

The ARCHAEOLOGICAL SITE OF QAŞR AL-UŞAYKHM

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Introduction

The site of Qaşr al-Uşaykhim is situated on the northeastern side of Jordan, in the black desert called *al-bādiya*.

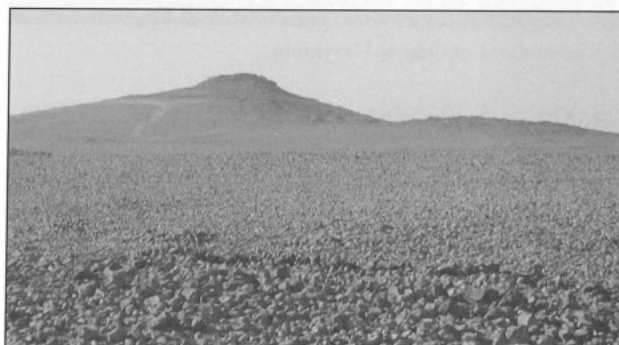
The desert castle belongs to the *limes Arabicus*, which is the eastern Roman frontier in Province Arabia, and is situated on a cone-shaped mound (Fig. 1) constituted of limestone overlaid with basalt stratifications, with two boundary walls around it, in a drop of water shape (Fig. 2), the Roman castle is today called by the Bedouins of the area Qaşr al-Uşaykhim. The name of the ancient site, however, remains unknown.

The hill, on top of which rises the castle, is called Jabal al-Uşaykhim (Fig. 3). Its height is about 641m above sea level, from where one enjoys a spectacular view. The castle faces Wādi al-Uşaykhim to the south (Fig. 4) and the contemporary Qaşr al-Azraq to the northeast (Fig. 5), which is far about 19,2km away.

The remains of the Roman castle of the *limes Arabicus* are constituted by huge precisely squared stones (Fig. 6), also scattered around it in a disorderly fashion where the primary boundary walls of quadrangular shape and belonging to the first elevation of the castle (the castle walls measure N.



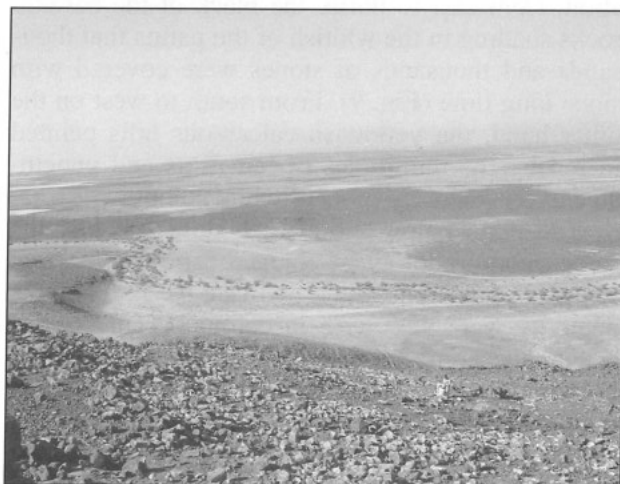
1. Jabal al-Uşaykhim.



3. Jabal al-Uşaykhim.



2. The site of al-Uşaykhim.



4. Wādi al-Uşaykhim.



5. Qaṣr al-Azraq.



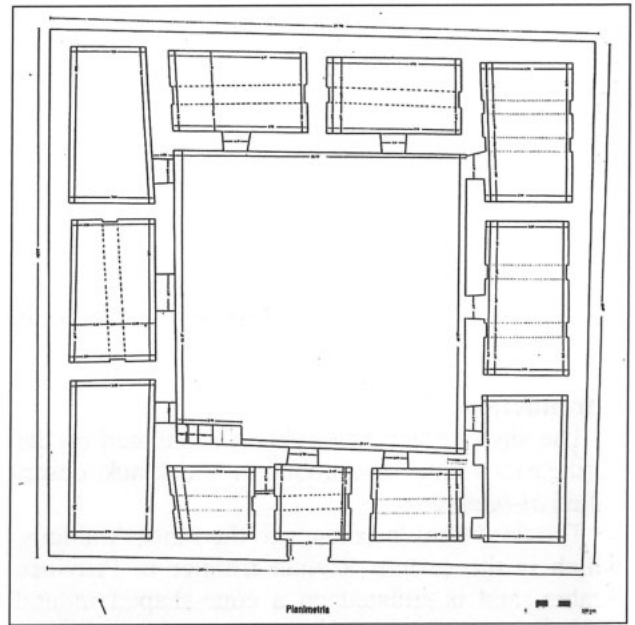
6. The remains of Qaṣr al-Uṣaykhim.

24.00m x S. 23.90m x E. 23.60m x W. 23.50m)
(Fig. 7).

The landscape changed in both colour and geological aspects. From the layers of cooled volcanic lava, which had changed into a vast heap of black basalt stones, to the calcareous plain overlaid by a stratum of flints, where the Wādī al-Uṣaykhim crossed the territory with its winding path (Fig. 8).

The colour was unique in its chromatic variation, from east to north, the black of the basaltic rocks shading in the whitish of the patina that thousands and thousands of stones were covered with since long time (Fig. 9). From south to west on the other hand, the yellowish calcareous hills painted in red by the multitudes of red flints and punctuated everywhere by spots of white colour.

The plain below the al-Uṣaykhim hill had the same geomorphological characteristics as the top. It was, in fact, constituted by black basalt while the declivity were yellowish in colour because of the calcareous conformation mixed to the purple-red brought by the flint horizons, that run down to the plain with their shrill jingling. Because of this chromatic variation, the hill's name is al-Uṣaykhim, which in Arabic means strong change of colours from black to reddish (Fig. 10). Till today, the arid



7. Plan of Qaṣr al-Uṣaykhim.



8. Wādī al-Uṣaykhim.



9. East side of the Castle.

landscape of Uṣaykhim is unchanged.

The *al-bādiya* around Jabal al-Uṣaykhim is today full of life and rich in archaeological and historical heritage, such as the Bedouin settlements, the epigraphy (Fig. 11), the rounded enclosures for domesticated animals, and the huge traps (Fig. 12), constituted by dry walls in basaltic stone, of vari-



10. West side of the Castle.



11. Epigraphy.



12. Huge traps.

ous shapes and sizes with their kilometric protuberances. Once upon a time, these traps were used by the lords of the desert for hunting, so much as to extinguish any presence of gazelles, foxes, ostrich, and other wild animals that lived in this area.

Aurel Stein was one of the first explorers to reach the castle in the desert in the twentieth century. He carried out his survey by flying in an aircraft, taking photographic documentation of his explorations, which was later continued by David

Kennedy and Gregory

(Kennedy 1982). Stein noticed the two boundary walls, and in describing them stated that they had been built later than the original construction of the castle by the auxiliary Arabic troops. He also suggested that within these boundary walls (of small construction size, the reason for which Stein believed them not to have been built by the Romans) the auxiliary troops had built their tents in the proximity of the castellum in order to inhabit them (Gregory and Kennedy 1985: 277).

Archaeological Excavations

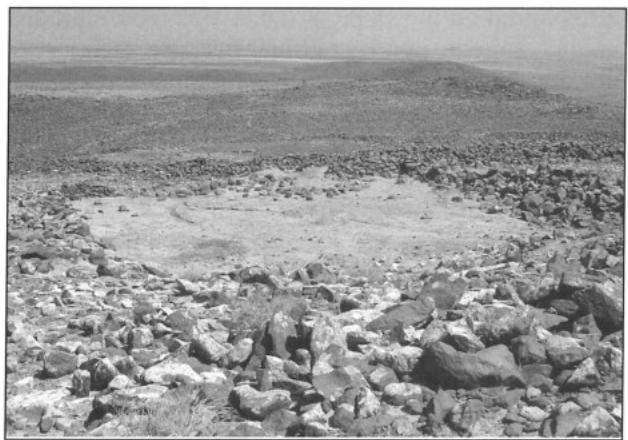
This is a joint project between the Department of Antiquities of Jordan and our Institute (Istituto Superiore per le Tecniche di Conservazione dei Beni Culturali e dell'Ambiente "Antonino De Stefano"). In this project of Archaeological Excavation and Restoration at Qaşr al-Uşaykhim there has been five archaeological missions initiated in 2000.

We studied the site and carried out archaeological excavations inside and outside of the Roman castle, and dated the castle to the third century AD.

We restore the foundations of the castle that in more points was opened by the clandestine. In addition, we carried out restoration in the boundaries of the castle (on the eastern side).

The two boundary walls have been studied, which we believe to belong neither to the Roman nor to a later period, but to an earlier period, owing to both their conformation and to the construction technique, which is quite primitive both in its manufacture and in its placement. On the other hand, within the boundary walls of Qaşr al-Uşaykhim, a rectangular feature (Fig. 13) was found, which was used to keep the water inside.

On the southern side, a series of small round feature (Ø 2,00m ca.) have been found (Fig. 14),



13. Rectangular stemming.



14. Round structures.

made of basaltic stone, possibly obtained from the stone blocks from the external boundary walls of the castle. We excavated these structures and we found a layer of calcium carbonate. The depth of the layer of calcium carbonate was of 30cm, and it extends directly on top of the bedrock.

It would appear for the first time that these circular structures were used for agricultural cultivation, even though the plant species remain unknown, as no traces of seeds of vegetables have been found. The canalisation system was also investigated between circular structures where there was an evident water decanting, so it seems that they were used for collecting water; indeed these structures look like other structures found in the desert of Negev and al-Ḥumayma (Oleson 1986).

A survey was carried out in the area above the slope's basin-like structures and it was gathered that the structures clashed with some well holes dug near the basalt quarries on the top of the hill. This induced the suggestion that from these wells water might come from, which was used to water the round structures below.

It cannot be believed that these circular structures found on the slope of the al-Uṣaykhim hill are neither Roman nor Byzantine, because their creation was the cause of the dismantlement of one of the two boundary walls of the Roman castle, also proving that the Romans would never have thought to build the structures creating such ruin. It could also give value to the theory that the circular structures are proof of an urban transformation of the castle (with the consequent search for food supplies) after the Roman or Byzantine soldiers had abandoned it.

On the other hand, another theory that can be

formulated is that these basins had been built prior to the Roman settlement of al-Uṣaykhim hilltop and that the Roman army left them there untouched, and thus they survived in those conditions till the present time. In any case, the importance of the discovery of the basins confirms that the area was much frequented and that its vegetation and climatic appearances were quite different from those of the present day.

During the first excavation campaign two important conservation interventions¹ were carried out in the two holes illicitly excavated close to the western boundary wall under the arch that supported the castle's attic (Fig. 15). The hole was over 4m deep and had affected the foundations of the castle, creating serious damage both on the relieving arch of the attic and the boundary walls of the central room on the western side. After strengthening all the masonry, the hole was filled with earth and rubble, packing down the various fill layers.

The second hole had been illicitly dug in the centre of the courtyard (Fig. 16) and it created a serious problem for movement within the site. The hole was thus filled with earth and stones re-compacting the layers of the fill.

A survey was also carried out within the first set of boundary walls and the Castle where a great amount of ceramics (pottery sherds) from the Roman and Byzantine periods was found, which date the settlement. This important find was revealed in the rainy season, when it washed away.

Some conservation tests have been carried out, which are of extreme importance for future conservation project and reconstruction of the Roman



15. The arch in the western side of the Castle.

1. The project of conservation of Qaṣr al-Uṣaykhim was created by Prof. Giuseppe Claudio Infranca, Professor of ar-

chaeological conservation in the University of Reggio Calabria and in the University of Rome "La Sapienza".



16. Court yard.

castle of al-Uşaykhim.

Then a survey was conducted in the area around the castle, an urban installation in the vicinity of the Roman castle was founded (Fig. 17), with 105 structures built from un-worked basaltic rocks built with dry-stone technique and two surrounded buildings full of flint stone tools from the Neolithic period (Fig. 18). A large urban settlement surrounded by two imposing boundary walls. The thick urban settlement has been partly destroyed by the Roman use of the site and by the later use of the hill that overlooks the wadi below.

We think that the two settlements of Jāwā and al-Uşaykhim were a part of the same prehistoric civilization, which was able to build extraordinary fortified cities, an articulated system of satellite-villages closely linked to the central settlement, ca-



17. Plan of the site of Qaşr al-Uşaykhim.



18. Flint tools.

nalizations, dams and cisterns for the water supply, essential for such arid territories.

We discovered a dam (Fig. 19) from the Neolithic period and we restored it, the dam is located in the north side of Jabal al-Uşaykhim, it is of significant dimensions (20m) and it channeled the waters in an artificial canal built with great skill by the prehistoric population inhabiting the site. After studying the dam we think that it belongs to the same period as the urban settlement of al-Uşaykhim. The dam is certainly one of the oldest



19. The Dam.

artificial canal built by man.

In addition, we discovered 36 villages (Fig. 20) of the urban installation near Wādī al-Uṣaykhim from the Neolithic period (Fig. 21).

We presume that Wādī al-Uṣaykhim was civilized with small villages, that also lasted under the Byzantine domination, and during the *limes Arabicus* where the military installations lived together with the native populations.

During these missions we have compiled a project of conservation of the area and of the Roman castle that was delivered to the Department of Antiquities. In 2003 we published a book, titled "*Limes Arabicus*"².

Limes Arabicus

The *limes Arabicus*, needed by the Roman army in order to defend and protect the vast Empire on the eastern boundary, is one of the borders which better survived the political, military and diplomatic meanderings that characterised the long life of



20. South village.



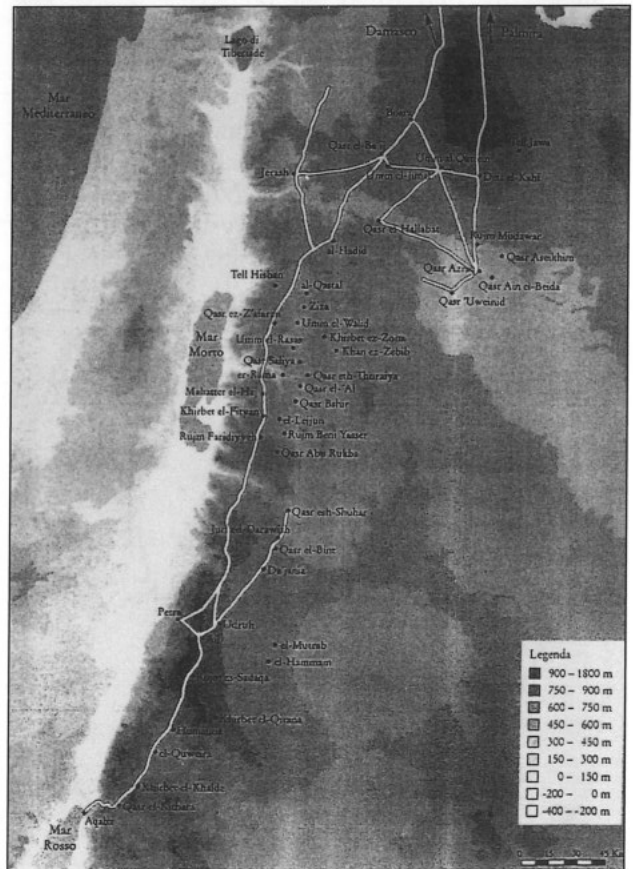
21. A hut from the village.

Rome's power over its own and neighbouring territories. Furthermore, a fact not to be overlooked, it has also survived the devastation and fragmentation of the Eastern Empire, becoming itself a fundamental column of the new Byzantine Empire.

The *limes Arabicus*, born as a military structure, was able in time to transform into a complex system, where civilians and military were able to live side by side with their military, social and commercial interests, all part of a wise game of diplomacy and power, where Rome drew the best advantages.

The Roman castle, situated along the *limes Arabicus* (Fig. 22), built on the highest top of that eastern strip of land of the Roman province called Arabia. The conical-shaped hill that dominated the underlying plain and overlooked the sinuous Wādī al-Uṣaykhim, reached the arid clearings of the Arab desert.

The province Arabia is where the oriental frontier had been created under the direct Roman control, and the army had already built the first military structures of the new alignment of the *limes Arabicus*. The reason that induced the Romans to



22. Limes Arabicus sites and streets.

2. The book '*Limes Arabicus*' is edited by Maysoun Al-Khoury.

make such a shift in the alignment of the limes Arabicus was a strictly economic one, linked to the control of the principal silk, incense and spices trade routes from the East that arrived to Rome's Empire. It was thus of increasing importance the construction of a new limes which integrated the pre-existing one crossing it with the *Strada Diocleziana*, a road built for this new occurrence.

The conical-shaped hill of al-Uşaykhim, today, as at the time of the ancient limes Arabicus, has an open view in all directions of the compass, it is a perfect site for a Roman castle (Fig. 3).

The arid environment where the Roman castle of al-Uşaykhim was built, must have been surprisingly live with both trade of goods and peoples who crossed the frontier on a daily basis, and on a vegetation and faunal level for the rich and blooming environment.

It is known from the historical sources that the fortifications built during the third century AD were occupied by military garrisons until the fifth century AD perhaps because the great earthquake that was registered between 498 and 552AD. Furthermore, for a certainty, only the military settlements of al-Lajjūn, al-Fityān, and Yāssir remained to defend the limes orientalis during this last period.

In particular, the Roman castle of al-Uşaykhim was under the military control of Castle al-Azraq, where the third Cyrenaica guaranteed safety and protection to the limes (Bowersock 1983: 98). Qaşr al-Uşaykhim together with Qaşr al-'Uwaynid and Qaşr al-Azraq were perfectly aligned in the complex military system to defend this part of the limes (Fig. 22). The auxiliary militias of Arab origin stayed at Castle al-Uşaykhim.

In addition, the archaeological research carried out at Qaşr al-Uşaykhim has demonstrated that the castle was inhabited even well beyond the military use for the defence of the eastern front and was accepted by the indigenous populations as a harmonious architectural structure respected and appreciated by those who lived in the savannah. This demonstrates that the fortresses of the limes Arabicus became, subsequent to their military function, a place of life and a refuge for the stationary and nomadic populations of the area, thus giving depth and significance to the architecture required by the Roman army, which was never considered an enemy by these populations, who considered it a structure of their own. This had to do with the fact that auxiliary troops, constituted by indigenous soldiers, had always been sheltered, and these same troops had popularised and brought closer the entire border defensive system, making it become co-

herent with the environment, and socially and economically alive.

Thus, the examination of methodology has become innovative and functional as it demonstrates that the limes Arabicus was a complex system already planned in the times of Augustus that had matured in its most intrinsic potentialities with the military support firstly of the Flavians and Trajan, and later of Septimius Severus and Diocletian, who enlarged the territories while keeping the basic strategy unchanged. Then the activation plan of the limes Arabicus carried on its general strategic lines also under the Byzantine emperors until Justinian's time.

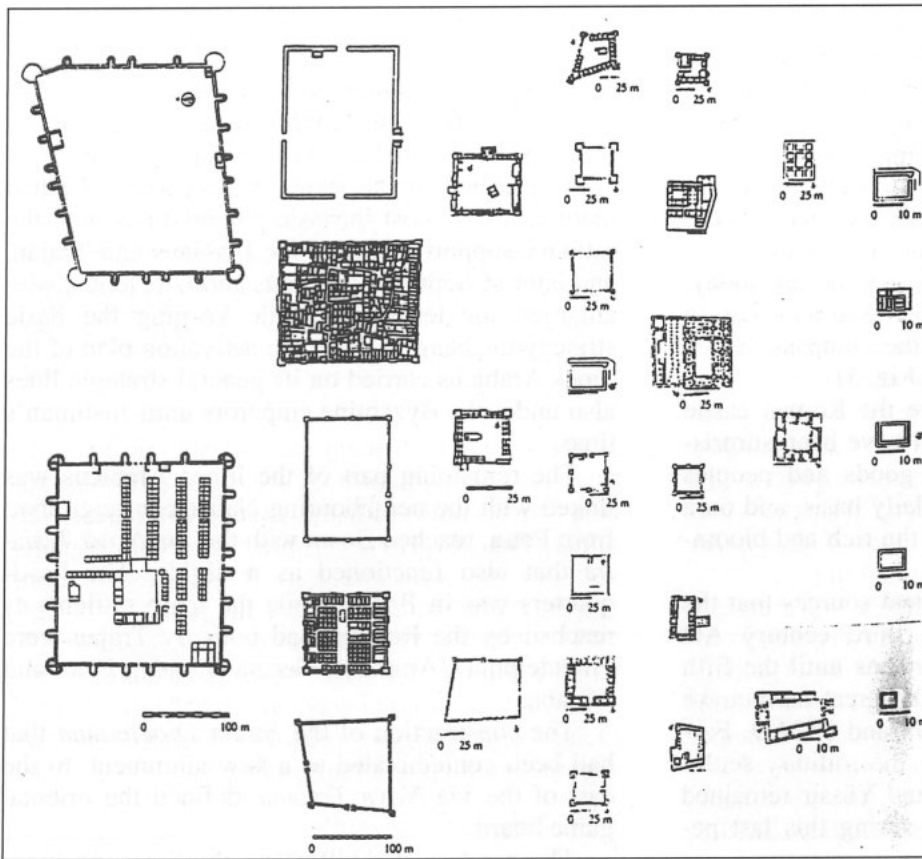
The remaining part of the limes Arabicus was linked with the neighbouring Nabataean reign that, from Petra, reached Bosra with the *via Nova Traiana* that also functioned as a divide. The headquarters was in Bosra, while the main settlements reached by the Roman road built by Trajan were Philadelphia ('Ammān), Gerasa (Jarash), Petra and 'Aqaba.

The construction of the *Strata Diocletiana* that had been contemplated as a new alignment, to the east of the *via Nova Traiana*, defined the oriental game board.

The great roads built along the limes Arabicus were fortified and under strict control of the army. Thus, while these run parallel to the border, the other secondary routes of the limes stretched straight across the border and beyond. The key role they played in the composition of the limes Arabicus was unavoidable. The defence structures of the fortified routes were constructed in a different way according to the topographic conditions or the military tactics: with walls, palisades, and ditches; apart from the fixed settlements that were the *castella*, forts, and blockhouses that were conveniently connected, as was the tower system that tightly controlled the borderline structure (Clausetti 1939: 43).

The typologies of the military installations (Fig. 23) created between the third and fourth century AD are:

1. The *castra* and the large *castella* that housed first the legions of Rome and those of Byzantium after the fall of the Western Empire. The *castra* housed the entire Roman legion. Up to now only two of these great military settlements have been found, even though it is known from historical sources of other sites which would have housed other legions with the same characteristics, as in the case of 'Aqaba with the X Fretentis. The two *castra* mentioned are those of al-Lajjūn, which has an extension of 5.50ha, and of Udhrū' with



23. Typologies of the military installation.

an extension of 6.00ha, both have a rectangular conformation. The so-called large *castella* which housed a whole legion or a large part of one, they were nothing but *castra* that were a military variant because of their conformation in the shape of a *castella*. The dimension of the large *castella* vary between 1 to 2ha, they come in two versions according to their planimetry:

- a) Quadrangular, Umm ar-Raṣāṣ and ad-Da'jāniyya;
- b) Rectangular, al-Ḥadīd and ḥumayma.

Amongst these large *castella* there is that of Umm al-Jimāl that varies slightly from the quadrangular form because of orographic reasons, but must be assimilated to this typology.

2. The *castella* where the Roman troops were permanently based: The *castella* housed some troops of the Roman legions and as the large *castella* had a quadrangular or rectangular shape. They differed only by the dimension that varied between 3500 and 6200m². The known *castella* of the limes Arabicus are: Qaṣr al-Azraq, Dayr al-Kahf, Khirbat al-Fityān.
3. Cohort *castella* in which it is presumed that

both Roman and auxiliary troops were housed: The cohort *castella* (Causetti 1939: 12) with a length of about 40m to the sides of the square, measure that corresponded to the width of the front of a cohort. A cohort was a unit that constituted the garrison (presidium) of the castellum. The castellum was in fact a military community that did not have the status of colony or municipium. To the quadrangular typology belonged the castles of Umm al-Walid, Qaṣr al-Bā'ij, and Jāwā, on the other hand those of Khirbat al-Qirāna, al-Quwayra, Qaṣr ath-Thurayya, Qaṣr al-Ḥallābāt, Khān az-Za'farān and Maḥa at al-Ḥaj, present a number of towers for sighting and defence. Finally, the castles with trapezoidal shape are: Qaṣr 'Uwaynid, Umm al-Jimāl, and Qaṣr al-Kithāra.

4. The blockhouses exclusively for auxiliary troops³: The blockhouses housed the auxiliary troops and their dimensions were always inferior to 1000m².

The blockhouses were: Qaṣr al-Uṣaykhim, Qaṣr al-'Al that has a quadrangular shape, Khirbat az-Zūna also quadrangular but with towers in the cor-

3. In the limes Arabicus the auxiliary troops were exclusively

made up by personnel of Arab descent.

ners. Rujum Bani Yāssir was of trapezoidal shape. A separate matter is the case of Rujum aş-Şadaqa.

5. The *turris* or the *burgius*: The *Turris* positioned along the *limes Arabicus* were observation posts, for liaison and transmission of fire or smoke signals, for the defence of water sources and advanced defence. As far as their architectural forms are concerned, they were built with a quadrangular or circular plan. Along the *limes Arabicus* the towers that have been found are the exact same number of the ones that were once positioned in front of the enemy lines. Proof of this is the discovery, made during the surveys carried out of the territory around Qaşr al-Uşaykhim, of two towers belonging to the *limes Arabicus*. One has a rounded shape, it garrisoned a water source; the other, with a quadrangular plan, was used for signalling.

The *burgus*, on the other hand, were created separately from the military plan, designated for the enforcement of public law, this was a village with an embryo of municipality. However, this small civilian community had small pertinence with the *limes arabicus*, because no trace of any such thing has been found. On the other hand, there are some examples of *burgus speculatorius*, which was a small stationing, that ensured a street-police service and/or vigilance of the public order in the proximity of the villages of the *limes Arabicus*.

Finally, some examples of station have also been found in the *limes Arabicus*, these were military settlements made up of a few graduates or war veterans that carried out the task of fighting brigandage, very frequent in the oriental borderlands.

These new discoveries, which were made during the archaeological missions of the (Istituto Superiore per le tecniche di conservazione dei Beni culturali e dell'ambiente "A. De Stefano") are the sign that other surveys must be carried out to complete the exploration of the *limes Arabicus*.

The Construction Technique of Qaşr al-Uşaykhim

The castle was certainly built after having conveniently levelled the rocky terrain on the summit, and at the same time quarrying stone from it. The construction material for the castle had been found by the Roman constructors in the quarry that had been opened near the settlement (Fig. 24), and that functioned as fabbrica where today traces of manufacture and extraction of the large blocks used in the construction of the fortress are still visible.

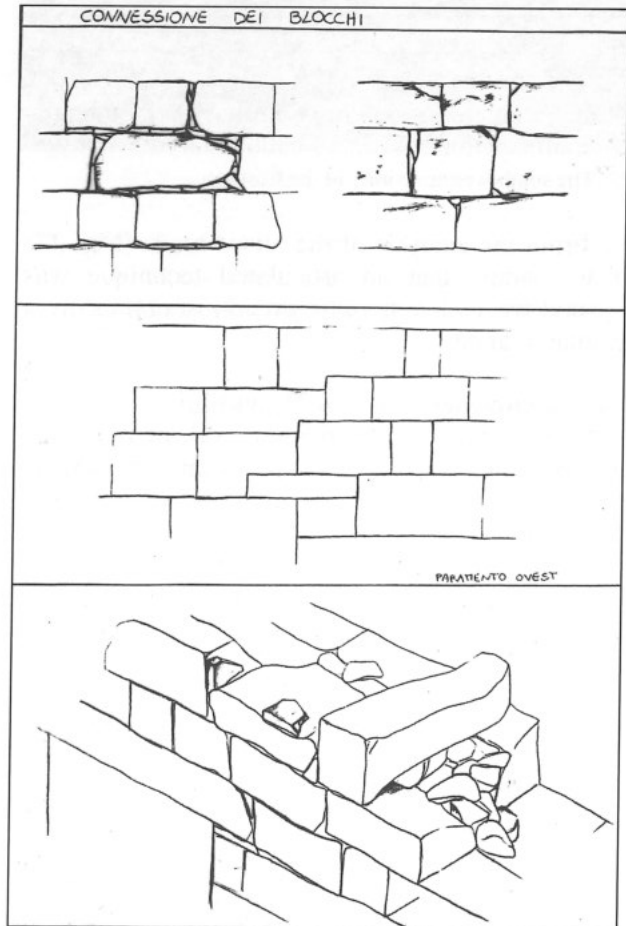
The traces of the castle, today, appear as a heap



24. Quarry.

of debris on which stand out majestic raised walls. The masonry structure of these raised walls appears to be built with the *pseudo-isodomus* technique (Fig. 25). However, after an accurate analysis of the structure, it is an autonomous construction technique used in the past.

In all *limes Arabicus*, borderland region of the Roman Empire, a new building technique developed in an original way, which had strong architectural characteristics (Fig. 26). In Jordan the traditional building was built in this way.



25. Pseudo-isodomo technique.



26. Construction technique.



27. The south western corner of the Castle.

From the analysis of the raised walls (Fig. 27) it is evident that an articulated technique was created—we called it *opus pseudo-isodomus* in a Roman manner.

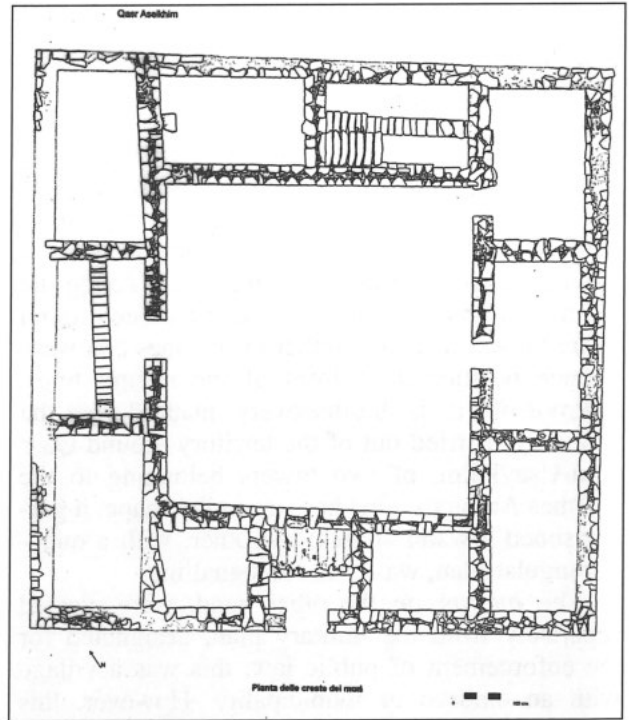
The *Anastilosi* of Qaşr al-Uşaykhim

The original construction work of the castle has been carried out by two groups of workers starting from the centre of each side for meeting at the corners. For this reason the sides do not measure up, but are slightly off (Fig. 28).

The *opus pseudo-isodomus* in a Roman manner is constituted of the reciprocal contrast between the blocks.

The *anastilosi* will proceed with only two groups of workers, working in opposite directions to reach the corner, as the Romans did in the original procedure.

The construction techniques used by the Romans at Qaşr al-Uşaykhim are still used in Jordan for the construction of dwellings and Bedouin villages close to the Jordanian desert, which often substitute the typical village tent. For this reason it



28. Plan of the walls of the Castle.

is easy to find skilled labour for a possible *anastilosi* of the castle, after studying the stratigraphic units of the collapses of Qaşr al-Uşaykhim.

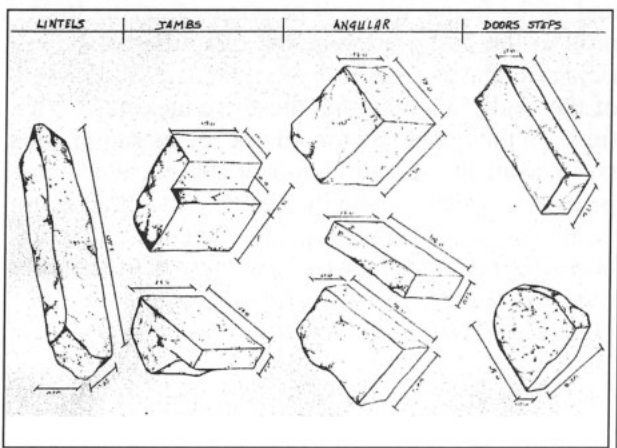
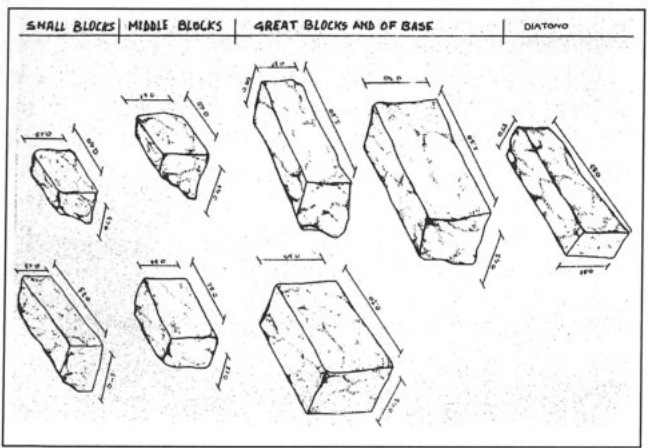
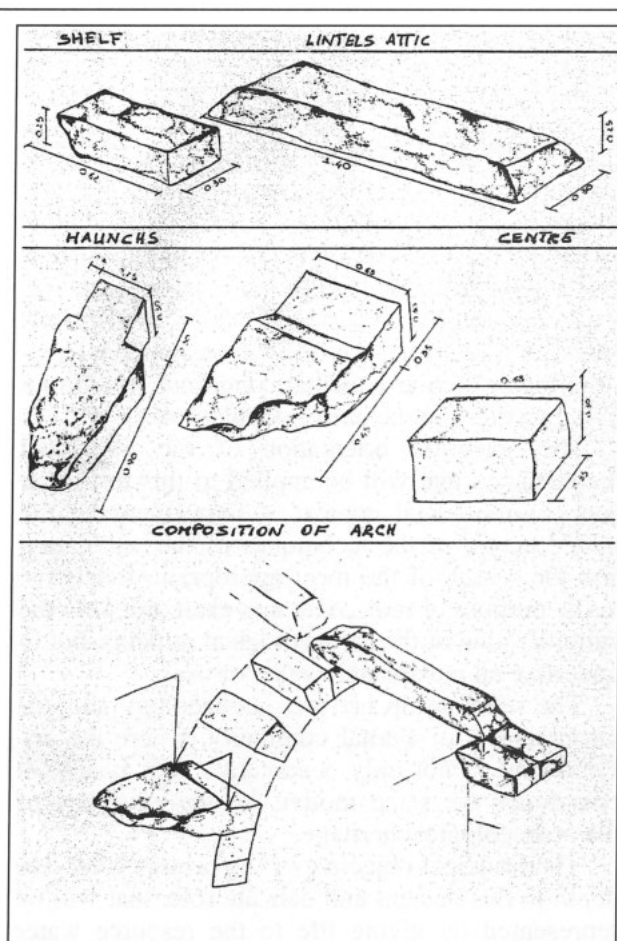
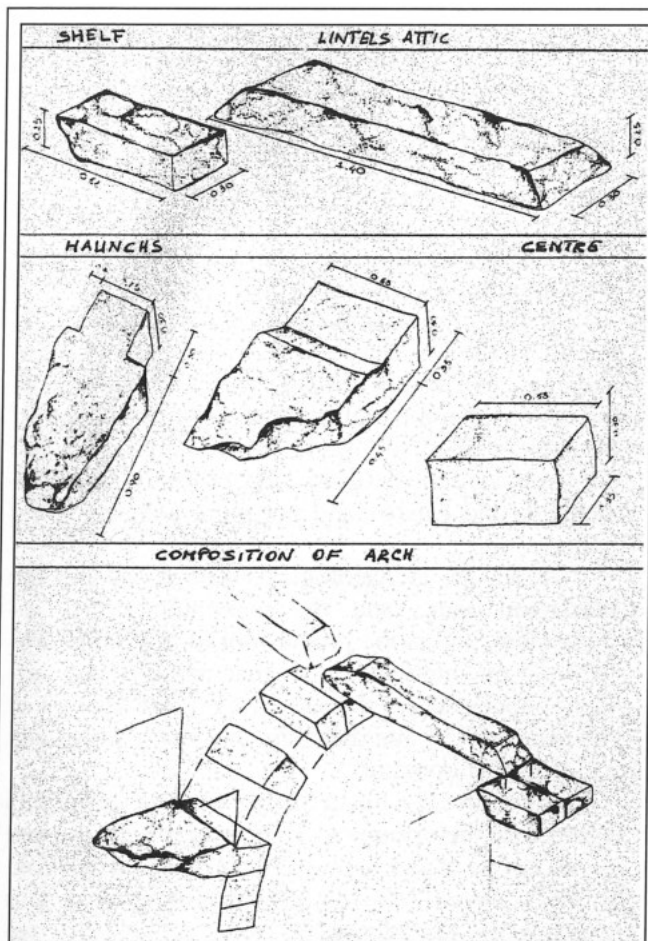
Using the skills For the ability and experience that some local workers still possess along with the guide of the Italian restorers they can rebuild the castle, using the *opus pseudo-isodomus* in a Roman manner. In order to facilitate this work, the use of a crane for the reconstruction will be carried out in quite a short time.

Analysing all the archaeological remains of the Roman castle of al-Uşaykhim we created the *abacus* (Fig. 29) of all the original architectonic elements of the castle. The abacus is the most useful instrument that will allow the realization of the intervention of the archaeological conservation.

In this *anastilosi*, we will not use new materials but we will use the original stones with the original technique the *opus pseudo-isodomus* in a Roman manner.

Already in this analytic phase, it was possible to establish that all the architectural elements that composed the castle found on site (Fig. 6), for this important verification to proceed the intervention of the archaeological conservation that we called *anastilosi*.

One of the first steps will be carrying out the stratigraphic analysis of the collapses and thus proceed to free the rooms from the debris placing the retrieved blocks in an area close to where they will finally be placed.



29. Abacus.

As previously mentioned the work will have to start from the central room then to move towards the corners of each facing wall. This operation will have to be carried out by use of a crane, numbering the blocks according to the stratigraphy of the collapse.

Plan of Safeguard of the Area and Integration of the Monument

Connecting the project of restoration of the Ro-

man castle of Al-Uşaykhim, a plan of safeguard of the territory and the environment of Wādi al-Uşaykhim has been proposed to guarantee an essential continuity of intents for the maintenance of the archaeological work and the environment, of which the area is rich so as to befit cultural resources.

The project acquits to the explicit wishes manifested by the local community that intends to preserve the archaeological site Qaşr al-Uşaykhim to-

gether with the environmental value that it possesses.

From here the duplicity of the project is born, that contemplates the integrated maintenance not only of Qaşr al-Uşaykhim but of the whole testimonies and archaeological remains present in the area, including the Bedouin villages, the Roman towers of the limes arabicus, the thousand of epigraphs of different epochs that have been recovered carefully by the team of Dr. Fawwaz al-Khraysheh imposing the difficult assignment to restore the best environmental conditions to return a living territory to the native populations.

The scientific orientation of the integrated maintenance that will be applied to this territorial and environmental context is that legacy to the joined action of the techniques of the restoration and the search of the most appropriate functions, to the purpose of rediscover and exalt, not only the cultural value of the archaeological remains, but to underline an indisputable value of use.

The relationship between archaeology and environment is of a total continuity, where the environment is not only a container, but it always constitutes the same motive for the existence of the archaeological heritage.

The principal objective of the project is to give depth to this ancient and delicate role, that will be represented by giving life to the resource water and of the fauna: this will be pursued, trying to exploit to the best advantage the quantities of superficial waters that sporadically stagnate on the bed of the wadi, avoiding that these are inexorable victims of the phenomenon of the evaporation, derived from the joined action of the elevated temperatures, together with the strong winds that insist on this zone, and inserting some special native arboreal kinds, to perennial character, with the purpose of stimulating the restoration of the environment of the wadi (Fig. 30).



30. Wādi al-Uşaykhim.

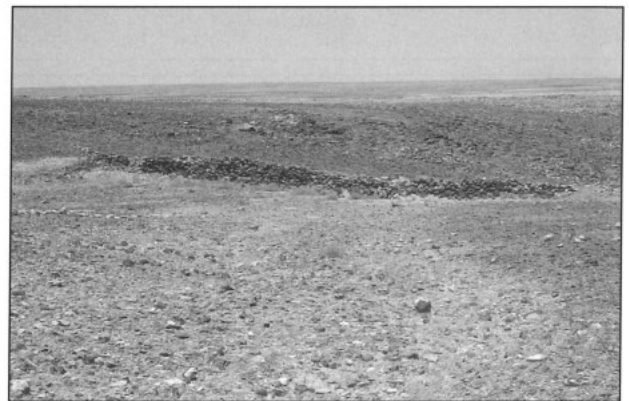
Secondly, the attention of the project will be stretched out to the realization of an archaeological basin will have as fulcrum Qaşr al-Uşaykhim and with the epigraphs, the traps and the archaeological work of the area, with the rests of the Bedouin villages founds on the banks of the wadi.

The creation of the archaeological basin of Qaşr al-Uşaykhim means to redeliver a territory to the contemporary society which lives in the area.

For best organization, it is thought that about the archaeological basin, as an agile tool of management, everybody should feel a protagonist of the actions that are required for the development of the area of Wādi al-Uşaykhim. In Italy now there are Archaeological basins like *Cornus*, *Leopoli-Cencelle* and *Castro*, and not more archaeological parks.

Instead, the archaeological basin is seen as the maximum share and the maximum social involvement, and is the proper tool to manage a project and an intelligent plan that involves the resident populations in the same way as the visitors or the personnel of guardianship, and in the same way as the tourist operators.

Jordan already has a strong experience in this circle with the examples of Petra and Wādi Ramm, or as the so-called archaeological park in the historical centre of Mādabā, in which an open system exists where the inhabitants freely cohabit their relationship with the archaeological heritage of which they know the value of the cultural resource so do the custodians and the true protectors of it. In Petra and Wādi Ramm, these processes of integrated maintenance of the social and economic value was realized in spontaneously. In fact, the intervention of the Bedouin populations have imposed their way to converge the social and economic affairs on the cultural and environmental resources. Now these places can be visited without the necessary human and social context that pro-



31. The Dam.

liferates.

For all these motives that we have thought about, Wādī al-Uşaykhim not a protected area but an open system in which the Department of the Antiquities is the principal promoting, holder, collaborated and sustained by the contemporary society and by the population of the residents that together manage all the actions to anticipate the safeguard for that territory and for those cultural resources.

The fruition of the archaeological heritage will involve as a result the necessity to create some special infrastructures of project to guarantee the correct management of the archaeological basin, not forgetting that it will include Qaşr al-Uşaykhim all the other archaeological work of the area.

Particularly the project foresees the realization of parking, where the visitors will leave their own vehicles, motorcars or bus, and from which will begin the driven visit of the area using the Pick-up of the Bedouins, they will also act as tourist guides. The parking will be developed on a surface of around 459m, there will be in an area to park the buses and another area destined to the motorcars. This last zone will be protected by a series of wooden structures with the same mats used for the Bedouin tent.

This great structure will be inserted in the environment, and will be realized with traditional constructive and material techniques of the area.

The area of the parking will be built with basalt stones, this solution will be inspired to the Bedouin traps for animals that are today still present in Wādī al-Uşaykhim.

In the area of the services for the visitors will be a resthouse tent, a services tent and another tent for receiving tourists, and providing the necessary information.

Environmental aspects and project hypothesis for the safeguard of Wādī al-Uşaykhim, from the archaeological studies in these regions we have been able to ascertain that the climate has not always been arid as it is today. This area in fact was populated, even though in an irregular way, since the prehistoric times, and testimonies exist relating to a climatic change during the last two millennia.

We know that in the past it is banks were rich with vegetation, today present in a sporadic way, which guaranteed in turn the maintenance of a lot of animals kinds, that were suited for the difficult climatic situation. Besides, there is certainly the presence of different fertile grounds, mainly in the numerous cities of the limes Arabicus that in the past had contributed to make this zone a place of

attraction for the nomadic populations.

The actual state of degrade tied up partly to the geologic nature, that directed as consequence the almost total disappearance of one of the branches of Wādī al-Uşaykhim, it has been one of the causes of the notable abandonment of the area.

In the project of conservation of the archaeological site of Qaşr al-Uşaykhim we tried to create all the presuppositions to return the castle of al-Uşaykhim to a place of attraction for the local population.

The water is the principal objective in the project for the safeguard of the whole area.

The program of exploitation of the water resources of Wādī al-Uşaykhim is tightly connected with the quantity of water and the economic resources in such operation. The safeguard plan of the environment of Wādī al-Uşaykhim aim to increase the availability of alternative sources of water, among which it occupy a priority role of the use of the superficial waters. The artificial recharge of the superior water-bearing and stagnation and of maintenance of water.

From history, we have learned that the wadi constitutes the motive for the existence of the life in the zone. Instead from the ideological point of view it represents a potential water resource disposition.

Then the principal problem to be avoided is that of the evaporation, with the purpose to be able to exploit to the best advantage the precious quantities of superficial water. The excessive exploitation of the available water in the subsoil has changed the direct needs of the zone.

Our intervention foresees the realization of obstructions in the wadi, located in more points, for limiting the phenomenon of the evaporation to favour the infiltration of the waters in the subsoil. In this way we have created a natural recharge of the superior water-bearing, which will have as the first consequence the reinvigoration of the vegetation.

The recharge of the superior water-bearing, obtained through the obstruction, will allow the excavation of more wells that will constitute the principal water resource.

The wells foreseen by the project will be of low output. The structures of obstruction will be three and will be constituted by small dams, 3m of high and an ampleness of around 40m realized with loose material, with a nucleus of mud and covering in basalt, both are available *in situ*. The choice of this type of structure derives from the necessity to totally integrate in the environment of the wadi.

In addition, with the purpose to favour the infiltration of the water, the subsoil of the dam will

be endowed with a diaphragm in (bentonite) that will avoid stop of water by obstructions.

To this intention we have already restored a dam (**Fig. 19**) from the Neolithic period to the east of the Roman castle and of the Neolithic city. With this restoration we have been able to make green the grounds around the dam that it holds back the water for a long time.

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Bibliography

- Bowersock, G.W.
1983 *Roman Arabia*. London.
- Clausetti, E.
1939 Fortificazioni e Macchine Belliche. *Civiltà Romana* 11: 24-33.
- Gregory, S. and Kennedy, D.
1985 Sir Aurel Stein's Limes Report. *BAR International Series I: 272-277*.
- Kennedy, D.
1982 The Contribution of Aerial Photography to Archaeology in Jordan: With Special Reference to the Roman Period. *SHAJ* 1: 29-36.
- Oleson, J.P.
1986 Humayma Hydraulic Survey: Preliminary Report of the 1986 Season. *ADAJ* 30: 17-26.
- Vegenzio
De Re Militari, III.