regional exploitation of the surrounding land by the households and institutions of Tell Mishrifeh/Qatna from the 3rd to the 1st millennium BC[114].

V. Humans are one of the natural components of the environment of ancient cultures that draw major attention in archaeological research both as biological factors and as cultural agents. While the human as a cultural agent is prominent in nearly all aspects of material culture studies, the human as a biological factor is more difficult to trace. The human bones of 17 individuals (minimum)[115] from the Royal Hypogeum are an important source for the reconstruction of the life conditions, the nourishment, the life expectancy, and the diseases of humans at Qatna in the Late Bronze Age. However, this data is representative only for a very limited and distinguished group within the ancient society of Qatna, the royal family[116]. Anthropological data from tombs belonging to other social contexts at different places within the settlement[117] help to compare these results to other classes of the society and to develop a more general picture of the biological characteristics of men in ancient Qatna as human factor of the natural environment.

VI. The procurement of raw materials which are not present in the immediate surroundings of Qatna was an important economical concern for the rulers and traders of this city. Mineral resources and their import from other regions can

[112] Personal information by Otto Cichocki on the results of analyses carried out on samples from Operation G at the Dendrolab of the Vienna Institute for Archaeological Science.
[113] Du Mesnil du Buisson 1935: 109.
[114] Cf. Cremaschi *et al.*, this volume.
[115] Personal communication by Carsten Witzel on the basis of the preliminary analysis of the bone material in 2006.
[116] Cf. Witzel - Kreutz (note 105), this volume.
[117] Cf. Canci - Bartoli, this volume.

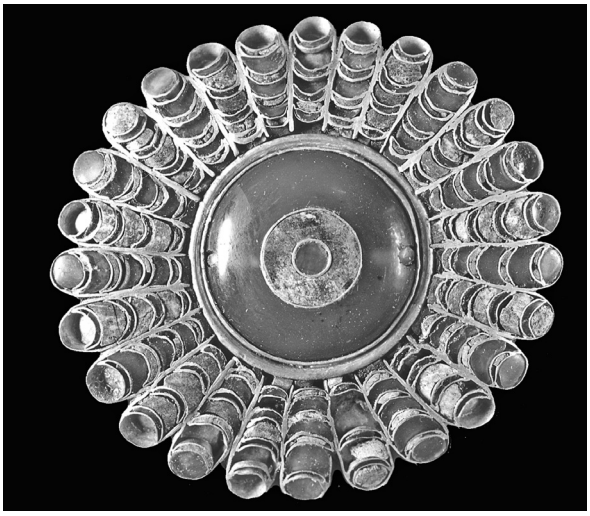


Fig. 36. The Royal Hypogeum: Gold broach with crescent shaped carnelian and lapis-lazuli inlays.

be traced on the basis of archaeological finds from the Royal Palace and the Royal Hypogeum.
Basalt is a material that was not only used for grinding tools but also as building material in foundations and walls, for example in the western wall of Corridor AQ leading to the Royal Tomb. The origin of the basalt must be searched not so far from Qatna in the regions adjoining to the north (the Hama/Selemiye region) or to the west (the Homs/Restan region). Provenance analysis for the basalt materials are being carried out by Claudio Mazzoli in order to evaluate this assumption.
More distant resources have to be taken into account for the calcite vessels of which more than 50 have been found in the Royal Hypogeum[118]. Possible provenances of the calcite raw material are Coastal Syria and Egypt. A mineralogical analysis programme has just begun at the University of Tübingen in order to investigate the calcite trade and calcite manufacturing places of the Middle and Late Bronze Age. Long distances had to be bridged to acquire carnelian and lapis-lazuli through interregional exchange. Both carnelian and lapis-lazuli are well attested as components of jewellery found in the Royal Tombs of Qatna (Fig. 36). This demonstrates that the political elite of Late Bronze Age Qatna valued these non-local and non-regional resources very highly. Another of these exotic and valuable raw materials was amber. It is present in the Royal Hypogeum in the form of a lion head (see above; Fig. 35), a miniature modelled hand, and beads. Qatna can be regarded as the place where, up to now, the highest amount of amber objects has been retrieved in the entire Near East. Amber was imported from the Baltic region, while carnelian and lapis-lazuli came from Afghanistan and probably India. These raw materials or finished products, including precious stones and metals, most notably gold which is abundantly present in the Royal Hypogeum, were inter-regionally transferred either by commercial transactions or by gift exchange between courts[119]. Regardless of which exchange model applies, this demonstrates that a broad, in those days nearly global, exploitation of the natural environment was in place, organised within a network of cultures of which Qatna was part of.

VII. The procuration of raw materials from distant regions must have happened in single, particular events[120], whereas the exploitation of the locally available raw materials and resources must have been carried out on a much more regular basis and systematically organized. The latter materials are mainly clay, water and limestone. All these resources were used in huge quantities for the construction of the Royal Palace: clay and water for the production of millions of mud bricks, limestone as a basic layer under the mud-brick foundations and as lateral covering for them. Water must have been present both in permanent wadis and in a small lake in the direct vicinity of the settlement[121]. Clay was available in unlimited quantities in the two main wadi beds surrounding the city[122], while limestone could be quarried at the flat ridges to the west, south and east of Tell Mishrifeh, no further than 1-2 km away[123]. This shows that the building process was in principle perfectly adapted to the local environment and to the local natural resources.

VIII. One of the most impressive achievements with regard to the Royal Palace of Qatna is the enormous mobilisation of a work force to exploit the local natural resources that were needed for the construction of the palace. It was one of the most voluminous building activities attested for

[118] See unpublished MA-thesis at the University of Tübingen (2005) by Alexander Ahrens, «Einfluß – Übernahme – Variation. Die ägyptischen und ägyptisierenden Steingefäße aus der königlichen Grabanlage von Tell Mišrife/Qatna. Eine Untersuchung zu den Beziehungen zwischen der nördlichen Levante und Ägypten im 2. Jahrtausend v. Chr.».
[119] Pfälzner 2007.
[120] *Ibid.*
[121] Cf. Cremaschi, this volume.
[122] Cremaschi - Trombino - Sala 2002: 20-23, fig. 4.
[123] *Ibid.* 18, fig. 4.

in the Bronze Age of Syria and as such needed an immense amount of building material (see above). Therefore, the effort of mobilizing a labour force was fundamental for the realization of such a project. These human resources and the instruments to mobilise them are the most essential link between the political concept of the rulers of Qatna and their natural environment.

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Bibliography

AL-MAQDISSI, M. 2003a: Ergebnisse der siebten und achten syrischen Grabungskampagne 2001 und 2002 in Misrife/Qatna, *MDOG* 135, 219-245.

AL-MAQDISSI, M. 2003b: Recherches archéologiques syriennes à Mishirfeh-Qatna au nord-est de Homs (Émèse), *CRAIB*, 1487-1515.

AL-MAQDISSI, M. - DOHMANN-PFÄLZNER, H. - PFÄLZNER, P. - SULEIMAN, A. 2003: Das königliche Hypogäum von Qatna, *MDOG* 135, 189-218.

AL-MAQDISSI, M. - MORANDI BONACOSSI, D. 2005: *The Metropolis of the Orontes. Art and Archaeology from the Ancient Kingdom of Qatna. Seven Years of Syrian-Italian Collaboration at Mishrifeh/Qatna*, Damascus.

AL-MAQDISSI, M. - LUCIANI, M. - MORANDI BONACOSSI, D. - NOVÁK, M. - PFÄLZNER, P. 2002 (eds.): *Excavating Qatna. Vol. 1. Preliminary report about the 1999 and 2000 campaigns of the Joint Syrian-Italian-German Archaeological Research Project at Tell Mishrifeh*, Documents d'Archéologie Syrienne IV, Damascus.

BARRO, A. 2002: Operation H, in: M. al-Maqdissi - M. Luciani - D. Morandi Bonacossi - M. Novák - P. Pfälzner (eds.): *Excavating Qatna. Vol. 1. Preliminary report about the 1999 and 2000 campaigns of the Joint Syrian-Italian-German Archaeological Research Project at Tell Mishrifeh*, Documents d'Archéologie Syrienne IV, Damascus, 111-122.

BARRO, A. 2003: Rediscovering 'Le Palais': New Data from the Royal Palace of Qatna (Operation H), *Akkadica* 124/1, 78-96.

BARRO, A. 2004: Il palazzo di Qatna: gli scavi italiani (cantiere H), in: A. Guidi - S. Ponchia (a cura di), *Ricerche Archeologiche in Italia e in Siria,* Atti delle Giornate di Studio, Verona 6-7 maggio 2002, 121-32.

BOTTERO, J. 1949a: Les inventaires de Qatna, *RA* 43/1-2, 1-40.

BOTTERO, J. 1949b: Les inventaires de Qatna (suite), *RA* 43/3-4, 137-215.

BOUNNI, A. - LAGARCE J. 2004: Ras Ibn Hani, in: Y. Calvet, G. Galliano (éd.), *Le royaume d'Ougarit. Aux origines de l´alphabet*, Exposition Musée des Beaux-Arts Lyon, Paris 2004, 57-59.

BUCHHOLZ, H.G. - KARAGEORGHIS, V. 1971: *Altägäis und Altkypros*, Tübingen.

CHARPIN, D. - ZIEGLER, N. 2003: Mari et le Proche-Orient à l´époque amorrite. Essai d´histoire politique, *Mémoires de NABU* 6, Paris.

CREMASCHI, M. - TROMBINO, L. - SALA, A. 2002: The Geoarchaeology of Tell Mishrifeh, in: M. al-Maqdissi - M. Luciani - D. Morandi Bonacossi - M. Novák - P. Pfälzner (eds.): *Excavating Qatna. Vol. 1. Preliminary report about the 1999 and 2000 campaigns of the Joint Syrian-Italian-German Archaeological Research Project at Tell Mishrifeh*, Documents d'Archéologie Syrienne IV, Damascus, 17-24.

DOHMANN-PFÄLZNER, H. - PFÄLZNER, P. 2002: Untersuchungen zur Urbanisierung Nordmesopotamiens im 3. Jt. v. Chr. am Beispiel des Tall ChuÁra, Teil II: Die Entstehung der Parzellenhäuser und die Entwicklung des Stadtzentrums, in: R. Eichmann (Hrsg.), *Ausgrabungen und Surveys im Vorderen Orient* I, OrA 5, 1-22.

DOHMANN-PFÄLZNER, H. - PFÄLZNER, P. (unter Mitarbeit von M. Abbado, A. Ahrens, R. Evershed, E. Formigli, E. Geith, A. Mukherjee, V. Paoletti, C. Pümpin, E. Rossberger, C. von Rüden, J. Schmid, C. Schmidt, A. Stauffer) 2006: Ausgrabungen und Forschungen in Tell Mišrife/Qatna 2004 und 2005. Vorbericht der deutschen Komponente des internationalen Kooperationsprojektes, *MDOG* 138, 131-180.

DU MESNIL DU BUISSON, R. 1926: Les ruines d´el-Mishrifé au Nord-Est de Homs (Émèse), *Syria* 7, 289-325.

DU MESNIL DU BUISSON, R. 1927a: Les ruines d´el-Mishrifé au Nord-Est de Homs (Émèse) (2e article), *Syria* 8, 13-33.

DU MESNIL DU BUISSON, R. 1927b: L´ancienne Qatna ou les ruines d´el-Mishrifé au N.-E. de Homs (Émèse). Deuxième campagne de fouilles, 1927, *Syria* 8, 272-301.

DU MESNIL DU BUISSON, R. 1928: L´ancienne Qatna ou les ruines d´el-Mishrifé au N.-E. de Homs (Émèse). Deuxième campagne de fouilles, 1927 (2e et 3e article), *Syria* 9, 6-24; 81-89.

DU MESNIL DU BUISSON, R. 1930: Compte rendu de la quatrième campagne de fouilles à Mishrifé-Qatna, *Syria* 11, 146-163.

DU MESNIL DU BUISSON, R. 1935: *Le site archéologique de Mishrifé-Qatna*, Paris.

DURAND, J.M. 1987: L´organisation de l´espace dans le palais de Mari: Le témoignage des textes, in: E. Lévy (éd.), *Le système palatial en Orient, en Grèce at à Rome*, Strasbourg, 39-110.

ELSEN-NOVÁK, G. 2002: Die altsyrische Glyptik von aus Qatna. Eine erste Einordnung, *MDOG* 134, 257-274.

FALES, F.M. 2004: Rileggendo gli inventari di Qatna, *KASKAL* 1, 83-127.

HEINRICH, E. 1984: *Die Paläste im Alten Mesopotamien*, 1984.

JAMES, A. *et al.* in press: Royal Purple Dye from a Bronze Age Royal Tomb.

KLENGEL, H. 1992: *Syria 3000 to 300 BC. A Handbook of Political History*, Berlin.

Klengel, H. 2000: Qatna – ein historischer Überblick, *MDOG* 132, 239-252.

Lamon, R.S. 1935: *The Megiddo Water System*, OIP 32, Chicago.

Margueron, J.-C. 1982: *Recherches sur les palais Mésopotamiens de l'âge du bronze*, Paris.

Margueron, J.-C. 2004: Le palais royal d'Ougarit, in: Y. Calvet, G. Galliano (éd.), *Le royaume d'Ougarit. Aux origines de l´alphabet*, Exposition Musée des Beaux-Arts Lyon, Paris 2004, 143-149.

Matthiae, P. 1995: Urbanistica e architettura della città paleosiriana, in: P. Matthiae - F. Pinnock - G. Scandone Matthiae (a cura di), *Ebla - alle origini della civiltà urbana. Trent'anni di scavi in Siria dell'Università di Roma 'La Sapienza'*, Milano, 164-179.

Morandi Bonacossi, D. 2007: The Chronology of the Royal Palace of Qatna Revisited. A Reply to a Paper by Mirko Novák (Ä&L 14), *Ä&L* 17.

Morandi Bonacossi, D. - Eidem, J. 2006: A Royal Seal of Išhi Addu, King of Qatna, *Akkadica* 127/1, 1-17.

Mukherjee, A.J. - James, M.A. - Roßberger, E. - Pfälzner, P. - Higgitt C. - White R. - Peggie D. - Evershed, R.P. in press: Exceptional Baltic Amber Sculpture and Beads from a Bronze Age Royal Tomb in Syria.

Novák, M. 2004: The Chronology of the Royal Palace of Qatna, *Ä&L* 14, 299-317.

Novák, M. 2006: Fundamentierungstechniken im Palast von Qatna, in: E. Czerny - I. Hein - H. Hunger - D. Melman - A. Schwab (eds.), *Timelines. Studies in Honour of Manfred Bietak*, OLA 149, Vol. III, 63-71.

Novák, M. - Pfälzner, P. 2000: Ausgrabungen in Tall Mišrife-Qatna 1999. Vorbericht der deutschen Komponente des internationalen Kooperationsprojektes, *MDOG* 132, 253-295.

Novák, M. - Pfälzner, P. 2001: Ausgrabungen in Tall Mišrife-Qatna 2000. Vorbericht der deutschen Komponente des internationalen Kooperationsprojektes, *MDOG* 133, 157-198.

Novák, M. - Pfälzner, P. 2002a: Ausgrabungen in Tall Mišrife-Qatna 2001. Vorbericht der deutschen Komponente des internationalen Kooperationsprojektes, *MDOG* 134, 207-246.

Novák, M. - Pfälzner, P. 2002b: Excavations in the Western Part of the Bronze Age Palace (Operation G), in: M. al-Maqdissi - M. Luciani - D. Morandi Bonacossi - M. Novák - P. Pfälzner (eds.): *Excavating Qatna. Vol. 1. Preliminary report about the 1999 and 2000 campaigns of the Joint Syrian-Italian-German Archaeological Research Project at Tell Mishrifeh*, Documents d'Archéologie Syrienne IV, Damascus, 63-110.

Novák, M. - Pfälzner, P. 2003: Ausgrabungen im bronzezeitlichen Palast von Tall Mishrife – Qatna 2002. Vorbericht der deutschen Komponente des internationalen Kooperationsprojektes, *MDOG* 135, 2003, 131-166.

Novák, M. - Pfälzner, P. 2005: Ausgrabungen in Tall Mišrife-Qatna 2003. Vorbericht der deutschen Komponente des internationalen Kooperationsprojektes, *MDOG* 137, 57-78.

Orthmann, W. 1975: *Der Alten Orient*, Propyläen Kunstgeschiche Band 14, Berlin.

Paoletti, V. 2005: Eine Keramikassemblage aus der frühen Benutzungszeit des Palastes in Bereich BW, *MDOG* 137, 79-89.

Parrot, A. 1936: Les fouilles de Mari. Deuxième campagne (hiver 1934-35), *Syria* 17, 1-31.

Parrot, A. 1958: *Misson Archéologique de Mari. Le palais. Architecture*, Paris.

Pfälzner, P. 2001: *Haus und Haushalt. Wohnformen des dritten Jahrtausends vor Christus in Nordmesopotamien,* Damaszener Forschungen 9, Mainz.

Pfälzner, P. 2002/2003: Die Politik und der Tod im Königtum von Qatna, *Nürnberger Blätter zur Archäologie* 19, 85-102.

Pfälzner, P. 2004a: Die Welt der Lebenden und die Welt der Toten, Forschung, *Das Magazin der Deutschen Forschungsgemeinschaft*, 8-12.

Pfälzner, P. 2004b: The World of the Living and the World of the Dead, *German Research* 2-3, 16-20.

Pfälzner, P. 2005a: Syrien: Qatna. Ahnenkult im 2. Jahrtausend v. Chr., *Welt und Umwelt der Bibel* 2/2005, 56-59.

Pfälzner, P. 2005b: Mondo di vivi, mondo di morti, *Prometeo. Rivista trimestrale di scienze e storia*, anno 23, No. 91, 98-101 (trad. S. Petrillo).

Pfälzner, P. 2006a: Syria's Royal Tombs Uncovered, *Current World Archaeology* 15, 2-13.

Pfälzner, P. 2006b: Qatna. B. Archäologisch, *RlA* 11/1-2, 161-170.

Pfälzner, P. 2007: Das System des „kommerzialisierten Geschenkaustausches" im 2. Jahrtausend v. Chr. in Syrien, in: H. Klinkott - S. Kubisch (Hrsg.), *Geschenke und Steuern, Zölle und Tribute*. Antike Abgabenformen, Leiden, 117-131.

Pfälzner, P. in press: The Late Bronze Age ceramic traditions of the Syrian Jazirah, in: M. al-Madissi - V. Matoïan - C. Nicolle, *Céramique de l'âge du bronze en Syrie, II*, Beyrouth.

Preziosi, D. - Hitchcock, L.A. 1999: *Aegean Art and Architecture*, Oxford History of Art, Oxford.

Richter, T. 2002: Zu einigen Tontafelfunden der Grabungskampagne 2002 in Misrife/Qatna, *UF* 34, 2002, 603-618.

Richter, T. 2003: Das „Archiv des Idanda". Bericht über Inschriftenfunde der Grabungskampagne 2002 in Mishrife/Qatna, *MDOG* 135, 167-188.

Richter, T. 2005: Qatna in the Late Bronze Age. Preliminary Remarks, *SCCNH* 15, 109-126.

Schaeffer, C.F.-A. (éd.) 1962: *Ugaritca IV. Découvertes des XVIII^e^ et XIX^e^ campagnes 1954-1955. Fondements préhistoriques d'Ougarit et nouveaux sondages. Etudes anthropologiques. Poteries grecques et monnaies islamiques de Ras Shamra et environs,* Mission de Ras Shamra tome 15, Paris.

Starke, F. 2002: Chronologische Übersicht zur Geschichte des hethitischen Reichs, in: *Die Hethiter und ihr Reich. Das Volk der 1000 Götter*, Katalog, Kunst- und Ausstellungshalle der Bundesrepublik Deutschland, Theiss-Verlag Stuttgart, 310-315.

Tsukimoto, A. 1985: *Untersuchungen zur Totenpflege (kispum) im alten Mesopotamien*, AOAT 216.

Virolleaud, Ch. 1930: Les tablettes de Mishrifé-Qatna, *Syria* 11, 311-342.

Woolley, C.L. 1955: *Alalakh. An Account of the Excavations at Tell Achana in the Hatay*, 1937-1949, Oxford.

Yadin, Y. 1972: *Hazor. The head of all those kingdoms, Joshua 11:10*, London.

Yadin, Y. 1975: *Hazor, The rediscovery of a Great Citadell of the Bible*, Tel Aviv.

Biomolecular Analysis of Ceramic Containers, Skeletal Remains, Anthropogenic Sediments and Organic Artefacts from the Royal Tomb at Qatna

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يؤمن القبر الملكي في تل المشرفة/قطنا القديمة / فرصة لا مثيل لها للبحث باستخدام تحليل الأنسجة، لقد أغلق القبر وبشكل كامل منذ دمار القصر الملكي، وقد اكتشف ولحسن الحظ في حالة ممتازة من الحفظ وخاصة موجوداته "بقايا هياكل عظمية إنسانية وحيوانية" موزعة على غرف الدفن الأربعة.
عدد كبير من الأواني لفخارية والحجرية نشاهد بقاياها في المكان، وأرض القبر مشبعة بالبقايا العضوية تم دراستها من خلال نشاطات الدراسات الوراثية.
لدينا رغبة بإعادة فهم بعض النشاطات التي كانت تمارس في المدفن الذي يستخدم كغرفة دفن للطبقة العليا في المدينة.
وخلال الدراسة المركزة على عينات الأنسجة والمواد المأخوذة من قعر القبر ومحتويات الأواني الفخارية، "بقايا الهياكل العظمية والبقايا العضوية".
وهنا تصنف استراتيجية العمل على العينات المأخوذة وبرنامج التحليل والفرز بأنه الطريق الموعود إلى عمل ناجح وباهر.

Abstract

The Royal tomb at the site of Tell Mishrifeh (ancient Qatna) provides an unparalleled opportunity for investigation using an integrated biomolecular approach. The tomb has been sealed since the destruction of the palace thus, the finds were discovered *in situ* and appear to be in an excellent state of preservation. Skeletal remains of humans and animals are distributed throughout the four chambers of the tomb, many of the pottery and stone vessels have visible residues in place and even the tomb floor holds substantial organic deposits deriving from anthropogenic activity. We aim to reconstruct some of the activities which took place throughout the tomb's use as a high status burial chamber, through the application of a range of biomolecular and elemental analyses focusing on the floor sediments, vessel contents, skeletal remains and organic artefacts. Here we describe the sampling strategies, analytical programme and preliminary findings for what promises to be an exciting and rewarding project.

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1. Introduction

The biomolecular investigations of archaeological finds from Tell Mishrifeh, being undertaken at Bristol University, focus primarily on the Royal Tomb discovered beneath the northern edge of the Palace. At the time of writing we are in the early stages of a three year project. The tomb (Fig. 1), dug into the natural rock cliff, consists of an antechamber, main chamber and three side chambers. A major feature of the tomb is that it has been sealed since the destruction of the Palace by fire in the Bronze Age. The finds have not been buried and there has been very little inundation of groundwater, therefore are in a remarkable state of preservation. The contents of the tomb were found *in situ* and include ca. 2000 artefacts including jewellery and carved decorative objects, human and animal bones, sarcophagi and many stone and pottery vessels, many with visible organic residues still in place. Even the floor of the tomb remained undisturbed showing evidence of substantial organic deposits; these are essentially anthropogenic sediments arising from the use of the tomb which have not been subjected to weathering or bioturbation activity and thus offer considerable potential for reconstructing different areas of activity. The remarkable preservation of the tomb and nature of the artefacts contained therein, offers an unparalleled opportunity to investigate key aspects of Bronze Age burial practice through analysis of the organic residues associated with the various classes of find.

2. Sampling strategies

Sampling campaigns were performed during the original excavation in December 2002 (anthropogenic sediments), September/October 2003 (vessels and contents, further anthropogenic sediments) and August/September 2004 (further vessels and contents, human remains, potsherds from the Palace and organic artefacts). These have resulted in over 500 individual samples. Further sampling will also take place during the summer of 2005 to collect human, animal and plant remains. Visible residues, contents and fabric samples were collected from the vessels which include simple food, drink and storage containers, in addition to more specialised forms which were imported or traded over considerable distances. Potsherds from a storage area of the Palace were also selected as a comparison to those within the tomb. The anthropogenic sediments were systematically sampled from the tomb floor, including areas which were visually assessed as being the foci of human activity and from other less intensively used areas. Human tissue, plant remains and textiles were sampled with guidance from an anthropologist, micromorphologist, textile expert and archaeologists. Small samples of artefacts of organic origin, such as a carved lion's head container and various items of jewellery which appear to be composed of, or incorporate, a resinous substance(s), were sampled from Damascus Museum.

3. Analytical programme

This project offers scope for testing hypotheses relating to: (i) the nature of the organic based commodities contained in the various vessel types, including identification of commodities that were traded or imported from other regions; (ii) the role of specific commodities in the burial ritual, including a number of exceptional examples of possible 'wine' or 'beer' vessels containing copious residues; (iii) the processes of formation of the organic sediments within the tomb in relation to burial practices and ritual activities; and (iv) the nature and composition of the organic artefacts found within the tomb. The majority of the biomolecular analyses will be performed according to established protocols as described below, although opportunities also exist for the development of new procedures, all interpretations will be made in conjunction with the findings of the many other specialists, e.g. ceramicists, faunal and human bone specialists, micromorphologists, etc.

3.1 Organic residue analyses of pottery vessels

The tomb contained ca. 200 ceramic and stone vessels of widely varying forms (Fig. 2); while these forms can proffer valuable clues to the nature of the contents and will assist in directing the chemical analyses only lipid residue analysis can provide direct chemical evidence for determining their actual mode of use. The types of organic commodities encountered in archaeological vessels fall into three major categories, namely, foodstuffs, beverages and exotics (i.e. ointments, perfumes, incense etc.).

3.1.1 Food vessels

Such vessels would have been used for the presentation, preparation, storage and transport of con-

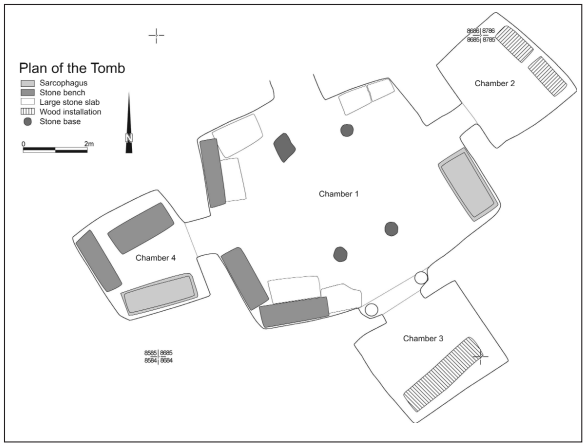


Fig. 1. Plan of the Royal Tomb at Tell Mishrifeh.



Fig. 2. Photograph showing the range of vessels types found within the tomb.

sumable commodities. The major foci in the analysis of this vessel type will be the preserved lipids since these offer considerable opportunities for determining the nature of their contents. Lipid residue analysis *via* gas chromatography (GC), GC-mass spectrometry (GC/MS) and GC-combustion-isotope ratio-MS (GC-C-IRMS) has enabled the detection and characterisation of a wide range of commodities including ruminant adipose fats, non-ruminant adipose fats, dairy fats[3], epicuticular plant waxes[4], plant oils/lipids[5], beeswax[6] and coniferous and triterpenoid plant resins[7]. Many of the food vessels contained within the tomb displayed visible remains of their contents, including ceramic platters holding large quantities of morphological remains, e.g. animal bones, which appear to be the remains of meals or offerings. Analyses will be performed of both visible residues and those absorbed within the ceramic matrix[8]. Given the majority of the vessels are intact, a modified sampling strategy was adopted. Visible residues were removed from the interior surfaces of vessels using a scalpel, while ceramic fabric samples, containing absorbed residues, were removed using a modelling drill equipped with an abrasive bit. After addition of internal standard, sub-samples are extracted with a mixture of chloroform and methanol (2:1 v/v) to obtain the total lipid extract (TLE). After derivatisation, TLEs or fractions thereof are analysed using GC, GC/MS and GC-C-IRMS. Compositional information from these residue analyses will be combined with the results of macro-analysis of morphological remains, e.g. animal bones present within vessels. We will also work with epigraphers to relate vessel contents to inscriptions and ceramicists to relate vessel forms to residue type and geographical origin. This combination of analyses will allow comprehensive relationships between vessel types and contents to be assessed.

3.1.2 Vessels used for beverages

Vessels used for the transport and storage of alcoholic beverages (wine/beer) are certain to have existed in antiquity, however, residues of such products have never been adequately characterised from archaeological contexts[9]. The tomb contains multiple examples of possible wine or beer vessels holding copious homogeneous residues. Since there has been no water-logging of the tomb we have a unique opportunity to study remains of potentially water soluble residues. Few vessels of this type have been recovered from such

3 Evershed - Heron - Charters - Goad 1992: 187-208; Dudd - Evershed 1998: 1478-81; Copley - Berstan - Dudd - Docherty - Mukherjee - Straker - Payne - Evershed 2003: 1524-9.

4 Evershed - Heron - Charters - Goad 1992: 187-208; Evershed - Heron - Goad 1991: 540-544; Charters - Evershed - Blinkhorn - Quye 1997: 1-7.

5 Copley - Rose - Clapham - Edwards - Horton - Evershed 2001: 593-597; Copley - Rose - Clapham - Edwards - Horton - Evershed 2001: 538-542.

6 Charters - Evershed - Blinkhorn - Denham 1995: 113-27.

7 Beck - Smart - Ossenkop 1989: 369-80; Charters - Evershed - Goad - Heron - Blinkhorn 1993: 91-101

8 Copley - Berstan - Dudd - Docherty - Mukherjee - Straker - Payne - Evershed 2003: 1524-1529; Evershed - Heron - Goad 1990: 1339-1342; Evershed - Dudd - Copley - Berstan - Stott - Mottram - Buckley - Crossman 2002: 660-668; Mottram - Dudd - Lawrence - Stott - Evershed 1999: 209-221.

9 McGovern - Glusker - Moreau - Nuñez - Beck - Simpson - Butrym - Exner - Stout 1999: 863-864.

a favourable environment. While lipid residues may aid in the identification of these residues, the analysis of inorganic and insoluble components will also be investigated. Our recent studies of fermented beverages, produced in laboratory experiments involving replica vessels[10], have already provided insights into the types of chemical indicator that may be diagnostic. Based on this the following lines of enquiry are being pursued: (i) characterisation of diagnostic marker compounds characteristic of fermentable substrates, such as lipids released from cuticular waxes or more polar compounds such as the phenolic acids (e.g. hydroxybenzoic acids, hydroxycinnamic acids and their derivatives and flavanoids) which are found in grapes and survive the fermentation process[11]; (ii) higher plant resins believed to have been added to wine (the original 'resinated' wine), as flavour enhancers and preservatives will be targeted[12]; (iii) yeast derived lipids in both visible and absorbed resides will be targeted as these will aid in the detection of fermented beverages; (iv) the identification of inorganic compounds such as tartaric acid salts and oxalates may provide complementary evidence for alcoholic beverages, although these markers have to be used with great caution. Spectroscopic and spectrometric techniques are being developed to identify specific biomarkers for the most likely beverage types. While several of the possible biomarkers for wines and beers are non-specific, the use of a combination of these criteria, in addition to the assessment of vessel forms, will help to identify fermented products and any organic compounds which may have been added to them during their production.

3.1.3 Specialised vessels

This class of vessel, including those constructed of ceramic and stone fabrics, is likely to have contained 'exotic' products such as ointments, perfumes or incense. Although any volatile compounds present in perfumed goods will have evaporated, lipid residue analysis will prove useful for the identification of oil and fat based products[13], as well as resinous materials, e.g. pistacia[14] and frankincense[15], which are known to persist at archaeological sites for many millennia. Visible residues and ceramic fabric samples have been collected from several vessels of this type and are being submitted to analysis by GC and GC/MS as described above.

3.2 Biomolecular analysis of anthropogenic sediments and sarcophagi contents

The sediments contained within the tomb are quite exceptional since the chamber is rock-cut and no soils would have been present prior its use as a tomb. Since these sediments are entirely anthropogenic in origin they offer truly unique potential as a sink of chemical indicators of human activity. The range of sediment samples are essential for distinguishing, through chemical (and morphological) analyses, between the different functional areas of the tomb, as they will reflect burial or ritual activities. The major contributors to the sediments are likely to be decomposed human and animal tissues, plant remains, embalming agents or treatments, and food offerings. Small fragments of wood observed in some areas suggest wooden artefacts were present, e.g. biers used to carry the dead or superstructures associated with decoration of the tomb. Due to the unusual nature of formation of these sediments, their analysis provides a novel analytical challenge. Approximately 40 sediment samples have been collected to date, these are being analysed for a variety of biomarkers including: (i) adipocere derived fatty acids and sterols, such as cholesterol and coprostanol, indicative of the presence of human tissue[16]; (ii) phenolic markers indicative of the presence of wood or other plant tissues, such as reed or rush[17] (iii) biomarkers for beeswax or other plant and insect waxes and 'exotic' commodities, such as resins, perfumes and ointments, which may have been used to treat the bodies of the dead[18]; and (iv) evidence for food remains which may have been presented as ceremonial offerings. An hierarchical approach has been adopted, progressing from bulk analyses, such as organic (C, H, N) and

[10] Chivall 2003.
[11] Gil-Muñoz - Gómez-Plaza - Martínez - López-Roca 1999: 259-272.
[12] Murray - Boulton - Heron 2000: 577-608.
[13] Dudd - Evershed 1998: 1478-1481; Condamin - Formenti - Metais - Michel - Blond 1976: 195-201.
[14] Stern - Heron - Corr - Serpico - Bourriau 2003: 457-469.
[15] Evershed - van Bergen - Peakman - Leigh Firbank - Horton - Edwards - Biddle - Kjolbye Biddle - Rowley Conwy 1997: 667-668; van Bergen - Peakman - Leigh Firbank - Evershed 1997: 8409-8412.
[16] Evershed - Connolly 1994: 577-583; van Bergen - Bland - Horton - Evershed 1997: 1919-1930.
[17] van Bergen - Bland - Horton - Evershed 1997: 1919-1930; van Bergen - Poole - Ogilvie - Caple - Evershed 2000: 71-79.
[18] Buckley - Evershed 2001: 837-841.

inorganic (inductively coupled plasma-atomic emission spectroscopy and phosphate analysis) elemental analyses. Sediment samples will be analysed for their lipid content largely as described for the pottery samples above[19]. Off-line and on-line pyrolysis-GC/MS will be used to screen for lignin biomarkers[20]. Quantitative assessments of the various indicator compounds will allow a 'chemical map' to be produced which will help to define the uses of the different areas of the tomb.

3.3 Biomolecular analysis of human bones and tissue and animal bones

The bones of several individuals were contained within the sarcophagi and on the tomb floor and the remains of a further individual were discovered on a stone bench in Chamber 4. Animal bones were also found in various areas on the floor of the tomb. Due to the largely mixed nature of the bone assemblage the principal biomolecular information that will be obtained concerns the diets of individuals. Extraction of collagen from these bones will allow $\delta^{13}C$ and $\delta^{15}N$ values to be determined[21]. The remains of the individual in Chamber 4 are being analysed using lipid residue analysis, as well as Py-GC/MS where samples are of a very small size, enabling us to decipher what was placed on the different areas of the stone bench. Degradation experiments will also be performed to further our understanding of the degradative processes occurring to a human body in such a context.

4. Integration of biomolecular information

By integrating the information obtained from analysis of the many pottery and stone vessels and their contents, anthropogenic sediments, human and animal bones, we will be able to build up a picture of how this tomb was used, gaining substantial insights into the activities involved in the burial ritual. Due to the paucity of information currently available, the information we gain from this specific tomb will significantly add to our wider understanding of Eastern Mediterranean Bronze Age commodities, trade, diet, burial practices and ritual beliefs.

5. Results to date

Initially a number of preliminary studies on a relatively small number of samples have been undertaken in order to assess the preservation of organic materials from the context.

5.1 Resin artefacts

Among the many finds in the tomb was a series of artefacts made from a homogeneous amorphous organic material, possibly a type of plant resin. Resins are sticky, water-insoluble metabolic by-products exuded by plants. They are composed of complex mixtures of mono-, sesqui-, di- and triterpenoids and possess structures based on isoprene (C_5H_8) units[22]. Under natural forest conditions, the volatile fractions of most resins evaporate, while the non-volatile dienic functions can polymerise over geological time and become fossilised[23]. Resins have been attractive as materials for use in adhesives, coatings, pigments and incense since antiquity; and have also been used to make jewellery and small sculptures, particularly in the case of fossil resins, such as amber and the various hard copals[24]. The diverse origins, chemical complexity and diagenetic alteration of aged resins require the application of a wide range of organic geochemical techniques for their characterisation. Due to the polymeric nature of these materials and the small (submilligram) samples available, the most suitable technique is Py-GC/MS, the use of which is enhanced by simultaneous thermally assisted hydrolysis and methylation (THM) with tetramethylammonium hydroxide (TMAH)[25]. Initial analyses have focused on four artefacts, two beads (MSH02G-i1448 and MSH02G-i2329), a carved lion's head container (MSH02G-i0759), and a lid for the lion's head (MSH02G-i0766), in order to determine the origin of the material used in their production.
Analyses have revealed that the four samples are composed of the same material, containing a range of mono- and diterpenoid biomarkers and succinic acid (Fig. 3 and structures 1-8), the presence of

[19] Bull - Elhmmali - Roberts - Evershed 2003: 149-161.
[20] van Bergen - Bland - Horton - Evershed 1997: 1919-1930; van Bergen - Poole - Ogilvie - Caple - Evershed 2000: 71-79.
[21] Richards - Hedges - Molleson - Vogel 1998: 1247-1252; Privat - O'Connell - Richards 2002: 779-790; Ambrose - Buikstra - Krueger 2003: 217-226.
[22] Mills - White 1994: 95-128.
[23] Langenheim 1969: 1157-1169; Lambert - Poinar 2002: 628-636.
[24] Mills - White 1994: 95-128.
[25] Anderson - Winans 1991: 2901-2908.

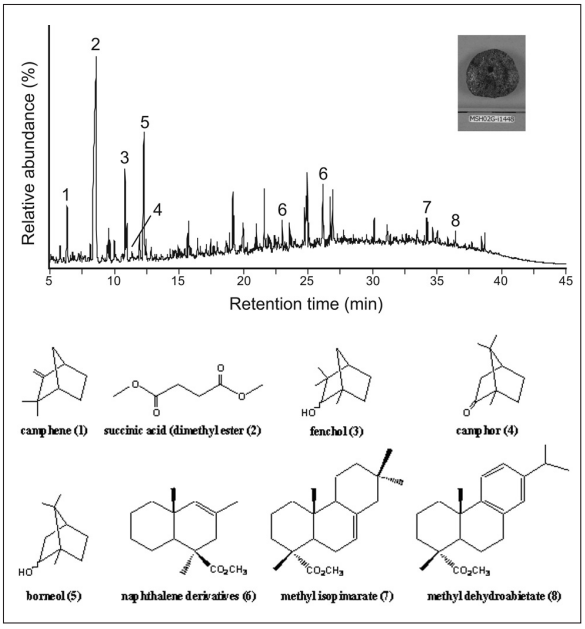


Fig. 3. Partial pyrogram and photograph of resin bead MSH02G-i1448 pyrolysed at 610°C in the presence of TMAH.

methyl dehydroabietate and related compounds point to a coniferous resin source. The best known materials with the observed chemical and physical properties are ambers and copals. Radiocarbon dating of the artefacts and analysis of a series of reference resins are currently being undertaken. This will establish whether the artefacts were made from fossilised or recent resin, and help to determine their origin.

5.2 Py-GC/MS analysis of anthropogenic sediments from the tomb

An important question relating to the nature of the tomb in antiquity is whether large quantities of wood were present, e.g. the presence of wooden superstructures such as funerary beds/platforms and shrines. The presence of small fragments of wooden material, along with darkened areas of sediment on the tomb floor provides a clue to the likely location of wooden artefacts placed in the tomb whilst in use. Although morphologically identifiable wooden remains are scarce in the present state, biomarker compounds should be detectable for the purpose of determining the locations of decayed organic materials. A preliminary investigation has been carried out on two sediment samples from the tomb, one obtained from under a stone bench where there was little evidence of organic input (MSH02G-i0185) and the other from a suspected organic rich region of the tomb floor where wooden structures may have been present (MSH02G-q1361). When pyrolysed in the presence of TMAH, no organic compounds were detected from the material obtained from under the stone bench, this is believed to be rubble from the cutting of the tomb from the limestone bedrock and therefore indicates that no organic material was present prior to its use as a tomb. Conversely, pyrolysis of sample MSH02G-q1361, revealed several classes of compound (Fig. 4a and structures 9-16) including: fatty acid methyl esters (FAMEs); homologous series of alkenes/alkanes and methoxy benzene derivatives. The FAMEs may derive from either free fatty acids or bound, esterified fatty acids that have been liberated by hydrolysis and subsequently methylated during thermochemolysis with TMAH. The presence of longer chain FAMEs (C_{20} - C_{26}) are indicative of the presence of higher plant matter, in the sediment, whilst the high abundance of the $C_{18:0}$ FAME could potentially indicate an animal derived input; however, further analysis would be necessary to confirm this. The presence of homologous alkanes/alkenes, are reported to derive from resistant, non-hydrolysable aliphatic macromolecules such as cutan and suberan, which are found in plant tissues such as cuticles and bark[26].

After cellulose, lignin is the most abundant biopolymer in vascular plants and accounts for approximately 25% of the mass of woody tissues[27] and consists of a polyhydroxyphenolic macromolecular structure, which has not yet been fully determined. As a vascular plant decomposes, lignin becomes a geopolymer that is degraded at a much slower rate than other biopolymers and as a result, is well preserved and often enriched in geochemical systems. It was therefore anticipated that pyrolytically formed lignin marker compounds would be present in the sediment where wood was present in antiquity. Fig. 4 contains several compounds which are known to derive from the guacyl and syringyl lignin subunits (see structures below). Of note is the presence of benzoic acid derivatives, which have been suggested to derive from oxidation of the benzaldehyde equivalent as wood ages, supporting the theory that decayed wood has contributed to the tomb sediment[28]. The

[26] Nierop 1998: 1009-1016.
[27] Hatcher - Minard 1996: 593-600.
[28] Challinor 1995: 93-107; McKinney - Hatcher 1996: 217-228.

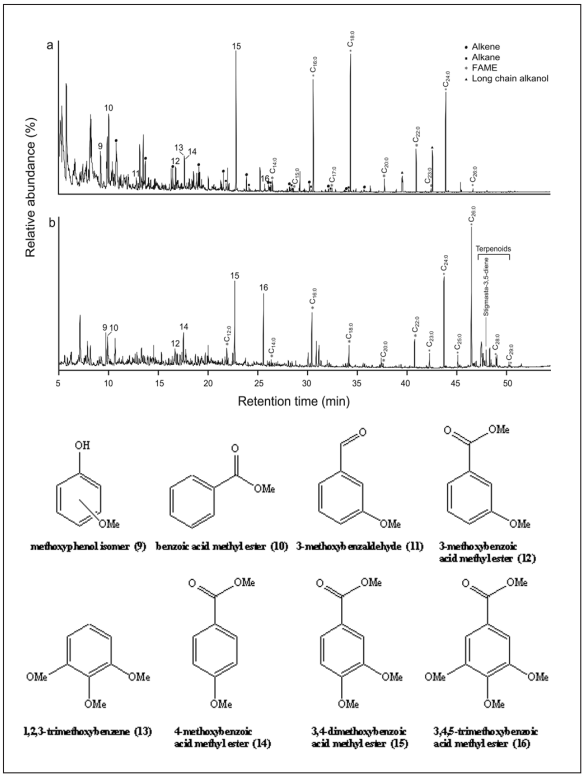


Fig. 4. Pyrograms of a) sediment from tomb floor (MSH02G-q1361) and b) wood recovered from inside vessel MSH02G-q1139, pyrolysed at 610 °C in the presence of TMAH.

absence of pyrolysis products incorporating aliphatic side chains, which are observed in abundance in modern wood, suggests that the lignin has undergone extensive chemical alteration through time[38].

In order to support the theory that these lignin marker compounds are derived from wood, a sample of a fragment of material which has been identified as wood (MSH02G-q1139) was pyrolysed in the presence of TMAH (Fig. 4b). The presence of longer chain FAMEs (C_{20}-C_{28}) is similar to the distribution observed in Fig. 4a, apart from the much higher abundance of the $C_{26:0}$ FAME. The relative abundance of the $C_{18:0}$ FAME in Fig. 4b compared to that in Fig. 4a suggests that this fatty acid is derived from a non-wood source, possibly human or animal tissue. The identities and distribution of lignin pyrolysis products correlate closely with those observed in the sediment sample, again supporting the presence of degraded wood in the sediment. Of additional interest in Fig. 4b is the presence of several compounds whose mass spectra suggest a terpenoid structure, with the identity of stigmasta-3,5-diene, the dehydration product of the major plant sterol sitosterol, being confirmed. The exact identities of the other terpenoid compounds are as yet undetermined, but may provide a means to identifying the species of tree from which the wood derived.

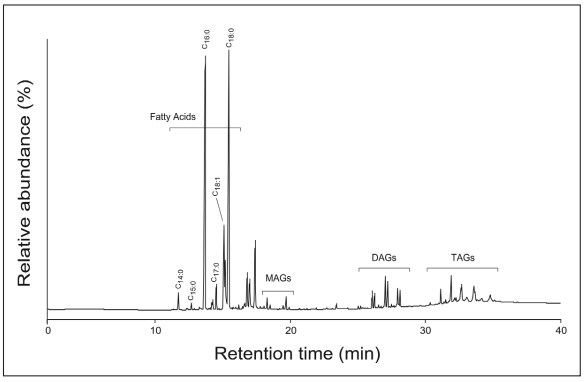


Fig. 5. Partial chromatogram of the lipid residue from potsherd MSH04G-q0318 from the Palace at Qatna.

5.3 Lipid residue analysis of potsherds

A total of 21 potsherds and one surface residue obtained from an area within the Royal Palace at Qatna believed to have been a storeroom were lipid extracted and analysed by HTGC and GC/MS. The majority of lipid extracts comprise mainly free fatty acids, particularly $C_{16:0}$ and $C_{18:0}$, which together with the mono, di and triacylglycerols (MAGs, DAGs and TAGs), are characteristic of a degraded animal fat (Fig. 5). The total lipid content of the sherds was variable with concentrations varying from <5 μg g^{-1} to >3000 μg g^{-1}. This difference could be due to several factors, such as the specific depositional environment of each sherd, the nature of the commodity and means of processing in the pottery vessel (e.g. storage or cooking), the number of times the vessel was used and the nature of the sherd (i.e. whether a rim or body sherd). Overall, 8 of the 21 vessels (38%) exhibit lipid concentrations considered to be significant. Further analysis using GC-C-IRMS, will provide information on the origin of the animal fat present within the vessels (i.e. porcine, ruminant or dairy fat). The high percentage of vessels suitable for isotope analysis provides evidence that the preservation found at the site may prove to be better than expected for the region.

6. Summary

The analyses so far completed on samples of resin artefacts, sediments, and potsherds from the Royal

Tomb and Palace at Qatna indicate that there is indeed good preservation of organic materials from this context. The major findings to date are: (i) the four suspected resin artefacts were confirmed to be composed of a resin with a coniferous tree source, all were fashioned from the same material; (ii) decayed wood, plant matter and potentially animal derived lipids were identified in a sample of sediment from the tomb floor and therefore contributed to the formation of the anthropogenic sediments; and (iii) lipid residue analysis of a selection of potsherds from the site have shown the level of preservation to be higher than expected for this region. The majority of vessels analysed were found to contain degraded animal fat.

There is great potential for further biomolecular analysis of archaeological finds from the Palace and Royal Tomb at Qatna. Initial analyses have shown a high level of preservation from a diverse range of organic materials. Ultimately, the findings of biomolecular investigations being undertaken at Bristol will be integrated with the data from the many other specialists involved in the project in order to build up a comprehensive picture of how the tomb was used.

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Bibliography

Ambrose S.H. - Buikstra J. - Krueger H.W. 2003: Status and gender differences in diet at Mound 72, Cahokia, revealed by isotopic analysis of bone, *Journal of Anthropological Archaeology* 22, 217-226.

Anderson K.B. - Winans, R.A. 1991: Nature and Fate of Natural Resins in the Geosphere.1. Evaluation of Pyrolysis-Gas Chromatography Mass-Spectrometry for the Analysis of Natural Resins and Resinites, *Analytical Chemistry* 63, 2901-2908.

Beck, C.W. - Smart, C.J. - Ossenkop, D.J. 1989: Residues and linings in ancient Mediterranean transport amphoras, *ACS Symposium Series* 220, 369-380.

Buckley, S.A. - Evershed, R.P. 2001: Organic Chemistry of embalming agents in Pharaonic and Graeco-Roman mummies, *Nature* 413, 837-841.

Charters, S. - Evershed, R.P. - Blinkhorn, P. - Quye, A. 1997: Simulation experiments for determining the use of ancient pottery vessels: the behaviour of epicuticular leaf wax during boiling of a leafy vegetable, *JAS* 24, 1-7.

Bull, I.D. - Elhmmali, M.M. - Roberts, D.J. - Evershed, R.P. 2003: The application of steroidal biomarkers to track the abandonment of a Roman wastewater course at the Agora (Athens, Greece), *Archaeometry* 45, 149-161.

Challinor, J.M. 1995: Characterization of Wood by Pyrolysis Derivatisation Gas-Chromatography Mass-Spectrometry, *Journal of Analytical and Applied Pyrolysis* 35, 93-107.

Charters, S. - Evershed, R.P. - Goad, L.J. - Heron, C. - Blinkhorn, P.W., 1993: Identification of an adhesive used to repair a Roman jar, *Archaeometry* 35, 91-101.

Charters, S. - Evershed, R.P. - Blinkhorn, P.W. - Denham, V. 1995: Evidence for the mixing of fats and waxes in archaeological ceramics, *Archaeometry* 37, 113-127.

Chivall, D. 2003: *Brewing in Antiquity: An Investigation into the Application of Organic Residue Analysis for the detection of Fermented Beverages in Archaeological Pottery*. unpublished MSci Thesis, University of Bristol.

Copley, M.S. - Rose, P.J. - Clapham, A. - Edwards, D.N. - Horton, M.C. - Evershed, P. 2001a: Detection of palm, fruit lipids in archaeological pottery from Qasr Ibrim, Egyptian Nubia, *Proceedings of the Royal Society London Biology* 268, 593-597.

Copley, M.S. - Rose, P.J. - Clapham, A. - Edwards, D.N. - Horton, M.C. - Evershed, R.P. 2001b: Processing palm fruit in the Nile Valley-biomolecular evidence from Qasr Ibrim, *Antiquity* 75, 538-542.

Copley, M.S. - Berstan, R. - Dudd, S.N. - Docherty, G. - Mukherjee, A.J. - Straker, V. - Payne, S. - Evershed, R.P. 2003: Direct Chemical evidence for widespread dairying in prehistoric Britain, *Proceedings of the National Academy of Sciences of the United States of America* 100, 1524-1529.

Condamin, J. - Formenti, F. - Metais, M.O. - Michel, M. - Blond, P. 1976: The application of gas chromatography to the tracing of oil in ancient amphorae, *Archaeometry* 18, 195-201.

Dudd, S.N. - Evershed, R.P. 1998: Direct demonstration of milk as an element of archaeological economies, *Science* 282, 1478-1481.

Evershed, R.P. - Heron, C. - Goad, L.J. 1990: Analysis of organic residues of archaeological origin by high tem-

perature gas chromatography and gas chromatography-mass spectrometry, *Analyst* 115, 1339-1342.

Evershed, R.P. - Heron, C. - Charters, S. - Goad, L.J. 1992: The survival of food residues: New methods of analysis, interpretation and application, *Proceedings of the British Academy* 77, 187-208.

Evershed, R.P. - van Bergen, P.F. - Peakman, T.M. - Leigh-Firbank, E.C. - Horton, M.C. - Edwards, D. - Biddle, M. - KjolbyeBiddle, B. - Rowley Conwy, P.A. 1997: Archaeological frankincense, *Nature* 390, 667-668.

Evershed, R.P. - Dudd, S.N. - Copley, M.S. - Berstan, R. - Stott, A.W. - Mottram, H. - Buckley, S. - Crossman, Z.M. 2002: Chemistry of archaeological animal fats, *Accounts of Chemical Research* 35, 660-668.

Evershed, R.P. 1992: Chemical-composition of a bog body adipocere, *Archaeometry* 34, 253-265.

Evershed, R.P. - Connolly, R.C. 1994: Post mortem Transformations of sterols in bog body-tissues, *JAS* 21, 577-583.

Gil-Muñoz, R. - Gómez-Plaza, E. - Martínez, A. - López-Roca, J.M. 1999: Evolution of phenolic compounds during wine fermentation and post-fermentation: Influence of grape temperature, *Journal of Food Composition and Analysis* 12, 259-272.

Hatcher, P.G. - Minard, R.D. 1996: Comparison of dehydrogenase polymer (DHP) lignin with native lignin from gymnosperm wood by thermochemolysis using tetramethylammonium hydroxide (TMAH), *Organic Geochemistry* 24, 593-600.

Lambert, J.B. - Poinar Jr., G.O. 2002: Amber: the organic gemstone, *Accounts of Chemical Research* 35, 628-636.

Langenheim, J.H. 1969: Amber - a Botanical Inquiry, *Science*, 163, 1157-1169.

McGovern, P.E. - Glusker, D.L. - Moreau, R.A. - Nuñez, A. - Beck, C.W. - Simpson, E. - Butrym, E.D. - Exner, L.J. - Stout, E.C. 1999: A funerary feast fit for King Midas, *Nature* 402, 863-864.

McKinney, D.E. - Hatcher, P.G. 1996: Characterization of peatified and coalified wood by tetramethylammonium hydroxide (TMAH) thermochemolysis, *International Journal of Coal Geology* 32, 217-228.

Mills, J.S. - White, R. 1994: Natural resins and lacquers In *The Organic Chemistry of Museum Objects* Butterworth-Heinemann, Oxford, 95-128.

Mottram, H.R. - Dudd, S.N. - Lawrence, G.J. - Stott, A.W. - Evershed R.P. 1999: New chromatographic, mass spectrometric and stable isotope approaches to the classification of degraded animal fats preserved in archaeological pottery, *Journal of Chromatography*, 833, 209-221.

Murray, M.A. - Boulton, N. - Heron, C. 2000: Viticulture and wine production, in: P.T. Nicholson, I. Shaw (eds), *Ancient Egyptian Materials and Technology*, Cambridge University Press, Cambridge, 577-608.

Nierop, K.G.J. 1998: Origin of aliphatic compounds in a forest soil, *Organic Geochemistry* 29, 1009-1016.

Privat K.L. - O'Connell T.C. - Richards M.P. 2002: Stable isotope analysis of human and faunal remains from the Anglo-Saxon cemetery at Berinsfield, Oxfordshire: Dietary and social implications, *JAS* 29: 779-790.

Richards, M.P. - Hedges, R.E.M. - Molleson, T.I. - Vogel, J.C. 1998: Stable Isotope Analysis Reveals Variations in Human Diet at the Poundbury Camp Cemetery Site, *JAS* 25, 1247-1252.

Stern, B. - Heron, C. - Corr, L. - Serpico, L. - Bourriau, J. 2003: Compositional variations in aged and heated pistacia resin found in late Bronze Age Canaanite amphorae and bowls from Amarna, Egypt, *Archaeometry* 45, 457-469.

van Bergen, P.F. - Bland, H.A. - Horton, M.C. - Evershed, R.P. 1997: Chemical and morphological changes in ancient seeds and fruits during preservation by desiccation, *Geochimica et Cosmochimica Acta* 61, 1919-1930.

van Bergen, P.F. - Peakman, T.M. - LeighFirbank, E.C. - Evershed, R.P. 1997: Chemical evidence for archaeological frankincense: Boswellic acids and their derivatives in solvent soluble and insoluble fractions of resin-like materials, *Tetrahendron Letters* 38, 8409-8412.

van Bergen, P.F. - Poole, I. - Ogilvie, T.M.A. - Caple, C. - Evershed, R.P. 2000: Evidence for demthylation of syringyl moieties in archaeological wood using pyrolysis/gas chromatography/mass spectrometry, *Rapid Communications in Mass Spectrometry* 14, 71-79.