



Mansoura University
Faculty of Tourism and Hotels

El Zarqa (Maximianon): A proposed virtual reconstruction of a fortified water station in the desert

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**El Zarqa (Maximianon): A proposed virtual reconstruction of a
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الزرقاء (مكسيميانون): محطة مياه محصنة في الصحراء مقترح ترميم افتراضي مع لمحة عن الآثار المعمارية والسيراميك والجوانب الأثرية العضوية

ملخص

يقع موقع حصن الزرقاء (ماكسيميانون) في وادي أبو زيران، على بعد 65 كم من القصير، حيث يضيق اتساع الوادي إلى (150 إلى 170 متراً). وتعتبر الزرقاء أول محطة مياه (*Praesidia*) يتم التنقيب عنها من قبل فريق العمل الفرنسي على طريق (قفط - القصير). تعد الزرقاء من أفضل المواقع من حيث حالة الأثر على طول طريق قفط - القصير. حيث تم البناء في عهد أسرة الإمبراطور فلافيان وتم هجر الموقع في بداية القرن الثالث الميلادي. يمثل موقع الزرقاء (ماكسيميانون) متحفاً مفتوحاً، يضم آثاراً معمارية مختلفة وأثار منقولة لذلك، يمكن الحفاظ على الموقع من خلال التوصيف والنشر العلمي.

تحتوي بقايا حصن ماكسيميانون على العناصر المعمارية الشائعة في محطات المياه القديمة على طول طريق قفط - القصير مثل: الباب والأبراج والستائر والمبنى والحمام والمطبخ وحتى المقبرة. علاوة على ذلك، قدمت الزرقاء خلال حملات التنقيب المختلفة عدداً كبيراً من شقف الفخار والتي ربما تم استخدامها في نقل البضائع السائلة أو في الاستخدام اليومي، مما ساعد على تحديد الحقبة الزمنية للموقع بين القرن الأول والقرن الثالث بعد الميلاد، وهي الفترة التي شهدت نشاطاً تجارياً ضخماً بالإضافة إلى استغلال الثروة الحيوانية حسب نوع الموقع وتغير الطلب على الغذاء.

يعد هذا البحث دراسة تحليلية لنتائج حملات التنقيب السابقة كما يقدم اقتراح إنشاء نماذج ثلاثية الأبعاد يمكن استخدامها في الموقع. ومن ثم، نموذج رقمي يمثل نسخة افتراضية طبق الأصل للموقع أو المنطقة الممسوحة ضوئياً، حيث تتداخل صور المكان الأصلي مع النموذج المقترح لإضفاء صبغة أكثر واقعية (من حيث الحجم والمحتوى).

تسلط الدراسة الضوء على الأهمية التراثية للموقع كما تهدف إلى تعزيز مدخلات جديدة على طريق ميوس هرمس من أجل إدراجه بين مواقع الزيارة السياحية. بالإضافة إلى الهدف التعليمي التنموي والذي يقود إلى تفعيل الدعاية والتسويق حيث يمكن للزائر فهم القيمة المعمارية والزخارف بشكل أفضل بعد إعداد النماذج الافتراضية.

يمكن تنفيذ المقترح دون التأثير على البقايا المتواجدة بالموقع وعليه سيقود هذا المشروع التنموي إلى مشاريع مستقبلية تنطوي على تميز واضح وقيمة مضافة لمواقع التراث الهامة والمميزة.

Introduction

El Zarqa (Maximianon) is considered to be the best-preserved site along the road. It was built under the Flavian dynasty and abandoned at the beginning of the 3rd century AD. Maximianon represents an open museum, with different architectural traces and mobile relics on the road side. The fort represents the common architectural elements in the ancient water stops (*Praesidea*) along the Qift - Quseir road. Moreover, during the various excavation campaigns, Maximianon offered a great number of ceramics, that helped in determining the chronology of the site to the period between the 1st and the 3rd century AD., a period that witnessed a massive commercial activity in addition to the exploitation of animal resources according to the type of sites and the changes in food demand.

This study represents an analysis of previous excavation campaigns and proposes generating 3D models that can be used as the basis of the experimental video projection in *situ*. Hence, a digital model that turns out to be a virtual replica of the scanned location or area. The study sheds the light on the heritage importance of the selected *praesidia* in order to enhance a new input on the long *durée* Myos Hormos commercial road so as to be inserted among the tourist visiting sites.

Key words: Praesidia, Hydreuma, El Zarqa, Maximianon, Eastern Desert cultural heritage

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لزرقاء (مكسيميانون): محطة مياه في الصحراء - مقترح ترميم افتراضي مع لمحة
عن الآثار المعمارية والسيراميك والجوانب الأثرية العضوية

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تعد الزرقاء من أفضل المواقع من حيث حالة الأثر على طول طريق قفط - القصير. حيث تم البناء في عهد أسرة الامبراطور فلافيان وتم هجر الموقع في بداية القرن الثالث الميلادي. يمثل موقع الزرقاء (ماكسيميانون) متحفًا مفتوحًا، يضم آثار معمارية مختلفة وآثار منقولة لذلك، يمكن الحفاظ على الموقع من خلال التوصيف والنشر العلمي. تحتوي بقايا حصن ماكسيميانون على العناصر المعمارية الشائعة في محطات المياه القديمة على طول طريق قفط - القصير علاوة على ذلك، قدمت الزرقاء خلال حملات التنقيب المختلفة عددًا كبيرًا من شقف الفخار والتي ربما تم استخدامها في نقل البضائع السائلة أو في الاستخدام اليومي، مما ساعد على تحديد الحقبة الزمنية للموقع بين القرن الأول والقرن الثالث بعد الميلاد، وهي الفترة التي شهدت نشاطًا تجاريًا ضخماً بالإضافة إلى استغلال الثروة الحيوانية حسب نوع الموقع وتغير الطلب على الغذاء. يعد هذا البحث دراسة تحليلية لنتائج حملات التنقيب السابقة كما يقدم اقتراح إنشاء نماذج ثلاثية الأبعاد يمكن استخدامها في الموقع. ومن ثم، نموذج رقمي يمثل نسخة افتراضية طبق الأصل للموقع أو المنطقة الممسوحة ضوئياً. تسلط الدراسة الضوء على الأهمية التراثية للموقع كما تهدف إلى تعزيز مدخلات جديدة على طريق ميوس هرمس من أجل إدراجه بين مواقع الزيارة السياحية.

Water stations in the desert

Desert sites and ancient roads should be considered as a new, multifaceted field of research, it is implicit that such an approach has strong links to the archaeologies of mobility and desert populations, as well as the pronounced multi-disciplinary character. especially if most of these ancient roads leading, at least in part, through barren regions are widely-neglected.¹

Desert roads appear usually in snippets of written history, exotic objects and materials and the distribution of languages, religions, technological knowledge and other cultural aspects. Moreover, archaeology has unearthed some remains that can be identified as trading centres, caravanserais, trading depots, or check points along the routes of major road systems. However, the roads themselves, the old tracks, the barren landscapes seem to have been sunken into oblivion.²

These roads once connected the known trading centres and posts that formed the crossroads of the routes which are the

¹ Examples of these roads are:

- The Silk Road that connected Europe and the Near East with China over thousands of years, cf., Whitfield, S. 1999.
- The network of high mountain Inca roads, cf., Snead, J. E. et al. 2009. "Making human space: The Archaeology of trails, paths and roads", in Snead, J. E. et al. (eds.) 2009: 7; Riemer, H. and Förster, F. 2013: 19 – 58; Chevallier, R. 1997; Laurence, R. 1999; Connah, G. 2004: 107-111; Austen, R. A. 2010.

² Riemer, H. and Förster, F. 2013: 19; for a recent study on Saharan trade networks in Roman times, cf., Wilson, A. 2012: 409 – 449.

fixed geographical markers in historical reconstruction, because they appear and often figure prominently in old travelogues and histories. Some of them still exist in the shape of old medinas, while others are ruined or sunken into earth. Very little, however, is known about the roads and paths themselves, how tracks wind their way through sandy or mountainous landscapes, how people managed to walk (or ride) from one place to another, and how organisational matters and provisions were arranged for a safe arrival at the final destinations. Yet it is obvious that, until recently, there was not much incentive in archaeology to investigate specific desert roads, or distinctive aspects of desert traffic also due to the difficult working conditions in barren regions, especially in terms of logistics, as well as bureaucratic restrictions that was one of the difficulties of this study. Despite these facts, archaeological studies began to recognise the great potential ancient desert roads hold as a rich and unique archive.³

These studies were rewarded by a number of rather spectacular discoveries shedding new light on historical developments in ancient Egypt and the role played by the various desert routes, bypaths, and other Lines of communication. These scientific works considerably contributed to a change in scientific perception as Egypt is no longer considered a “gift of the Nile” but also the deserts.⁴

³ For more studies about the ancient desert roads, cf., Darnell, J.C. 2002: 132 - 155; Darnell, D. 2002: 156 – 177.

⁴ Friedman, R. 2002: xiii – xv.

It seems that the desert road archaeology is a rather new field of study aiming to evaluate either the cultural or the natural heritage of the barren roads, once trafficked for different reasons. However, the interest of studying the development of the Egyptian eastern desert routes and archaeological relics started quite early.⁵

The major reason to establish roads in the Egyptian Eastern Desert was to facilitate the process of quarrying and transporting precious stones to settlements in the Nile Valley, thus, connecting the Nile valley with quarries and mines. It is clear that one of the major differences between the Western and Eastern Deserts of Egypt is that exploiting stones and ores was a driving force to build roads east of the Nile, but not to the west, where almost no exploitable raw materials of interest existed (except for some regions close to the Nile Valley). The roads in the Eastern Desert connected the Nile Valley, with Wadi Gawasis, Berenike, Myos Hormos (Quseir) and other Red Sea ports for shipping goods overseas, mainly to and from southern Arabia and the Horn of Africa. Exotic incense and aromatics are among the most important commodities that had to be transported overland from the ports to the Nile Valley. This necessitated a road network that was outstanding in terms of traffic intensity and infrastructure. Here, it is not only the transport of goods, but also the maintenance of power and administration that led to regular postal traffic and policing of the roads.⁶

⁵ Weigall, A. E. P. 1909: 169ff.; Couyat, J. et Montet, P. 1912.

⁶ Bard, K. A. 533 – 555; Shaw, I. 2013: 521 – 532.

The study of Maximianon may therefore be regarded as a comprehensive and representative compendium on the Myos Hormos road due to the complexity of the subject as well as the broad research interest and the multiplicity of key issues.

The study of the ancient desert road archaeology can be outlined in the following arguments in application on El Zarqa (Maximianon):

- The Archaeology of Mobility and travel in terms of traffic and road infrastructure.
- Ancient desert roads include:
 - Historical perspectives of tracks and topography.
 - Ethnographic and ethno-historic parallels.
 - Names and narratives.
 - Transport and depot pottery.
 - Inscriptions, maps and petroglyphs.
 - Logistics.
 - Wayfinding and navigation.
 - Transportation.⁷

The ancient roads hold much potentials for archaeology and that this archaeological source is highly endangered also by the impact of the increasing desert tourism. Therefore, this proposal attempts to keep the traces through certain plans

⁷ Riemer, H. and Förster, F. 2013: 19 – 58.

that should be developed in order to protect the ancient road structures that are still standing, even partially, and are most exposed to the danger of destruction as these roads need to be adequately surveyed and documented through methodological approaches, such as:

- Mapping by means of satellite imagery.
- Innovative cross-disciplinary analogies, such as the ethnographic recording of modern caravan activities.
- Studies of ancient navigation.

El Zarqa “Maximianon”

The ancient name was derived from the name “Maximianus” which is strange as much as this name is otherwise unknown in Egypt until the emperor in the later third century, except for Iulius Maximianus, *epistrategus* of the *Heptanoimia* around 118 AD, perhaps later *δικαιοδότης*. The name of the *praesidium* is known through the dipinti on vases and letters carrying an address that have been found in the site, altogether 32 times. Maximianon was clearly an arid *hydreuma*, but served as a relay for pickled or fresh fish, fish-sauce, salt, and other products from the Red Sea.⁸

Maximianon is located in wadi Abu Ziran, about 65 km from Quseir. At this point the valley becomes very narrow (average 150 to 170 m), it receives two small tributaries, one to the north, and one to the south. The *hydreuma* represents an excellent state of conservation, it is preserved to a height of 3 to 5 m above the average level of the bottom of the valley.⁹

The archaeological site includes:

- The actual structure and the surroundings
- A dump that covered the oldest buildings.

⁸ Bülow-Jacobsen et al. 1994: 36, n.11. The ostrakon may have been written in “Persou”, since there is a *prokynema* to Athena. Therefore, it was never sent if it was found in the nearby site of Bir Fawakhir.

⁹ BÜLOW – JACOBSEN, A. et. al. 1994: 27; ZITTERKOPF, R.E. AND SIDEBOTHAM, S.E. 1989: 176 – 177; ADAM, J. P., BRUN, J. P. AND REDDE, M. 2006: 100.

- The area of the landfill that measures approximately 600 m square, with a height varying between 0.10 and 1.45 m.

The French excavations revealed:

- A very complex stratigraphy of accumulations of detritus on the ruins of older settlements.

- A small necropolis (pillaged and robbed), located at about fifty meters to the northeast corner of the fort.

- Two quadrangular towers located on the hill, one to the west and the other to the east.



Fig. 1
The *hydreuma* of Maximianon along the Qift - Quseir road.
After, After, Brun, Jean-Pierre (ed.); et al. 2018.

Description

A regular squared, precisely cardinal oriented construction, confined with a semi-circular tower at each corner, with a unique door, flanked by two semicircular towers to the north.

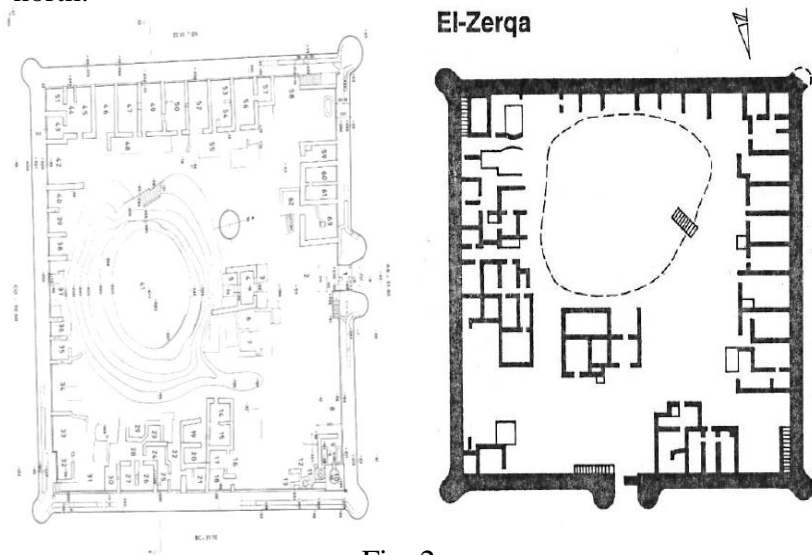


Fig. 2

Plan of El Zarqa “Maxinianon”

After, Adam, J. P., Brun, J. P. and Redde, M. 2006:

Fig. 75; Maxfield, V. A. 1993: 13, fig. 2.

A roughly regular square construction that measures 56.37 m long from the north to the south without the protruding towers and 55,85 m from the east to the west. Internally, it measures (51.22 X 51.80).

The building masonry is composed of (schist – greywacke) slabs, summarily related with earth mortar and carefully assembled to achieve regular surfaces. The stones were extracted from the quarries, located approximately 300 m northeast of Maximianon. The curtain walls and towers are in good conditions. The thickness of the curtain base varies between 2.45 and 2.70 m, while the width at the top is about 1.80 m.

The same estimation cannot be made for the lower and upper surfaces of the towers, because of the scree that affect them; In contrast, the inner rooms have vertical walls with an average thickness of about (0.50 - 0.70 m.) and about (1.80 - 3.40 m.) width of large slabs of schist (still in *situ*).

The Well, dug in the center of the fort, is mostly filled; its lowest point is currently 6.93 m. It used to be reached by a staircase of which the beginning could have been located on the west side. The stair stopped at an intermediate platform from which fetching was conducted. However, because of the large diameter opening of the cavity (approximately 16 m at the lowest point), it is possible that the latter continued spirally over the entire length of the inverted truncated cone of the well.¹⁰

¹⁰ Adam, J. P., Brun, J. P. and Redde, M. 2006: 100 - 101.



Fig. 3

The schist - greywacke masonry (construction raw material). After, Photography by the author during his first Ph.D. survey in 2014

I. The Door and Towers

The door is flanked by two projecting U-shaped towers. The foundations are merely composed of a hedgehog of dry stones laid on the bed of the wadi. The masonry, as for the entire fort, consists of (schist – greywacke) blocks attached by mud.



Fig. 4

Towers and jambs of the door. After, Photography
by the Author.

The door towers include inner lower chambers, the base is indeed filled with sand and stone piers to the level of the walkway, which gave access to the towers. The one to the west still bears some flat stones that were used to pave the defense platform. It seems obvious that the mass of accumulated rubble at the feet of the towers is insufficient to justify the existence of a floor. The eastern tower is accessible through a completely preserved staircase, that composes a defensive point once the entrance is reached. The passage is marked by two pink sandstone jambs (0.34 -

0.35 m X 0.42 - 0.43 m), one is 2.54 m distance from the other.¹¹



Fig. 5

A The parapet of the curtain.

B The defensive structure at the entrance. After, Adam, J. P., Brun, J. P. and Redde, M. 2006: figs. 81 - 83.

A cluster of three other blocks lying outside the door and a fourth that appears at some distance among the cuttings brought by the wadi helped in restoring 3 m. door jambs corresponding to the walkway level. The door jambs are based on irregular blocks of sandstone which continue in the threshold passage. The passage is paved by irregular schist - greywacke blocks. The threshold is raised to about 0.27 m above the level of ordinary traffic. Therefore, it seems impossible that vehicles could have entered the fort.

In a successive phase, the door was decreased to half of the size, about 1.32 m. In this phase, the threshold was raised

¹¹ A. Adam, J. P., Brun, J. P. and Redde, M. 2006: 102.

with three large greywacke blocks that formed a courtyard of 0.49 m high. The blockage was doubled towards the interior, before being endowed to the west with a new jamb of schist blocks which ultimately reduces the passage to 0.63 m. The eastern door leaf bears a graffito on behalf of Serenu [s]¹² while, the reverse threshold is simply composed of irregular slabs of sandstone, placed on a simple hedgehog of dry stones which continues under the primitive jamb of the door.



Fig. 6

Upper. Graffito on the eastern jamb. After, the author.

Lower. The reverse of the entrance door. After, Adam, J. P.,
Brun, J. P. and Redde, M. 2006: Fig. 84.

¹² Fournet, J. L. 1995: 205 – 206.



The excavations revealed that the access to the curtains through the two towers belongs to a successive reusing phase. In this phase, the walkway was walled and the two towers formed an autonomous defending fortress that may indicate the relatively precarious security situation in the *praesidium*.



Fig. 7

The wall bordering the walkway.

After, Adam, J. P., Brun, J. P.

and Redde, M. 2006: Figs. 85, 76.

II. The curtain

The curtain walls are kept in a good state of preservation, including the northwest, northeast and southeast corners. The walkway is elevated to about 3 - 3.15 m height, above the ancient soil. A thickness ranging between 0.60 to 0.65 m. of the bordering crenellated parapet is partially preserved in several points in addition to some barricades.

The width of the niches can be estimated to about 1.40 m; these measurements seem very low and it should probably assume that several stone beds have disappeared, especially since this height is about 1.14 to 1.15 m only in the niche relying on the eastern curtain. The corner towers are accessible through the walkway and the corner stairs, that remained, to the northwest and to the southeast. These towers should have functioned as a defensive platform like the towers of the door and for the same reasons.¹³

¹³ Adam, J. P., Brun, J. P. and Redde, M. 2006: 102 ff



Fig. 8

Left. The walkway and the parapet.
Right. Barricades (the western rampart). After, Adam, J. P.,
Brun, J. P. and Redde, M. 2006: Figs. 86 – 87.

The entrance has also been reduced in a later phase of occupation, to both the northeast and the north-west by a low arched wall. In the southeast corner, the internal side of the curtain was doubled by a wall measuring about 0.62 m wide.

It could be likely that behind the western gate tower, a doubling was destined to hide the side platform of the fort and to transform the tower into a standalone bastion. This used to hide a duct evacuation that crosses the rampart that was distinguished as the “*potamion*”.

This evacuation is carefully coated and surmounted by a stone lintel; it opens towards outside for about 2 m height. However, the function of such structure is still unclear. However, the hypothesis of a latrine could be plausible.

These vertical sumps have resulted in a substantially horizontal pipe. Moreover, the eastern curtain was traversed by another very carefully bricked rectangular pipe. This was internally coated with lime mortar and covered with squared stone lintels. There can be no doubt that this conduit was used to channel a liquid towards the exterior, that could have been either the water of the well for the animals staying outside the fort, or the evacuation of the sewerage.

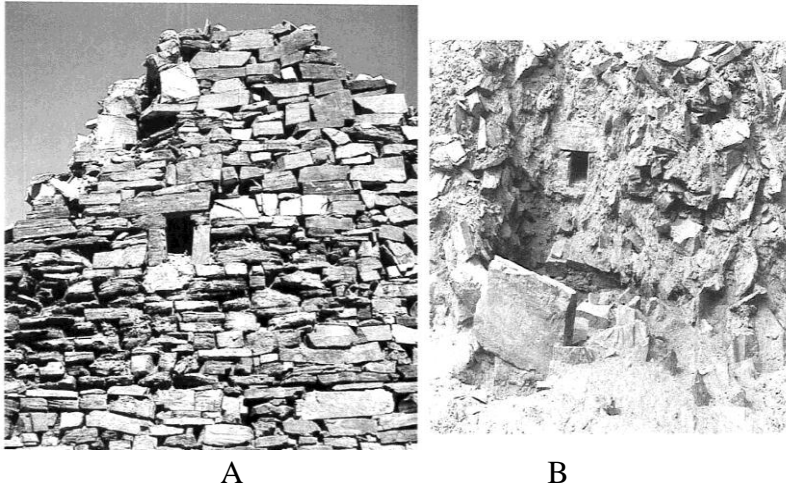


Fig. 9
A. The *potamion* of the southern curtain.
B. The pipe in the eastern curtain. After, Adam, J. P., Brun,
J. P. and Redde, M. 2006: Figs. 88, 90.

Fig. 10

The staircase that gave access to the north – western angle tower. After, photo by the Author



III. The Entrance

Facing the door, in the center of the row of buildings lying against the southern wall, appears the entrance building, measuring (7 x 4 m), of which the northern part was destroyed after the collapse of the well.

In the center, a bench, of about 2.28 m large and 1.85 m deep, is recognized in dry stone with blocking debris and sand in the center. However, a small bench seat about 1.50 m wide is laid against the wall to the west, and between the previous two benches, a niche was inserted.

In a first phase, the niche measured 1.13 m wide and 0.56 m depth but after the collapse of the eastern part, the depth was decreased to 0.19 m. There, a trace of lime plaster can still be seen. Moreover, to the east, a third bench seat of about 1.32 m. was constructed of schist slabs.

El Zarqa (Maximianon): A proposed virtual reconstruction of a
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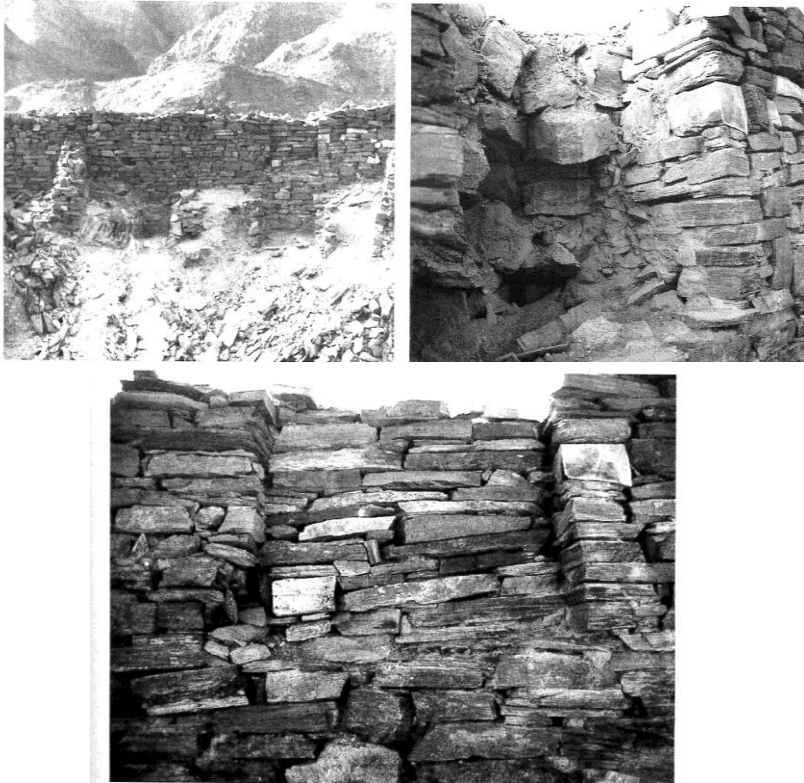


Fig. 11
The niche of the southern rampart.
After, Adam, J. P., Brun, J. P. and Redde, M. 2006:
Figs. 93 – 95.

IV. The central building

Facing the entrance, the central building is still preserved, however, its southern part, was destroyed during the collapse of the well. The access was through a barely raised dry stone threshold. The first room gave access into a second room, that once overlooked the wells.¹⁴

The eastern wall of this construction is the only preserved standing without back corner. In a later phase, the passage between the two rooms was opened and two benches were built along the east and west walls. The presence of some decoration fragments in the surface rubbles can be noted indicating the remains of a capital more than an arrowhead trefoil.

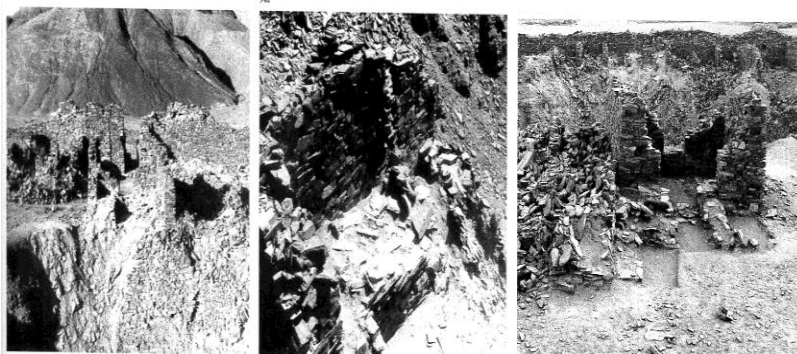


Fig. 12

The central building

After, Adam, J. P., Brun, J. P. and Redde, M. 2006: Figs. 96 – 98.

¹⁴ Adam, J. P., Brun, J. P. and Redde, M. 2006: 102 ff

V. The *Praetorium*

In the southwest corner of the fort, several parts can be accessed through a single door of which a rectangular stall, limited by three schist slabs set on edge could match a “**horse manger**”. The “coxa” ostraca file indicated that the pieces located in this corner correspond to the “*Praetorium*”, where the curator must have his office and house.¹⁵

The space was filled with sediments however, the neighboring rooms were almost empty. This 2 m thick embankment protected the walls of the erosion and retained the original appearance of the walls. They were covered with plastered clay mortar that was recovered, in a second phase, with a greenish clay that became powder afterwards.

¹⁵ The term originally identified the tent of a general within a Roman castrum, and derived from the title praetor, which identified a Roman magistrate., cf. Evan, E. 1994: 159 – 161; Smith, W. 1872; Murphy – O’connor, J. 2008: 23.

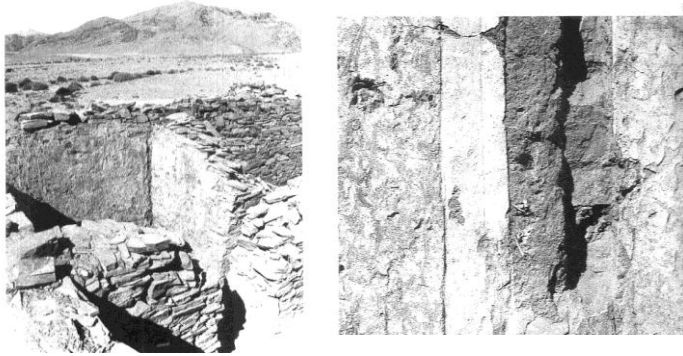


Fig. 13

The *Praetorium*.

After, Adam, J. P., Brun, J. P.
and Redde, M. 2006:

Figs. 99 – 100.

The floor was lower than the surrounding parts and it can be reached walking. This part revealed some faience material from the rubble. A second floor was marked by a bed of ashes and some objects, fabricated in Aswan such as (jugs, water bottles, pots and broken amphora spikes). Three soil levels succeeded the previous one and corresponded to a raising of the threshold. These soils have abundant furniture including amphorae, dishes produced in the workshops of Aswan, white - bodied jugs and bottles, pots, earthenware vases and a fine Painted wall in addition to a clay ball bearing the imprint of a horse rider.¹⁶

Moreover, four identical balls were found in the embankment above the soil. They could have sealed official documents received by the curator of the *hydreuma* and

¹⁶ For Similar discoveries, cf., Sidebotham, S.E. 1996: 389, fig. 1.6.

sent by the same person, probably the prefect of Berenice, who exchanged regular correspondences with the *curatores*.

In addition to the above mentioned four seals, there are two lamps, one dish, Eastern Sigillata B, one oil amphora, one Italian wine amphora. The glass is represented in two cups, two plates and one aryballos (dated between the mid-1st to mid-3rd century).

VI. Water, drainage system, bath and service area

Maximianon (Al Zarqa) has two water / drainage pipes but it is hard to imagine that there were two latrines. The eastern curtain of Maximianon is crossed in the middle by a very carefully bricked rectangular pipeline of about (0.27 x 0.27) m. The pipe is internally coated with lime mortar and covered with squared stone lintels. There can be no doubt that this conduit was used to channel a liquid towards the exterior as a part of the *praesidium* drainage system, that could have been either the water of the well for the animals staying outside the fort, or the evacuation of the sewerage.



Fig. 14

The pipe through the eastern curtain.

After, Adam, J. P. Brun, J. P. and Redde, M.
2006. Fig. 90.

(1) The bath

A small bath complex existed in the northeastern corner of Maximianon. After the construction of two thermal rooms, the basin used to be entered through a small door, along the north curtain wall and it led to a 4 x 3.15 m room containing two tubs, carefully built of coated and baked bricks of lime, measuring about 1.78 x 0.68 m, of which only the northern one is quite well preserved.

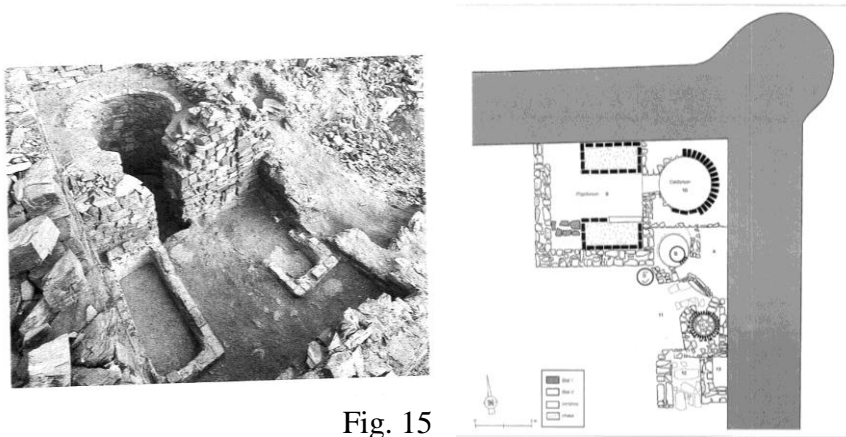


Fig. 15

The bath of Maximianon.

After, Adam, J. P. Brun, J. P. and Redde, M. 2006.: Figs. 103 – 104.

A small ocher lime coating marks the upper limit of the bath. Below, remains of white plaster are similar to the traces of the basin. Moreover, two successive floors were observed in the baths:

I. A first schist pavement that should have covered the leveling course of a wall that can be dated back to the first construction phase. This pavement revealed some

fragments of an amphora (AE3) and a bowl. In addition to, a layer of ash that contained some furniture (gourd, bottle, bowl, pot and amphora AE3).

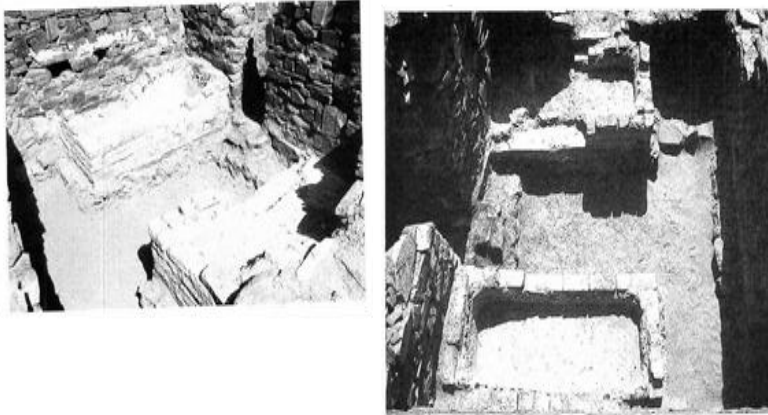


Fig. 16

Left: The *Frigidarium*.

Right: The schist pavement.

After, Adam, J. P. Brun, J. P. and Redde, M. 2006.: Figs.
105 – 107.

II. The second was based on two levels of rubble and sand embankments containing abundant furniture (10 gourdes, vases, cooking pot, Pompeian and AE3 amphorae and an apparent glass tumbler. This cold room opened on a hot circular room of about 1.80 m diameter.

The schist stove was probably surmounted by a dome, constructed of baked bricks, of which only the single lower row remains. The schist slabbed floor of the hot room rests on a sterile embankment down to the substrate.

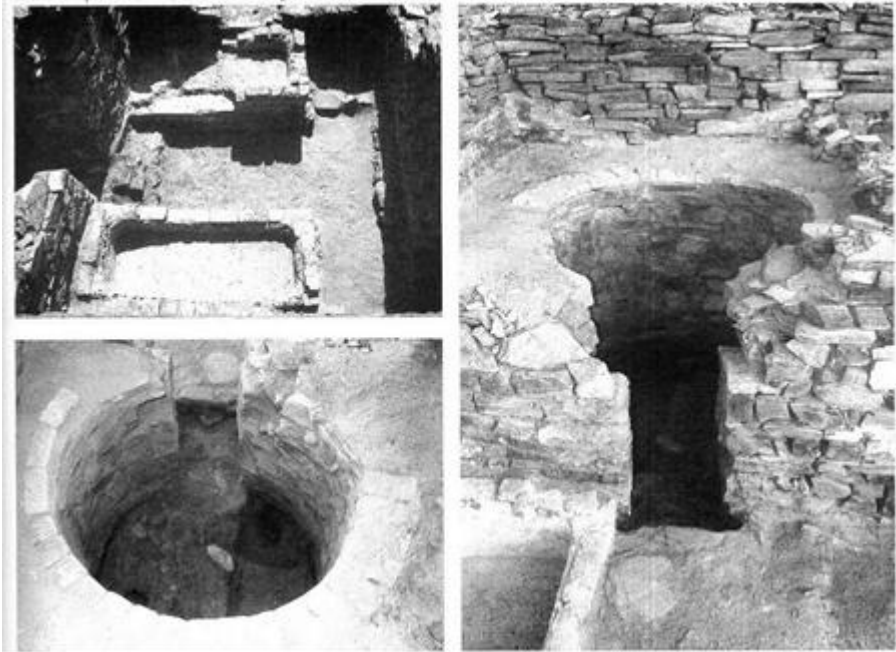


Fig. 17

The caldarium in the bath of Maximianon.

After, Adam, J. P. Brun, J. P. and Redde, M. 2006.: Figs. 108 – 109.

(2) The Kitchen

The kitchen dates to the same period of construction as the baths. It contains a thermal room that dates to a successive short phase to the construction, it was built of fragments of

jars and amphora bottoms and it should have been destroyed by a late refection. ¹⁷



Fig. 18

The fireplace and the thermal room

After, Adam, J. P. Brun, J. P. and Redde, M. 2006.: Fig.
112.

It forms a diameter of about 1 m, with a 15 cm crown of amphorae bottoms around the masonry.

The thermal room area was backfilled with stones after a period of use and a new layer of ash produced by the firehouse and the oven that was accumulated on the floor.

The oven is particularly well preserved on the ash layer, with a diameter of 0.75 m. It represents a schist paved

¹⁷ Othman, A. 2017: 86 - 90

hearth whose elevation is made of tips of amphorae AE3, carefully cut and assembled in successive crowns.

Two depressions were built at the same time as the thermal room, one of these depressions may have been used as tightening or silo, but it was quickly filled by an embankment, while the second depression represents a schist paving.

During the using phase, the space between the furnaces and the firehouse has been gradually filled with alternate beds of earth and ash until it reached the level of the firehouse.

The furniture of these layers includes fifty amphorae bottoms, a handle of an amphora of Cilicia, a bottle and three gourds resized as cooking pots. In the final phase, the firehouse was filled with ash and detritus (burnet bones, sherds) and the oven was reduced. The proximity of the thermal spot brings to consideration the use of these firehouses to heat water and possibly to prepare the coals used to heat the steam room, which is a weak hypothesis.

The function of this set of houses is not clear, however, the presence of burnt bones, numerous pots, a jar and a stone mortar found in the rubble indicated some sort of a kitchen.

18

¹⁸ Ovens resemble some of those found in Mons Claudianus, and they are most likely bread ovens, despite being different from those in use today, cf., Maxfield, V. and Peacock, D. 2001: 59 – 85.

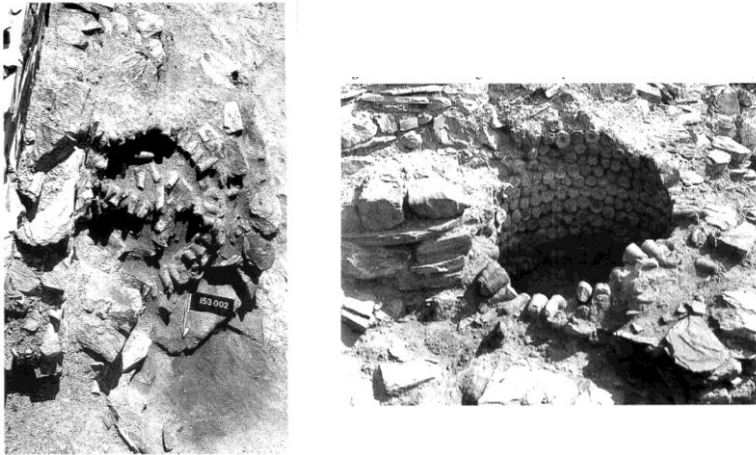


Fig. 19

The oven before and after the French excavation clearance.
After, Adam, J. P. Brun, J. P. and Redde, M. 2006.: Figs.

113 – 114.

Site conditions

The fort of Maximianon is in an excellent condition of preservation, covering an area of about 625 meters with a thickness that varies from few centimeters to 1.45 m which is a volume of about 325 m³. Some clandestine excavations were carried out by diggers and reached the outskirts and the top of the deposit.

The mound shaped by the waste was protected from the flow of the wadi waters by the crumbling wall stone of the primitive constructions covered by garbage. However, perhaps a significant part of the dump was washed away by the water, to the north, the west and the south of the dump.

- The levels related to the buildings include ground floor with small houses, occupation layers and layers of collapsed walls.

- The layers of discharges are formed of a mixture of gravel, schist and straw, containing all kinds of organic waste such as the date stones. It seems that it deals with sweepings gathered in the barracks of the fort or even in stables.

- The violent wind blowing frequently in this sector should have accumulated the straw, that was used for horses sheltered in the *praesidium*.

Next to this characteristic mixture of straw and gravel, especially at the beginning of the formation of the dump, pure gravel layers and later strata of pure straw were found.

- Ash deposits, of which the most characteristic is formed of pure ashes (often packed with water), contain amphora handles and flush tip pruned to enter the furnace construction. These various layers are frequently interrupted by deposits of amphorae, sometimes meles with little fragmented dishes.

Analysis of the stratigraphy indicated three phases:

Phase (A) includes the construction, occupation and destruction of primitive buildings.

This phase delivered:

Italian sigillée ceramic, one glass bowl, one Hellenistic horn - formed fragmented lamp and one Eastern Sigillata "A" plate. In addition to a small Ptolemaic bronze (1st century BC.).



Fig. 20
A small Ptolemaic bronze (1st century BC.)
found in the dump. After, Adam, J. P., Brun, J. P.
and Redde, M. 2006: 173, fig. 134.

Moreover, two coins of Nero were found on soil; this means that the occupation layers at the earliest phase were contemporary to his reign; they form a part of an abundant issue and they could move some time before being lost.

The ceramics varied between AE3 amphorae of Thebes, jugs of Aswan, bottles and jugs of Coptos (Qift), ceramic culinary pots and faience from Alexandria, glass vases (goblets) that can prove a building occupancy around the second half of the 1st century AD.

The empty space could have corresponded to a central courtyard as the structure might have functioned as a police station similar to the one of Wadi Hammamat.



Fig. 21

Ruins of Phase (A)

After, Adam, J. P., Brun, J. P. and Redde, M. 2006: figs. 125 – 127.

Phase (B) corresponds to the formation of the dump during the occupation of Maximianon.

Phase B 1

It may have been deposited in the last quarter of the 1st century. During the reign of Trajan, towards the end of (Phase B1), garbage was deposited on the mound formed by the ruins of (Phase A). The exact extent of these deposits to the north is unknown as much sediment has been washed.

Phase B2

Deposits of amphora, some gravel, straw or ash layers. This phase is probably dated to the reign of Hadrian.

Phase B3

The B3 phase is marked by thick layers of ash that appear in stratigraphy, most probably rejected by the ash produced of the baths, in addition to some earlier ash layers that might have come from the kitchen. It seems likely that this phase is attributed to the reign of Hadrian and the beginning of that of Antonius Pius.

Phase B4

It seems that the garbage management system changed, frequent cleaning for the barracks and thermal baths should have occurred, sometimes completed by extensive household that would have been succeeded in realizing big regular cleaning, perhaps at the time of the shifts.

Phase B4 is synchronous with the filling of the southeast part of the *praetorium* with many ostraca. It is probably that the ultimate developments were conducted in the baths during the phase B4 such as the embankment of the last soil of the *frigidarium* including ostraca file belonging to "coxa ". It seems possible to date this phase to the third quarter of the 2nd century AD.

Phase B5

This phase is characterized by large deposits of pure straw, ash and pottery. It seems to cover the late 2nd and probably the beginning of the 3rd century AD.



Fig. 22

The dump of the Paraesidium (Phase B).
After, Photo by the Author.

Phase (C) marks stabilizing the mound by forming a protective layer of windblown sand and colluvium. The rain and wind-blown sand washed away the upper layers and destroyed the organic matter therefore, the combined action of the two formed accumulations on the lower slopes and the hollow which do not appear to have received garbage dumps and have delivered only worn potsherds carried by the water.

The phase delivered one plate in Eastern Sigillata B, a handle of Gallic amphora, one bottle, two cups, three goblet, two aryballoi, two balsamarium in addition to two coins, one of Nero (10th year of reign) and one of Otho or

Vitellius that did not provide additional chronological information.

The Cemetery

At about one hundred meters to the northeast of the *hydreuma*, a cemetery where fourteen oriented east-west burial graves, was located. The cemetery was looted, except for a tibia and a femur. Excavations revealed some animal bones and a small mummified bird wrapped in linen.



Fig. 23

The cemetery of Maximianon. After, Adam, J. P.,
Brun, J. P. and Redde, M. 2006: fig. 148.

Ceramics of Al-Zarqa “Maximianon”

Amphorae were found in all layers, sometimes roughly clustered that reflects general cleanings of the *hydreuma* or massive releases after the festivities. The site has delivered a total of 4018 amphorae, of which only those related to B4 and B5 are datable to the second half of the 2nd century or the beginning of the 3rd century AD.

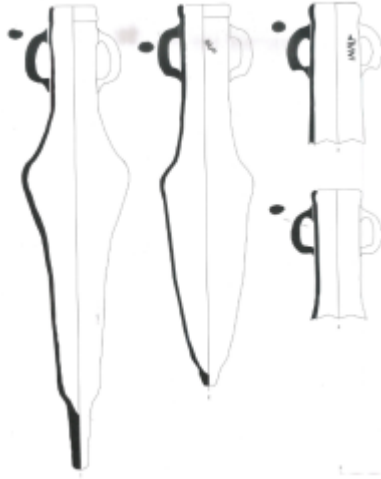


Fig. 24
alluvial paste amphorae models.
after, Brun, J.P. 2007: 520, fig. 16 (1 - 4).

The Egyptian products formed 99% of the ceramic discoveries in Al – Zarqa as: Four amphorae of Egyptian origin, Four pieces of Aswan amphorae (probably residual).

In addition to, fourteen amphorae from other provinces, one Italian amphora and a flat bottom little amphora, probably Campanian of the “Le Formiche” type.

Two examples of Amphorae from Laodicea (Latakia),

One example of Cretan amphorae,

One example of **Gaulish amphorae**,

One example of Knidian Amphorae,

One example with a figure on the handle of Ephesus,

Besides, few oil containers can be added to these wine
amphorae:

One example of **Tripolitanian amphorae**.

African amphora.¹⁹



Fig. 25

Upper: “Le Formiche” type. After, Brun, J.P. 2007: fig. 8.4.

Lower: Imported and Egyptian amphorae, after,
Brun, J. P. 2007: 521, (fig. 17.1 - 6).

¹⁹ Brun, J. P. 2007: 517 ff.; for more about the ceramics of Al-Zarqa cf.,
Brun, J-P. 1994: 7 – 26; inscribed ceramics from Al-Zarqa, cf., Bülow –
Jacobsen, A. et. al. 1994: 27 – 42.

Heritage Value of El Zarqa “Maximianon”

Navigation through the desert

Actual road-building was unnecessary in the Eastern desert, the roads in this case mean the desert tracks that might somehow be marked out and furnished with wells and stations at regular intervals.

Distances are much shorter in the Eastern Desert, and there are no permanent settlements and no agriculture due to the lack of water. Moreover, wells can be sunk in most places, the fossil water-reserves under the Eastern Desert are not renewable, so the water-table has been sinking ever since desertification.²⁰

By the 1st century A.D., the Eastern trade routine was well established. From Alexandria, it took twelve days sailing south along the river Nile to reach Coptos (Qift), almost 650 km distant from Alexandria. Roman merchants returning from the distant East would follow these same trade routes, crossing the Eastern Desert and loading their cargo onto barges at Coptos to be taken by river north to Alexandria and the Mediterranean.

The journey to the ports would have required skilled craftsmen for ship construction and maintenance. Indian society also sought Roman artisans for their foreign expertise, so subjects of the Empire could travel east to make their fortunes. By contrast, on the return from a trade voyage, the offloading of Eastern cargo would have been a

²⁰ Bülow – Jacobsen, A. 2013: 557 – 559.

rushed operation, as merchants scrambled to deliver their retail goods to Alexandrian markets in the shortest possible time. The transport operations managed by caravan firms continued throughout the year and it seems that private guards were hired to protect companies of travellers from bandits. The larger caravans probably contained hundreds of men and animals, including scores of drivers and dozens of guards.²¹

By the Roman times, Myos Hormos and Berenice became the two most important Red Sea ports in the Eastern trade. Journeys from Coptos to these ports were made transferring trade goods and supplies across the busy desert routes. Myos Hormos was approximately 180 km distant from Coptos and it took six or seven days to make this journey.²² However, Berenice lay further south at the very edge of the Roman territory, Consequently, the desert crossing was longer and the caravan took almost 12 days to cross 370 kilometres before reaching the port.²³

Shipping was the main reason for the existence of towns in these barren zones, traders needed temporary seasonal residences that can be reflected by the quality of the towns described as either “Squalid” or “instable” according to the trade patterns. It should have been the case of the 500 sailors and the 3200 soldiers recorded on the Antefoker stela as there is no evidence that their troops and

²¹ Adams, C, 2007: 83, 207, 223.

²² Sidebotham, S. E. 1986: 49 - 53; Adams, C. 2007: 35 – 36.

²³ Sidebotham, S. E. 2008: 159.

technicians did more than camping at “Saww – Mersa Gawasis”.²⁴

The term *praesidia* represents roughly squared forts with sides of about 40 m to 50 m and perimeter walls about 1,5 m thick. Depending on the location, walls were built of boulders and cobbles collected nearby the site and stone slabs sized by workers, dry-stacked with soils as binder. The Romans used granite from Bir Umm Fawakhir quarries for specific structural elements such as the door-posts of the forts.²⁵ While, the term “*Hydreuma*” gives a more general and a large sized compound that can host a little fort “*praesidium*”. There is no good evidence for the size of garrisons but the excavations proved that they were small and were perhaps supplemented by roving patrols and certainly before the extensive building of *praesidia* in the Flavian and Trajanic - Hadrianic period, such forts were small, unfortified and probably did have small garrisons.²⁶ As for the security and the fortified water points (*Hydreumata*), it should be stated that the very length and careful construction of the route indicates that the resources were available for the task. The lack of *hydreumata* along this section of the route was deliberate and indicated that the authorities perceived no threats requiring their constructions. This was not the case along the coastal portion of the route where there are a series of *hydreumata*

²⁴ Sidebotham, S. E. 1991: 27; Johnston, J. H. 1977: 389 – 398.

²⁵ Zitterkopf, R.E. and Sidebotham, S.E. 1989: 160.

²⁶ Adams, C. 2007: 38 – 39; Due to the current condition of the sites along the Myos Hormos road that did not allow a certain result about the function of each site the researcher used both the two terms referring to the sites as both *hydreumata* and *praesidia*.

that might have been due to some chronological implications. “Well” stops existed along the northern route and they were discovered with huge piles of sand and other detritus. In addition to the *hydreumata*, the coastal route may also have preserved unfortified settlements and road stations.²⁷

Potable water would have been easily located farther from the Red Sea and this must have been a major reason for placement of the road, where possible, some distance from the coast. Besides, wadis farther from the coast are shallower than those near the shore making road construction farther inland and travel along the coast where wadis emptying into the sea would be deep and difficult to traverse. Moreover, a route adjacent to the sea would be substantially longer due to the numerous bays, peninsulas and other irregularities of the coastline. Sometimes, deviations occurred in the road course such as the sharp inland turn for some distance in the case of Wadi Safaga due to the level of potable water.²⁸

Murray, G. W. 1925: pl. XI; For the full detailed description of the
Via Hadriana cf, Sidebotham, S. E. and Zitterkopf, R. E. 1997: 221 –
237, fig. 1.

²⁸ A secondary previous unrecorded route laying south of the east – west trans-desert segment of the via Hadriana and passed by the distinctive limestone outcrop is locally known as Demsa Umm Ragaba (27° 48.50' N / 31° 20.85' E). cf., Sidebotham, S. E. and Zitterkopf, R. E. 1998: 353 – 365; For more about the via Nova Hadriana cf., Sidebotham, S. E. et al. 2008: 42 – 53.

Identification sheet and panel

The need for a preliminary identification emerged during the author's PhD research and after a site survey, he proposed an inventory sheet (table 1).

Modern Name	El Zarqa – Bir El Zarqa.
Ancient Greek Name	Maximianon.
Sector / area	Red Sea Governorate, Wadi Abu Ziran, about 65 km from Quseir - Central Eastern Desert.
Typology	Hydreuma.
Chronology	Roman Period (1st century BC. – 3rd century A.D.).
Description	The best preserved hydreuma in the central desert route. Its purple stone provides its Arabic name. Many sections of walls are fully preserved; these walls are built of long thin roughly hewn stones laid without mortar. The free-standing interior buildings at El Zarqa appear to be parts of fortress associated with the well. Moreover, a heap of ceramic is still in situ in front of the gate of the door.
Archeological material	Ceramic, Ancient Fortress, Well, <i>hydreuma</i> .

Table. 1. Inventory sheet of El Zarqa (Maximianon). (The Author).

**El Zarqa (Maximianon): A proposed virtual reconstruction of a
fortified water station in the desert**

In addition to the above-mentioned sheet, a simple panel was created in the period between 2015 – 2016, including images for the most important remaining traces in the site during the survey executed under the supervision of the tour guidance syndicate in Hurghada and the cultural department of the Red Sea governorate.²⁹

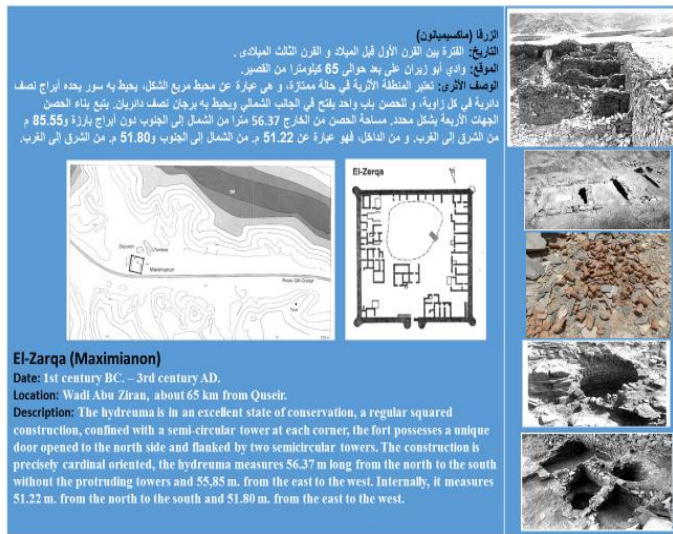


Fig. 26

Preliminary site panel of El Zarqa. (The author)

²⁹ Othman, A. 2017 (Phd Thesis): 499

Inventory and digital conservation

The paper proposes a virtual reconstruction of the site in order to sustainably conserve these traces left in the open air through the recent technologies in the form of a digital archive, which is a fundamental component for virtual museums; the success or failure of any kind of virtual museum lies on designing and implementing a solid digital archive, with a robust and rich content in addition to the type of thesauri suitable for the virtual museum. Therefore, with regard to the fort of El Zarqa and the other similar forts along the Qift – Quseir road, it is important to create digital archives which are becoming more and more popular, as the amount of digital information increases, together with the wish of the public to gain access to information. This requires not only a robust information storing system, but also intelligent tools to retrieve it.

A digital model, that turns out to be a virtual replica of the scanned location or area, requires an on-site inspection, digital diary as well as images, maps and digital videos to document the excavation results audio-visually, the existing excavation documentation, information on findings or architectural features, chronology, the excavated area, as well as the written and spoken annotations. These digital diaries need to be georeferenced and added (according to their subject) at the appropriate positions in the visual 3D-model as they can be accessed through any geo-browser (such as Google Earth). Such diaries may aid the exchange of information between collaborators efficiently.

This technique can be used to overlay specifically designed images, allowing to obtain 3D digital models that could be

focused on specific areas of an interesting cultural asset by means of data projectors to supplement or emulate polychromies (indoors or night-time outdoors). The projection facilitates both virtual restorations (showing how it would be like originally), as simulations of successive pictorial stages and their damage. No physical intervention on the surface will be required in any case, offering substantial additional information not only for specialists but also for general public. Light intensity does not harm the material support on which is projected (by temperature, exposure time nor discoloration)³⁰

Moreover, there are several crucial factors that should be considered when designing a digital archive for cultural heritage such as: a well-defined thesaurus of terms, a user-friendly ingestion system, a digital repository, an intelligent search / browse system that offers alternative paths of access to the stored information, and finally the easily accessible digital archive.³¹

Conclusion and Future Extensions can be a rather challenging process, for example, Google Earth proves a valuable tool for visualizing the entire reconstruction process. The concept of a digital video diary helps to clarify important details that were previously illustrated by the extensive on-site inspection.

³⁰ For similar interventions cf, Leronés, P. M. 2014. Using of 3D Digital Models for Polychromies Virtual Restoration on Interesting Cultural Sites, in *Journal of Cultural Heritage*, vol. 15 (2014), pp. 196-198.

³¹ Ferdani, D. et. Al. 2013: 21 ff.

Conclusion

Keeping a trace of the site, even virtually gives a new life to this forgotten heritage along one of the most important ancient trade routes between 1st – 3rd centuries AD. The exhibition, which complements the content, can take the form of a virtual visit to the ancient El Zarqa, providing information about the evolution of the site rather than the historical significance and institutions.

Archaeozoological data represented in the horse manger and the carbonized bones discovered during the French excavation, indicate the role of animals in all possible activities as soon as they interact with humans. Animal resources were used during the occupation of the praesidia. The bones discovered at these sites often reflect the role of the administration in supplying the garrisons; they also show alternative methods that praesidia occupants used to ensure a steady supply of food and equipment.

The objective is eminently educational and oriented to heritage marketing and diffusion. Moreover, setting up the virtual models, visitors can better understand how the praesidia was constructed and decorated. A project that can be executed without altering the remaining traces. Thus, the right interfaces for accessing this data should be created, in order to obtain a rich inter-operation of user / information in a sustainable environment.

This proposed developing project will lead to future projects that entail a clear differentiation and added value to these significant heritage sites. In the future, an extended version of such reconstruction may handle larger amounts

of data. Finally, web-based access can be expanded with more detailed explanation of the site and the visible results of the reconstruction process will make up-to-date scientific work accessible to a more general audience.

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