IMAGING OF THE LATE ROMAN CASTRUM.
Hypothetical Computer Reconstruction of Nag el-Hagar Fortress in Egypt

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Abstract

This work is dedicated to the computer reconstruction of Roman fortress Nag el-Hagar in Egypt. This fortification was situated to the south of Luxor (ancient Thebes), not far from Kom Ombo (ancient Ombos). Apparently the fortress was built during Diocletian's rule. Its architectural features are similar to other examples of Roman military architecture of the period of tetrarchy in Egypt. We chose Nag el-Hagar for the reconstruction because this fortress is a specimen of the classical Roman castrum which belongs to the period of Diocletian and at the same time it has some original architectural features. The remains of the palace of the Governor or a military commander which we can find inside the fortress are of a great interest to specialists in late Roman architecture. In this work we consider similar examples of late Roman military architecture both in Egypt and throughout the Roman Empire. Their architectural peculiarities give us the idea how the fortress and the palace in Nag el-Hagar could look like. Beside that, we have made an attempt to examine some problems of computer 3D reconstructions in general. This computer reconstruction of Nag el-Hagar shows that a late Roman fortress in Egypt was a majestic ensemble and its architectural and planning features were influenced not only by its military function, but also by the artistic concepts of the late Roman architects who built it.

Keywords: Nag el-Hagar, Egypt, Rome, fortress, late Roman, late antique, Late Antiquity, tetrarchy, Diocletian, computer, reconstruction, fortification, palace

Introduction

The study[1] is dedicated to the computer reconstruction of Roman fortress Nag el-Hagar in Egypt, which was situated to the south of Luxor (ancient Thebes), not far from Kom Ombo (ancient Ombos) (Fig. 1). Most of the well-preserved examples of Roman architecture had been thoroughly studied since Renaissance till the end of the 20th century. Today scientists have to deal with the buildings which are in a very bad condition. As a result, for someone who is not a specialist it is quite difficult to imagine how these buildings could have looked when they had just been built. In this case our aim is to show it, using the method of scientific reconstruction, and nowadays computer graphics have become the most convenient means to do it.

As well as handmade graphics and maquette specialists in ancient architecture often use 3D-reconstructions. For example, Dieter Arnold, who for many years has been illustrating his publications with wonderful drawings made by himself and his students now uses 3D-reconstractions too[2]. Besides, computer 3D-modelling not only allows to show the appearance of the building, but also makes it possible to reconstruct such details as natural and artificial lighting[3].

In our opinion, wide use of computer graphics in studying the history of architecture by no means diminishes the importance of handmade graphics.

In this article, along with reasoning of the reconstruction of the fortress based on the studied analogies[4], we will consider some specific features of making computer reconstructions of architectural monuments. For representing the results we will use general axonometric and perspective views, which were made from a human viewpoint, and only in some cases we will give some zoomed-in images showing necessary details, because for reconstructing such views we need to carefully examine the architectural monument and its analogs too, and this is sometimes impossible because of the bad condition of the original.

Unlike general axonometric and general perspective views, a perspective view which represents some part of the building in large scale – interior or exterior – demands exact and thorough details, for example, colour and fracture of the walls, stylistic features of architectural details, peculiarities of mason work, facing and floor paving. Thus, in the reconstruction of a late Roman monument we cannot use the model of a capital belonging to the period of Republic or Early Empire. But if we do not show this capital in large scale, then it is possible, because in that case it will mean just some capital in general. Here we can draw the analogy to handmade graphic reconstructions where minor details are usually skipped. As Nag el-Hagar fortress is almost completely destroyed (there is only a little more than the foundation preserved) it seems impossible to reconstruct all its stylistic features and peculiarities; that is why we give only a conventional view of some details.

3D computer graphics allows us to create very realistic images. We can reproduce the colour and texture of the materials used, and even the lighting which is typical for this area at any part of the day. The perspective views in this work are views from a human viewpoint at a given time and season. Two of them (see Fig. 4, Fig. 5 below) show the western wall of the fortress in winter, in the evening, when the sun sets in the south-west. One (see Fig. 6 below) shows this wall at sunset in summer, when the sun sets in the north-west. The last one (see Fig. 11 below) shows the peristyle court of the palace at mid afternoon (about 14.00).

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[2] See, for example: 3D-reconructions of the pyramid complex of Senwosret III [Arnold 2002. Pl. 153a, 153b. 154, 155] and of the Senwosretankh mastaba complex [Arnold 2008. Pl. 5a, 5b, 6], which were made by David Johnson, the Museum of Reconstructions [http://www.reconstructions.org].
[3] Study of lighting in late antique houses which contain computer reconstructions was conducted by Simon Ellis [Ellis 2007].
[4] Also about the reconstruction of Nag el-Hagar fortress see: [Karelin 2010a. P. 173-181, Fig. 71-80; Karelin 2010b, Karelin in print].
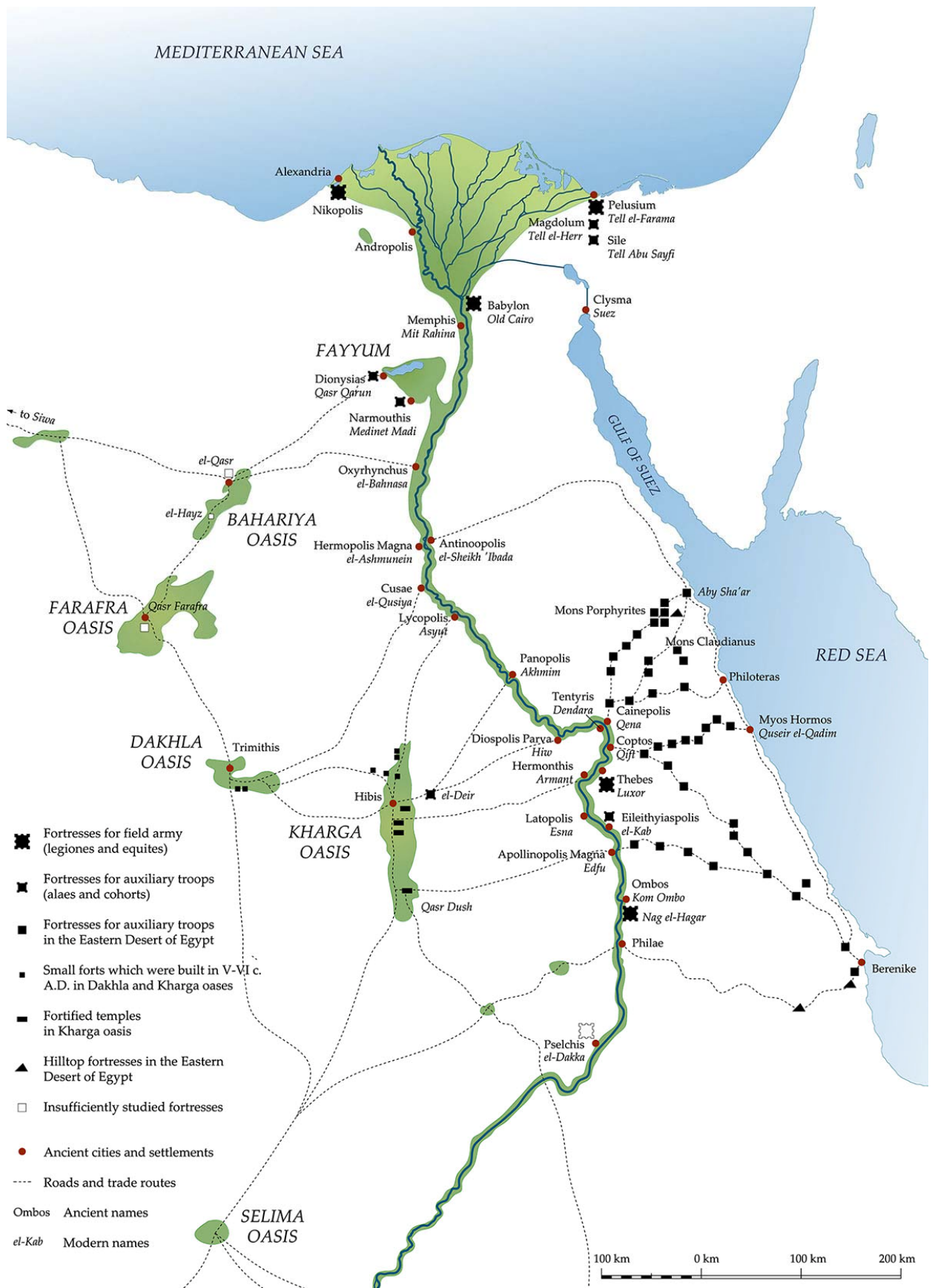
MEDITERRANEAN SEA

Alexandria
Nikopolis

Pelusium
Tell el-Farama
Magdolum
Tell el-Herr
Sile
Tell Abu Sayfi

Andropolis

Babylon
Old Cairo

Clysma
Suez

Memphis
Mit Rahina

FAYYUM

Dionysias
Qasr Qarun

GULF OF SUEZ

Narmouthis
Medinet Madi

to Siwa

el-Qasr

Oxyrhynchus
el-Bahnasa

el-Hayz

BAHARIYA
OASIS

Hermopolis Magna
el-Ashmunein
Antinoopolis
el-Sheikh 'Ibada

Cusae
el-Qusiya

FARAFRA
OASIS

Qasr Farafra

Lycopolis
Asyut

Aby Sha'ar

Mons Porphyrites

Mons Claudianus

RED SEA

Panopolis
Akhmim

Philoteras

Tentyris
Dendara
Cainepolis
Qena

Myos Hormos
Quseir el-Qadim

DAKHLA
OASIS

Trimithis

Coptos
Qift

Diospolis Parva
Hiw

Hermonthis
Armant

Thebes
Luxor

Hibis

el-Deir

KHARGA
OASIS

Latopolis
Esna

Eileithyiaspolis
el-Kab

Apollinopolis Magna
Edfu

Ombos
Kom Ombo

Qasr Dush

Nag el-Hagar

Philae

Fortresses for field army
(legiones and equites)

Fortresses for auxiliary troops
(alaes and cohorts)

Fortresses for auxiliary troops
in the Eastern Desert of Egypt

Small forts which were built in V-VI c.
A.D. in Dakhla and Kharga oases

Fortified temples
in Kharga oasis

Berenike

Hilltop fortresses in the Eastern
Desert of Egypt

Insufficiently studied fortresses

Pselchis
el-Dakka

Ancient cities and settlements

Roads and trade routes

Ombos   Ancient names

el-Kab   Modern names

SELIMA
OASIS

100 km   0 km   100 km   200 km

Fig. 1. Map of Egypt in the Roman period with Roman fortresses I-V c. A. D.

Nag el-Hagar fortress

Now about the monument itself. To the south from Luxor (ancient Thebes), not far from Kom Ombo (ancient Ombos) in the place called Nag el-Hagar (Fig. 1) there remained some ruins of a Roman fortress (Fig. 2), which was probably erected in the end of III century A.D., supposedly during the rule of Diocletian (284 – 305 A.D.)[5]. We chose this site for a graphic reconstruction because it is one of the few examples of the Roman fortifications for *comitatus*[6] in Egypt. Nag el-Hagar fortress represents a great interest to researchers as being a classical late Roman castrum of III-IV centuries A.D.[7], and at the same time here was the palace of a military commander or a civil governor[8]. The palace occupied about 1/8 of the fortress. Besides, except for Luxor fortress, the reconstruction of which has already been made [El-Saghir et al. 1986. Pl. XX], Nag el-Hagar is in a better condition than other late Roman fortifications for *comitatus* in Egypt. In Pelusium there are only the foundations of outer walls preserved [El-Maqsoud 1994], and in Babylon there remained some parts of outer walls, but we know almost nothing about the planning of inner part, though a thorough archeological research has been made[9]. The results of excavations in Nag el-Hagar give us some information about the architecture of its outer walls, gates, towers, about its inner part planning and also about some buildings which were situated inside the fortress.

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[5] During his rule Diocletian reorganized the administrative system in the Roman Empire (and Egypt as a part of it) and carried out the military reform, which had some influence on military architecture too. More on this subject the reader can find, for example, here: [Southern, Dixon 1996. P. 4-38]. It resulted in building more fortresses throughout the Empire. P. Zignani supposed that Diocletian could control the process of building Nag el-Hagar fortress himself during his stay in Egypt [Wareth, Zignani 1992. P. 208], but in M. Mackensen's opinion there is no sufficient evidence for such theory and we cannot date the fortress exactly to the period of tetrarchy [Mackensen 2006a. S. 169; Mackensen 2009. P. 296].

[6] *Comitatus* – field army of the Roman Empire in IV century A.D. It consisted of legions (*legiones*) and elite cavalry (*equites*) and was a mobile reserve. It is most likely that a part of *Legio III Diocletiana* was quartered in this fortress. P. Zignani supposed [Wareth, Zignani 1992. P. 207-209] that the fortress can be identified with the place called *Praesentia* which is mentioned in *Notitia Dignitatum* [ND. Pars Secunda. In partibus Orientis. XXXI.33], but M. Mackensen thinks that there is not enough evidence to confirm that [Mackensen 2006a. S. 163-164]. Anyway there is no doubt that the part of this legion which *Notitia Dignitatum* connects to either *Praesentia* or *Ombos* [ND. Pars Secunda. In partibus Orientis. XXXI.31] was quartered here.

[7] About architectural features of late Roman fortresses see: [Johnson 1983. P.31-54; Lander 1984. P. 151-262; Gregory 1995. Vol. 1; Gregory 1996; Southern, Dixon 1996. P. 127-147; Reddé 1995].

[8] P. Zignani supposed that it could be the residence of *Praeses Thebaidos*, who was the civil governor and at the same time the military commander of the province, or it could be used as a temporary residence of Diocletian during his visit to Egypt [Wareth, Zignani 1992. P. 207-208], while M. Mackensen doubts that and believes the palace could belong to a high-ranking officer; probably, it was a temporary residence of *dux Thebaidos* [Mackensen 2006a. S. 169; Mackensen 2009. P. 296-297]. This residence could be used for the reception of the ambassadors of the Blemmyes by the military commander [Mackensen 2006b. P. 216]. M. Mackensen's version rests upon L. Lavan's research, and he points out that residences of late antique provincial governors in the Roman Empire used to be situated in large cities [Lavan 2001. P. 45] and the audience halls in them were, as a rule, about two times bigger than the hall in Nag el-Hagar. So these signs indicate it is quite unlikely that *Praeses Thebaidos* lived in the palace. Also we cannot ignore the fact that in residences of provincial governors the main audience hall was situated close to the entrance [Lavan 2001. P. 50-52]. In that case the apsidal hall behind the palace looks more like the formal dining room of an aristocratic villa (see below, notes 34-36). Besides, a residence of provincial governor had to contain law courts, a *secretarium*, offices and a prison as well [Lavan 2001. P. 53-55]. The palace in question does not seem to have enough space for all these functions. So M. Mackensen's version about the palace being the residence of a high-ranking officer looks more substantial than the supposition that the governor of the whole province could live there.

[9] See: [Grossmann et al. 1994; Grossmann et al. 1998; Sheehan 1996]. Author didn't have possibility to look through a new P. Sheehan's book [Sheehan 2010] which was published at the end of the autumn 2010.
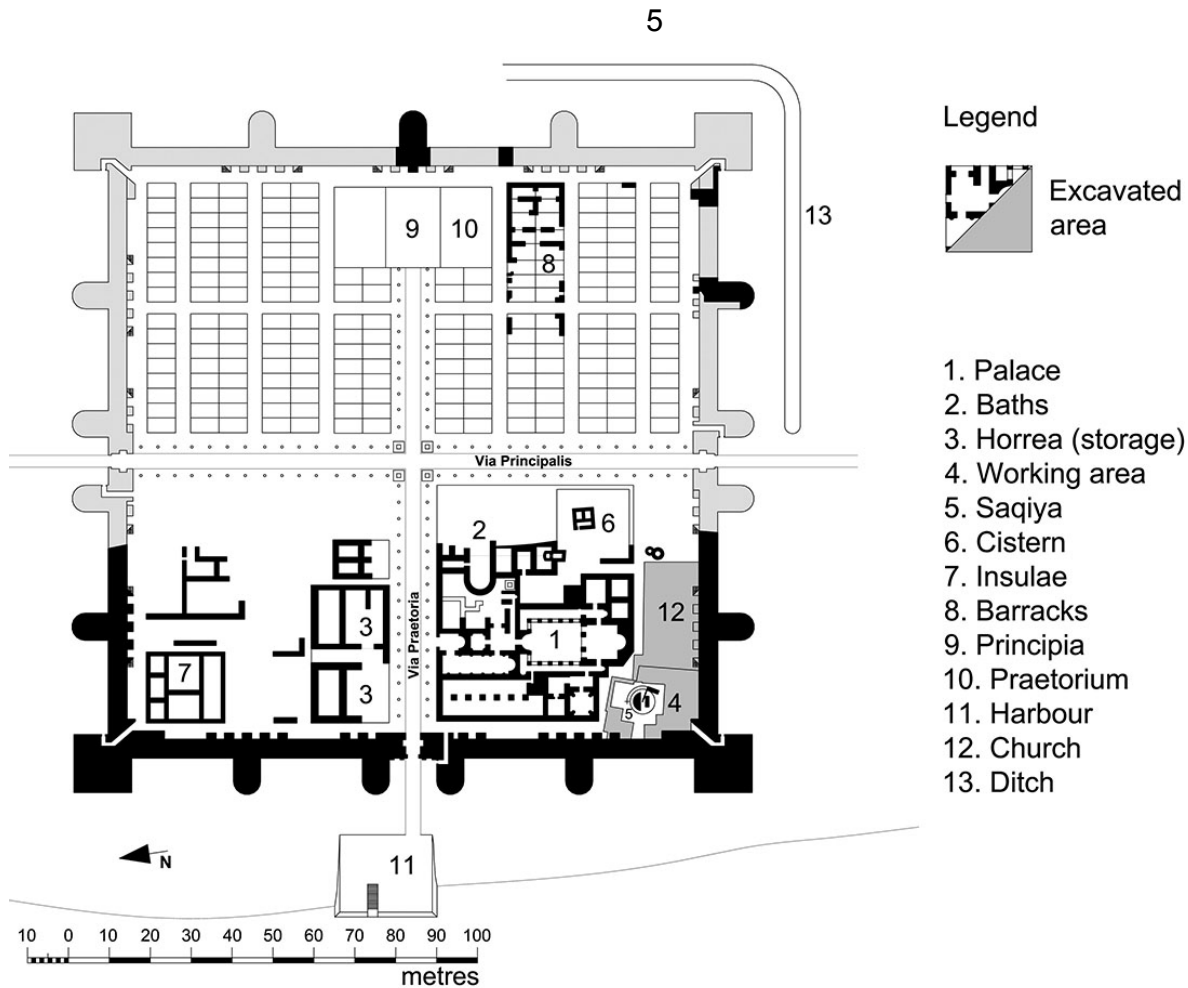
Fig. 2. Schematic plan of the late Roman fortress at Nag el-Hagar (made by the author. Based on: Jaritz, Mustafa 1984. Figs. 1-3; Wareth, Zignani 1992. Figs. 1,3, Pl. 22; Mackensen 2009. Figs. 2, 13, 15)

Brief history of archaeological survey of the site

In 1980s the archeologists studied the western part of the fortress [Jaritz, Mustafa 1984. Figs. 1-3; Wareth, Zignani 1992. Fig. 1, Pl. 22]. They excavated the western wall, the main gate, the palace, the baths (*thermae)* and some buildings in the north-western part of the fortress. Even then the mounds which formed in the places of northern, southern and eastern walls gave scientists the idea of the size and shape of the fortress and the number of towers [Wareth, Zignani 1992. P. 189]. At the beginning of XXI century a Swiss-Egyptian expedition continued the study of Nag el-Hagar. The eastern part of the fortress was excavated, as well as the western part [Mackensen 2006a; El-Bialy, Mackensen 2007; El-Bialy, von Kienlin 2008], and in the eastern part were found barracks, a *principia*, a *praetorium* and some traces of a ditch around the fortress [Mackensen 2009. P. 300-309]. Today the Swiss-Egyptian expedition continues to study the fortress. In this case my reconstruction can be only tentative. I hope that new discoveries will cast new light on the architectural history of the Nag el-Hagar fortress and improve my study.

Planning structure and main architectural features of the fortress

Nag el-Hagar fortress was planned as a square with the side length of about 150 m. The basis of the planning structure of this fortress was formed by *Via Praetoria* running from east to west and

Via Principalis running perpendicular to it. At the point where they crossed there could be situated a tetrastyle. The shafts of columns which were discovered in the eastern part of the fortress [Wareth, Zignani 1992. P. 195] make it possible to suppose that the main streets were lined with colonnades[10]. The road to the harbour went from the western wall gate, which faced the Nile. The western wall and its towers were made from the stones which had been taken from some earlier buildings of Ptolemaic or Roman period, while the other three were built from mud brick [Wareth, Zignani 1992. P. 190] (Fig. 3).
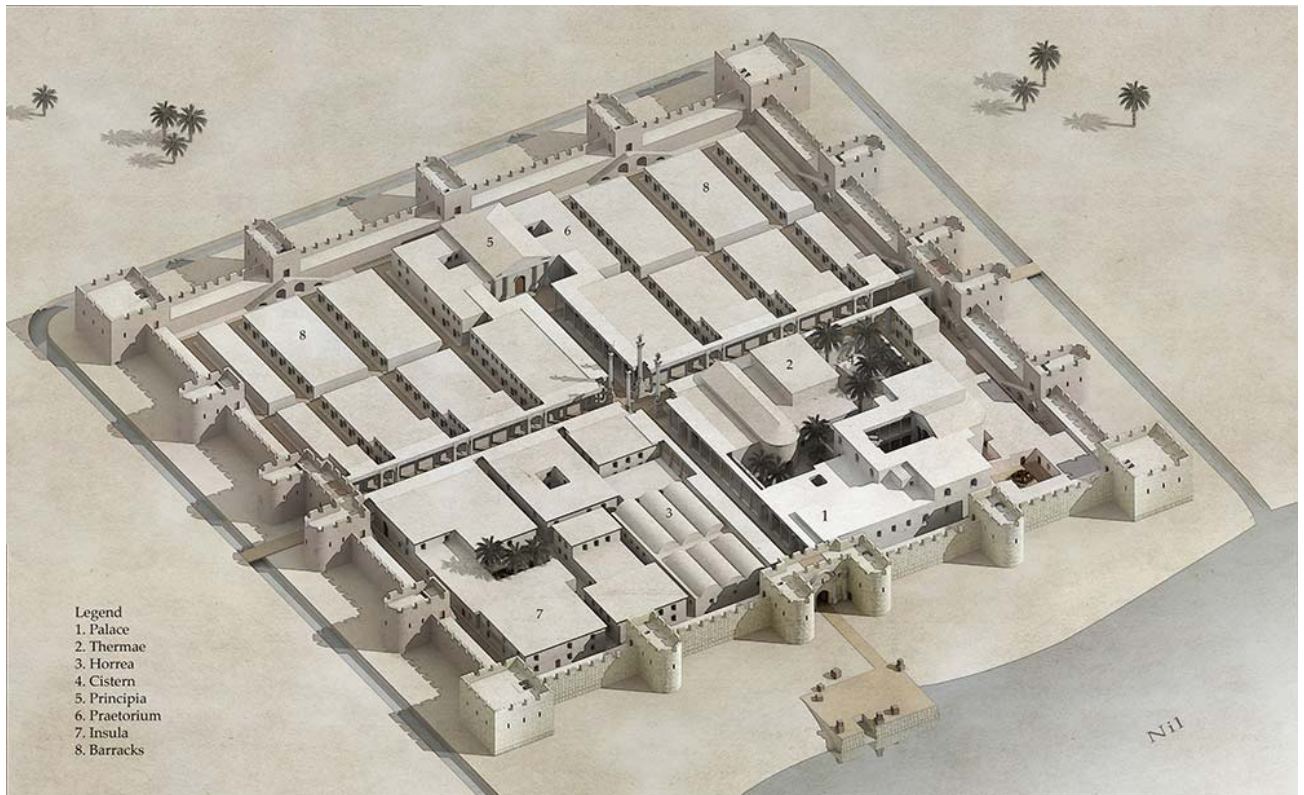

Fig. 3. Axonometric view of Nag el-Hagar fortress (made by the author)

To the north of *Via Praetoria* there was situated a storage (*horrea*)[11], and behind it some remains of a building, probably an *insula*, were found[12]. In the western part of *Via Praetoria* there was a palace with baths [Wareth, Zignani 1992. P. 199-200] adjoined on the east. To the south-east of the palace there was a cistern [Wareth, Zignani 1992. P. 200-201]. Between the palace and the southern wall there was a working area [Wareth, Zignani 1992. P. 201]. Later on that place a Christian church was built[13]. Due to the latest research we know that on the southern side of *Via Praetoria* in its

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[10] This suggestion was made by P. Zignani on the basis of studying the analogies in Luxor and Qasr Qarun (Dionisias) [Wareth, Zignani 1992. P. 195]. Colonnades on both sides of the street were quite usual for late Roman fortresses – in Egypt too, for example, the fortress in Dionisias [Schwartz 1969. Fig. 49a, 49b, Plan 2], and Abu Sha'ar [Sidebotham 1994. Fig. 16].

[11] *Horrea* is a storage for provision. Storages like these, which consisted of several extended rooms covered by barrel vaults, were found in Abu Sha'ar [Sidebotham 1994. P. 133, 153-154, Fig. 2; Sidebotham et al. 2008 P. 55, Figs. 3.5-3.6] and el-Lejjun [Crawford 2006. P. 235-240, Figs. 9.1-9.5, Pls. 9.1-9.4].

[12] See: [Wareth, Zignani 1992. P. 202-203]. M. Mackensen suggested that this building could serve as an additional habitation for officers besides *praetorium* in the south-eastern part of the fortress [Mackensen 2006a. S. 166].

[13] About the churches at Nag el-Hagar see: [Jaritz, Mustafa 1984. P. 28-30, Fig. 4; El-Bialy, von Kienlin 2008. P. 62-64; von Kienlin 2008. S. 118-119].

eastern part there were some barracks for soldiers [Mackensen 2009. P. 306-307, Figs. 13-15], and at the end of the street there were *principia* and *praetorium* [Mackensen 2009. P. 304].

Walls and Towers of Fortress

Having studied the stairs foundations which remained along the western, southern and eastern walls, P. Zignani suggested that people climbed the walls with the help of the staircases which were situated parallel to the walls and were supported by pylons [Wareth, Zignani 1992. P. 193, Fig. 2.]. Such staircases were often used in Roman fortresses in IV A.D.[14] P. Zignani also calculated the height of the walls – it used to be about 4 m. This conclusion is based on the measuring of the stairs foundations and steps, which we have already mentioned[15].

The corner towers of the fortress were square and the interval towers were U-shaped[16] (see Fig. 2 – Fig. 3 above; Fig. 4 – Fig. 6 below). There also remained the foundations and the lower part of the western gate, flanked by two U-shaped towers [Jaritz, Mustafa 1984. P. 22]. The mounds, which formed on the place where were the walls, as well as the double spots of sandstone chips, found in the middle of the northern and southern walls[17], show us the disposition of the towers and indicate that there used to be gates in these walls too.

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[14] Staircases like that were found in several late Roman fortresses in Egypt: in Luxor [El-Saghir et al. 1986. Fig. 19., Pl. XV, XX], el-Kab [Badawi 1947. P. 367], and also outside Egypt: in Iznik (Nicaea) [Schneider, Karnapp 1938. Abb. 9,11.] and el-Lejjun [de Vries, Goodwin, Lain 2006. P. 189, Fig. 6.2].

[15] P. Grossman made a critical analysis of P. Zignani's reconstruction of the walls and staircases [Grossmann 2003. S. 118-119]. M. Mackensen studied it and analysed the supposed height of Roman fort walls in Kharga oasis (for example, ad-Deir and Ain Labakha). He suggested that walls in Nag el-Hagar should be at least 10 m high [Mackensen 2009. P. 304]. But we think that P. Zignani's version is more probable. Firstly, almost the same wall height - no more than 5 m from the ground to wall-walks (approximately 7 m with parapet) was suggested for the reconstruction of another fortress for the legion in Egypt – that is Luxor [El-Saghir et al. 1986. Pl. XX], - and it is confirmed by the remains of stair close to tower B near to the pylon of Ramses II [El-Saghir et al. 1986. Fig. 19, Pl. XV]. Such wall height (5 m to the wall-walk) was also suggested for el-Lejjun fortress by B. de Vries [de Vries, Goodwin, Lain 2006. P. 209, Fig. 6.2]. Walls of 4-6 m high from the ground to wall-walks were often built in late Roman fortresses in the eastern part of the Roman Empire [Gregory 1995. Vol. 1. Fig. 6.5a,c,d,e,f]. Forts in Kharga oasis, which M. Mackensen refers to, are much smaller than Nag el-Hagar and Luxor, and were used for quartering auxiliary troops rather than parts of the field army. It is quite possible that the walls of bigger fortresses such as Nag el-Hagar, Luxor or el-Lejjun were lower than the walls of small forts situated on the border of Roman Egypt, because attacks of blemmies or native people's uprising were less dangerous for a large fortress with a big garrison than for a smaller one. A number of specialists in late Roman military architecture believe that fortifications in large Roman fortresses of the beginning of IV century could have an imposing appearance in order to impress the enemy. They were expected to defend against a sudden attack or uprising, but could not stand up to a real siege of well-armed forces [Lander 1994. P. 258; Gregory 1995. Vol. 1. P. 150].

[16] U-shaped towers (Interval or flanking the gates) and square corner towers were quite usual for late Roman fortresses. In Egypt towers like that were built in Luxor [El-Saghir et al. 1986. P. 25-26. Pl. I, XX] and Babylon [Grossmann et al. 1994. S. 272-276, Fig. 1] and there are a lot of such examples throughout the territory of the whole Roman Empire. More about tower types in late Roman military architecture see, for example: [Lander 1984. P. 198-251; Gregory 1995. Vol. 1. P. 132-137, 160-173].

[17] P. Zignani suggested that northern and southern gates, as well as the gate in Luxor, the main gate in Dionysias [Schwartz 1969. Fig. 48b, Plan 2] and el-Kab [Badawi 1947. Fig. 32] could be built from bricks; and that only the portal (of which the mentioned double spots of sandstone chips) was made of stone. The magnetogram of the eastern half of the fortress, made by Swiss-Egyptian expedition, showed that there are some symmetrical stone blocks in the front and back side of the southern gate [MacKensen 2009. Fig. 8].

Fig. 4. The western wall of Nag el-Hagar fortress, view from the north-west, winter evening (made by the author)

Fig. 5. The western wall of Nag el-Hagar fortress, view from the north, winter sunset. (made by the author)

Fig. 6. The western wall of Nag el-Hagar fortress, view from the south-west, summer sunset (made by the author)

The western gate (see Fig. 2 above; Fig. 8 below) did not have an inner fortified court, as opposed to Luxor [El-Saghir et al. 1986. P. 26-27], Babylon [Grossmann et al. 1994. Fig. 1,9] and many other late Roman fortresses both in the eastern and western parts of the Roman Empire[18]. We do not know if there used to be fortified courts at other gates. P. Zignani thought it was quite possible [Wareth, Zignani 1992. Fig. 3], but we cannot agree with him, as there is no reason why the main gate should be less fortified than other gates.

The stone western wall of the fortress was ashlar-faced with rubble core [Wareth, Zignani 1992. P. 190]. The Romans often used this technique when building large fortresses in the eastern part of the Roman Empire [Gregory 1995. Vol. 1. P. 110-111, Fig. 5.4.]. In Egypt they used it for Luxor fortress [El-Saghir et al. 1986. Pl. IV, VIII, XI, XIII]. But in Babylon, another fortress for the legion[19], they applied a different technique – masonwork *opus mixtum*[20] for the wall face, and wall core was also rubble [Grossmann et al. 1994. P. 272, Figs. 4-5]. The merlons of the wall parapet were, supposedly, typical for late Roman military architecture[21]. It is most likely that the towers, which projected from the wall at 10 m, were for one level higher than the walls. It was also typical for late Roman military architecture[22]. In that case the towers had two stores – the ground one and the first

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[18] Fortified courts were often built behind the gates of late Roman fortresses [Gregory 1995. Vol. 1. P. 137, Fig. 6.7]. We can see them in fortresses Dmeyr and Singara [Gregory 1995. Vol. 3. Fig. C10.3], Aurelianic Wall at Rome [Johnson 1983. P. 45, Fig. 18] and Diocletian's palace at Split [Johnson 1983. P. 49, Fig. 22].

[19] *Legio XIII Gemina* was quartered in Babylon fortress [ND. Pars Secunda. In partibus Orientis. XXVIII.15].

[20] This technique was mainly used for building fortresses in the western part of the Empire [Johnson 1983. P. 35].

[21] As a rule, the width of merlons was about 2 m, and of the embrasure about 1 m. The parapet was usually about 2 m high. See, for example: crenellations of Amida [Gregory 1995. Vol. 2. P. 59-65, Vol. 3. Fig. C1.2, C1.4, C1.5] and at Iznik (Nicaea) [Schneider, Karnapp 1938. Abb. 9-11].

[22] Towers were usually higher than walls and projected from external wall contour, because the soldiers had to make crossfire and to use artillery which needed some height and large area of tower top. Besides, higher towers and walls were necessary to defend against siege towers [Lander P. 258. Gregory 1995. Vol. 1. P. 173-174].

one. The lower level of the walls and towers was, probably, solid[23]. We supposed that in the inner corner of the such tower there used to be a staircase (Fig. 4) and there were some rooms with arrow-slits around it[24].
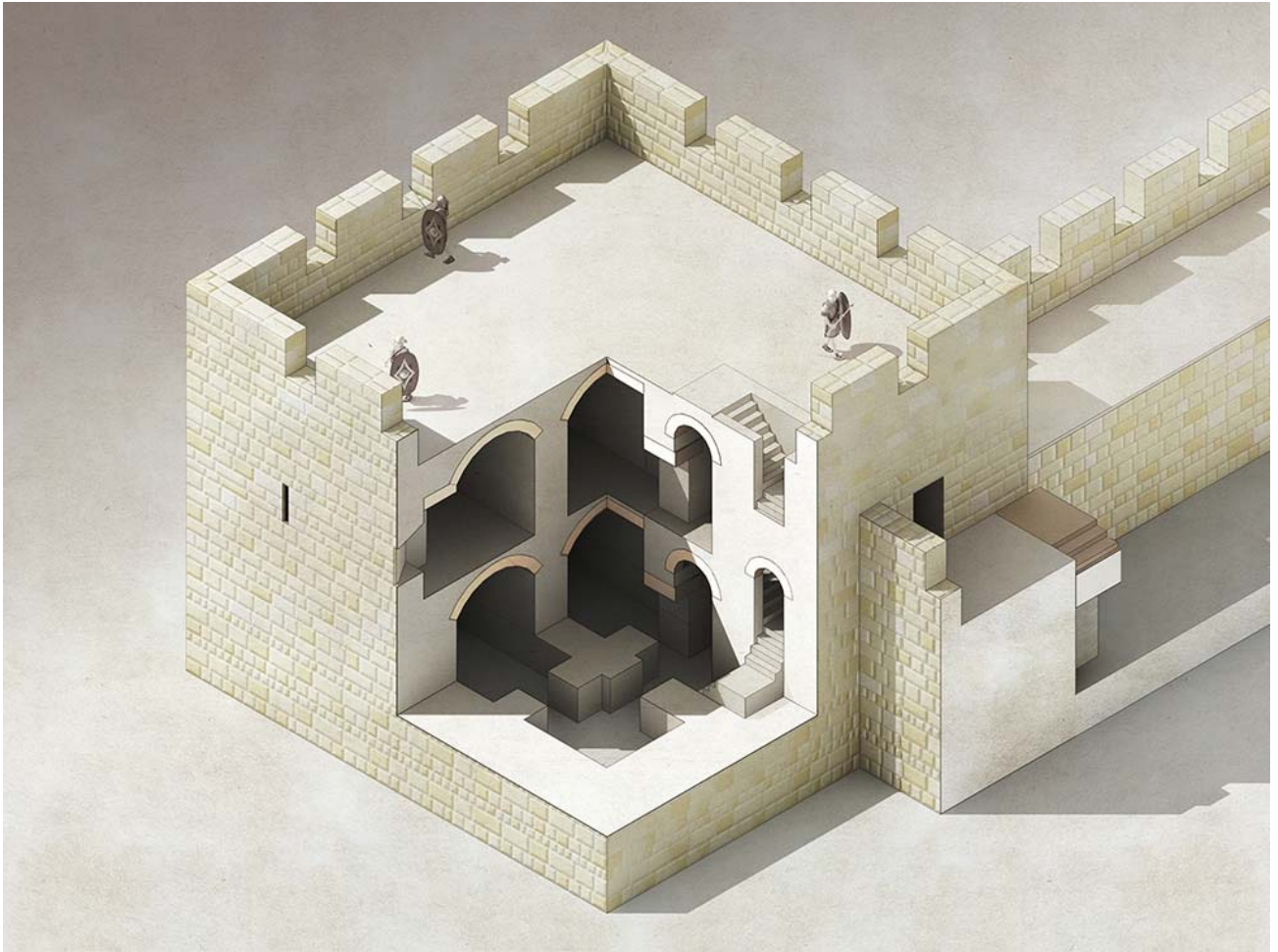

Fig. 7. Axonometric view of Nag el-Hagar fortress corner tower (made by the author)

The kind of arrow-slits we used for the reconstruction was most typical for late Roman military architecture[25]. On the lower level of the corner towers and the right tower of the western gate there remained some traces of posterns[26].

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[23] P. Zignani [Wareth, Zignani 1992. P. 192] and M. Mackensen [Mackensen 2009. P. 303] shared this opinion. The lower level of towers and walls in late Roman fortresses was often solid so that to defend them against rams [Gregory 1995. Vol. 1. P. 168].
[24] Such position of a staircase in square, rounded and fan-shaped towers was usual for late Roman military architecture, for example: at el-Lejjun [de Vries, Goodwin, Lain 2006. Fig. 6.3-6.4], Qasr Bsir [Gregory 1995. Vol. 3. Fig. F20.1], Odruh [Brünnow, Domaszewski 1904. Vol. 1. Fig. 490] and Iznik (Nicaea) [Schneider, Karnapp 1938. Taff. 28].
[25] See: [Gregory 1995. Vol. 1. P.153-155]. Arrow-slits like that remained at Resafa [Karnapp 1976. Abb. 10], Iznik (Nicaea) [Schneider, Karnapp 1938. Abb. 8] and Zenobia [Gregory 1995. Vol. 3. Fig. D3.14].

The Western gate

The western gate seems the most interesting to us (see Fig. 8 below). It was made from stone and it is in a better condition than other gates. We have already mentioned that it did not have a fortified inner court, so it is quite logical that it had to be compensated with some other means of defense. The scheme of the gate's opening was complex [Jaritz, Mustafa 1984. P. 25, Fig. 3]. From the outside we can see projecting of the gate's opening. It defended the hinges of the gates. Then the passage widened[27]. Apparently here there used to be a barrel vault[28]. The passage widened further on and then narrowed. Before this narrowing there could be a portcullis[29], which was pulled down if the enemy managed to break the gate.

On the front side of the western gate there are remains of niches and four attic bases of half columns [Jaritz, Mustafa 1984. P. 25, Fig. 3]. The eastern gate of Luxor fortress had alike architectural decorations, but there were pilasters instead of half-columns at Nag el-Hagar. Other gates of Theban fortress were less decorative [El-Saghir et al. 1986. Pl. III-XIV, XVIIIb]. At the gates of Babylon fortress there remained pilasters and a profiled archivolt which framed the opening; above it there was a pediment [Grossmann et al. 1994. Fig. 2]. It would be logical to suggest that at Nag el-Hagar there used to be a cornice resting on these four half-columns, like it was it in triumphal arches[30]. There are a lot of examples of such architectural decorations in fortresses and on town gates[31]. But if we consider the size and proportions of the gate which depended on the wall height we will see that either the cornice would have covered the most convenient place for arrow-slits or the columns would have had proportions untypical for Corinthian order.

We can also see the architectural decorations similar to those which, in our opinion, were used in Nag el-Hagar, on the gate of late Roman and early Byzantine Resafa fortress. The front of the gate was decorated with six Corinthian columns; one pair of columns framed one portal. Above the central portal there was an arcature, the side portals were framed by smaller arcatures, and between these three arcatures there were two even smaller arcatures [Karnapp 1976. Abb. 173,

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[26] We can see this in late Roman fortresses in Luxor [El-Saghir et al. 1986. P. 27], el-Kab [Badawi 1947. Fig. 32], and also in fortifications of Iznik (Nicaea) [Schneider, Karnapp 1938. Taff. 41]. Besides, there are some examples of posterns in late Roman military architecture in the western part of the Roman Empire [Petrikovits 1971. P. 201, Fig. 30.7, 30.10; Johnson 1976. P. 122, Fig. 69; Johnson 1983. P. 50, Fig. 20,]. M. Reddé suggested that they were used for letting in and out small groups of soldiers, sentries and also for making sallies [El-Saghir et al. 1986. P. 27]. It is confirmed by the position of posters: in all fortresses they were situated in the right tower, so that soldiers making a sally could defend themselves with shields and the enemy approaching postern had to turn their shieldless side to the wall. This principle of locating posterns and simple entrances was observed in some fortresses, camps and siege constructions which is confirmed in several Roman and Byzantine treatises, for example: [Vitruvius. I.V.2; Mauricius. X.3].
[27] Supposedly the opening had to be arched, which confirms the engraving by F.L. Norden. P. Zignani identified it with Nag el-Hagar fortress [Wareth, Zignani 1992. P. 188, Pl. 27b].
[28] We can find such a structure in Viransehir fortress in Cappadocia [Gregory 1995. Vol. 3. Fig. B.5.2].
[29] Due to the well-preserved slots in the gate of Babylon [Grossmann et al. 1994. Fig. 9], we can suppose that there might be a portcullis in this fortress too.
[30] The first person who suggested this was H. Jaritz. He studied Nag el-Hagar fortress during the expedition of Egyptian Antiquities Organization [Jaritz, Mustafa 1984. P. 22-23, Fig. 3]. He compared the architectural decorations of the western gate and triumphal arches on island Philae and in Baharia oasis, and also the architectural decorations of the gates in Luxor.
[31] The architectural decorations of a Roman fortress gate often had some features similar to triumphal arches. Since the beginning of I century A.D. triumphal arches were often fortified and gradually became a part of town walls in Gaul [Johnson 1983. P. 45]. In II-III centuries in the eastern provinces of the Empire the Romans built the gates which were as richly decorated as triumphal arches, for example: [Segal 1997. P. 83-106]. There are a lot of examples of them on late Roman coins, like town gates at Bizya (Thrace) [Donaldson 1965. P. 314-317, No. 83].

174; Musil 1928. Fig. 92]. In the centres of three main arcatures there were arrow-slits. As we think, a similar principle of architectural decoration, probably with a less number of columns and arcatures, could be used at Nag el-Hagar (Fig. 8). Although the gates of the fortress at Resafa were built at least one hundred years later than the gates at Nag el-Hagar, we know that arched decorations were used in the northern gate and southern facade of Diocletian's palace at Split, and it was erected approximately at the same time as Nag el-Hagar fortress [McNally 1996. P. 24-25, Fig. 17.1.C.3.-18.1.C.3; Ward-Perkins 1981. P. 459, Fig. 311, Wilkes 1993. P. 28-30, Pl. 6, P. 32-37, Pl. 7, Fig. 3]. In any case the variant we suggest is not the final one and the question of architectural decoration of the gate, like many others, is still unsolved.

Fig. 8. Axonometric view of Nag el-Hagar fortress western gate (made by the author)

The palace

The most interesting building inside the fortress is the palace (Fig. 9 – Fig. 11). The entrance to the palace was situated in 20 m from the western gate on the southern side of *Via Praetoria*. Its walls were built of burnt and mud bricks and covered with white plaster [El-Bialy, von Kienlin 2008. P. 62]. At first the visitor came into a little room with an apse, in the western wall of which there was the door leading to an elongated hall with half-columns and an apse[32]. Then from the hall he got into a small room with doorways in every wall.

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[32] More about our conception of functional zoning of this palace see: [Karelin 2010b. P. 10-11].
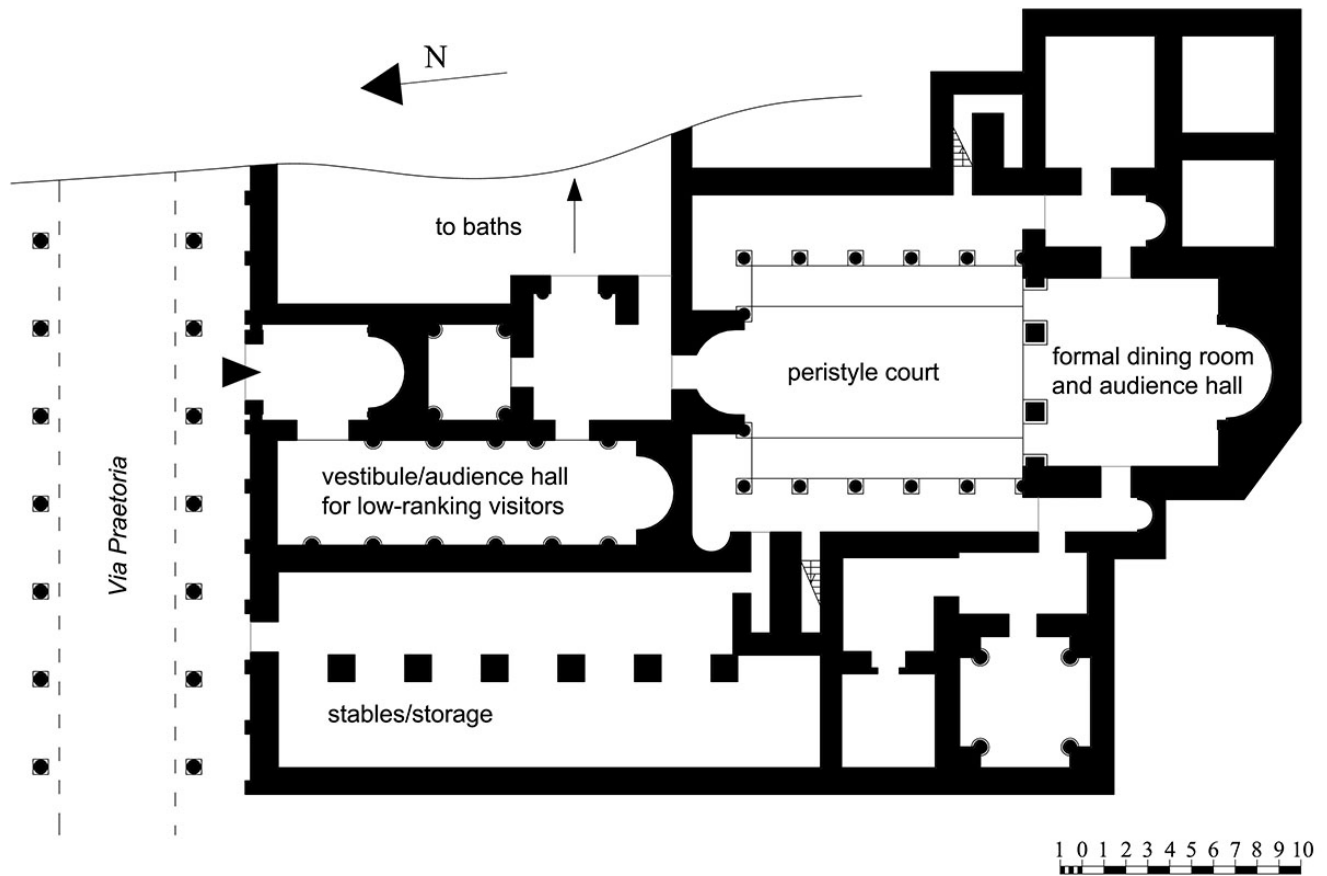
Fig. 9. Schematic plan of the late Roman palace at Nag el-Hagar (drawing by the author based on: Wareth, Zignani 1992. Fig. 3, Pl. 22)

The door in the northern wall led to an unroofed room, also not very big [Wareth, Zignani 1992. P. 197.], with columns in the corners. The door in the eastern wall led to baths, and the southern door – to a large paved double-height hall, encircled with columned galleries. It could be a peristyle or a basilica[33]. Some remains of sandstone Corinthian capitels and Attic bases were found here [El-Bialy, Mackensen 2007. P. 46, Pl. IVb; Mackensen 2006a. P. 191-194]. Through the portico with three doorways the visitor got into a room with an apse at the end. Together with the court it served apparently as an audience hall[34] for receiving visitors who were allowed into the private zone of the

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[33] Probably this court was rebuilt twice. Finally rectangular mud brick pillars of the court galleries were replaced by stone columns at two levels. About building phases of the palace see: [El-Bialy, von Kienlin 2008. P. 61-62; von Kienlin 2008. S. 123-126]. The axis of the court doesn't coincide with the axis of the apsidal hall for some decimeters. It might be provoked by construction reasons [von Kienlin 2008. S. 123]. This misfit was set aside in my schemes (Fig. 9, Fig. 10).

[34] P. Zignani compares the apsidal hall adjoining the court to a similar room in the *principia* of Diocletian's camp at Palmira [Wareth, Zignani 1992. P. 199]. M. Mackensen gives examples of such rooms with apses which were supposedly used for formal dinners in governor's residentions and in late Roman fortresses in Germany [Mackensen 2006a. P. 169]. A. von Kienlin compared the apsidal hall and the court at Nag el-Hagar with similar structures in the imperial palaces at Split and Gamzigrad. He suggested that so called "Peristyle" at Diocletian's palace at Split could be used as a model for this court [von Kienlin 2008. S. 127]. It was usual for late antique housing to use apsidal halls as an audience hall or a formal dining room, see, for example: [Ellis 2000. P. 170-174, 182-183]; about functions of apsidal halls (especially halls with a triconch) in late antique and early medieval palaces see: [Lavin 1962]; about audience halls in late antique houses in Britain see: [Ellis 1995. P. 169-177].

palace, or as a formal dining room[35]. For low-ranking visitors the host could use the elongated apsidal hall, situated next to the entrance[36].

Fig. 10. Axonometric view of the late Roman palace at Nag el-Hagar (made by the author)

As we think, the court in front of the apsidal hall was a peristyle and was unroofed[37], because the flight between the columns, which is more than 10 m, was quite large, while the columns of the

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[35] It is possible to state that the apsidal hall behind the court has some features typical for late antique formal dining rooms. This hall is divided into three functional zones. The first one, which is situated behind the triple entrance portal, was something like a "vestibule". The second one – it is in the centre of the room – had a communication function. In the middle of this hall there are the doors leading to the left and right wings of the palace; servants came through them. The centre of the hall could also serve as some kind of scene for dancing, for example, or some other performance, so that to entertain guests. In the third zone, which was in the far end of the hall, there was an apse where the guests sat at a semicircular table (*sigma*). A beautiful view to the court opened through the triple entrance portal of the hall. About architectural features of late antique dining rooms see: [Ellis 1997. P. 43-51]

[36] A Late Antique palace or a villa often had two apsidal halls. The first one, which was close to the entrance, was used for receiving low-ranking visitors, and the second one, which was situated in the middle of the house in front of the open court served as a formal dining room for visitors of higher rank [Ellis 1988. P. 570-572; Ellis 2000. P. 183]. We can see the same in late antique houses in Asia Minor [Ozgenel 2007. P. 265-269], in "Building of the Season" at Sufetula in Africa Proconsularis [Ghedini, Bullo 2007. P. 346, Fig. 5], in the Palace of Dux at Apollonia [Goodchild 1965; Ellis 1985]. As we think, in Nag el-Hagar palace both apsidal halls could have such functional meaning.

[37] A. von Kienlin suggested that this court was roofed by wooden constrictions at the end of the last building phase [El-Bialy, von Kienlin 2008. P. 62; von Kienlin 2008. S. 126]. He argued this assumption by the fact that wooden roofing constrictions were found in the church built at V-VI centuries A.D. to the south from the palace. In his opinion this timber was originally used for roofing of palace's court and after was reused [von Kienlin 2008. S. 126].

galleries were too thin to support the ceiling of such flight. Besides, there are many examples of late antique palaces and villas with a similar planning structure – a peristyle with an adjoining apsidal hall[38].

If the court was unroofed, then we can suppose that the orientation of it to the south was necessary to protect the room from sunlight. Indeed, the sunbeams fall at a sharp angle in the morning and in the evening. So even in summer the room remains shady, while in the afternoon only the southern part of the peristyle is sunlit and the hall itself again stays in the shadow (Fig. 11). Probably the peristyle was built on the same pattern as the Egyptian hall described by Vitruvius [Vitruvius. VI.III.9.]. We can find a hall like that at Bosra [Butler 1919. P. 256, ill. 229].

The door at the north-western corner of the peristyle led to an elongated hall with a gallery in the centre. It could be used as stables or storages[39]. The staircases of the western and eastern galleries led to upper floors, of which nothing remained. To the south of the western staircase there was a square space consisting of four rooms, and by the eastern staircase there was a similar group of three rooms [Wareth, Zignani 1992. P. 199].

To the north-east of the palace there used to be baths with a furnace in the southern room. P. Zignani suggested that the warmest rooms of the baths – *tepidarium* and *caldarium* – must have been situated next to the furnace. In this case the elongated room with a rounded end to the north of the furnace, which stretched from the east to the west, could be a *frigidarium* [Wareth, Zignani 1992. P. 200].

Besides the peristyle adjoining the apsidal hall, this palace has some features common to both imperial palaces of III-V centuries A.D. and late antique villas and palaces in general. First of all, it is situated inside the fortress, as well as Diocletian's palaces at Split and Antioch and Galerius's palace at Gamzigrad[40]. The area of the palace at Nag el-Hagar together with the baths occupied about 1/5 of the fortress. This proportion of the private residence to the rest of the buildings was kept up in the emperor's palaces at Split and Antioch[41]. The visitor got to the baths from the public zone of palace through the door in the left wall of the room which was in front of the peristyle. In the planning structure of some late antique villas, palaces or imperial residences baths were situated just like that[42]. It is quite possible that the official who owned the palace took a typical imperial residence of that time as an example.

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[38] For example, see: Villa Romana del Casale in Piazzo Armerina [Ward-Perkins 1981. P. 461, MacDonald 1986. P. 274-283, Fig. 207], Gamzigrad [Mulvin 2002. P. 81-83, Figs. 16-16a, Ćurčić 2010. P. 38-39, Fig. 8, 25], Abritus [Ivanov 1963, Ćurčić 2010. P. 39-40, Fig. 20, 26], villa "Casa de los marmoles" [Arce, Chavarria, Ripoll 2007. P. 313, Fig. 6] and Palace of Dux at Apollonia [Goodchild 1965. P. 253-254, Fig. 1; Ellis 1985. P. 21-22, Fig. 2.1.], House of Fortuna Annonaria at Ostia [Ward-Perkins 1981. P. 210, Fig. 128a].

[39] A room with square columns in the palace Dux Ripae at Dura-Europos served as stables [Rostovtzeff 1952. P. 73], while similar elongated rooms with rows of square columns served as granaries in many late antique villas in the Danube-Balkan region [Mulvin 2002. P. 37, 73, 82, 96, Fig. 1b, Fig. 16, Fig. 45].

[40] There are many examples of fortified villas, like in the Danube-Balkan region [Mulvin 2002. P. 33-35, 50-51, Fig. 82-85].

[41] S. Ćurčić compared the proportion of the palace itself to the rest of the area in Diocletian's palaces at Split and Antioch. [Ćurčić 1993. P. 68; Ćurčić 2010. P. 32].

[42] This was also observed by S. Ćurčić [Ćurčić 1993. P.70-71]. Besides the examples he gives we can name some more villas and palaces where the baths were situated the same way, for example, villa "Casa de los marmoles" [Arce, Chavarria, Ripoll 2007. P. 313, Fig. 6], Fishbourne palace [Ward-Perkins 1981. P. 240, Fig. 150].

Fig. 11. View of the peristyle court of Nag el-Hagar palace, afternoon (made by the author)

Conclusion

The reconstruction we made makes it possible to imagine how the fortress could look and how its architecture could influence people. As we suppose, the fortress was built strictly according to its military specifications, and at the same time Nag el-Hagar fortress was a majestic architectural ensemble. The stone western wall must have looked imposing and monumental to those approaching the fortress by the Nile (Fig. 4 – Fig. 6). It seems that the architects who built Nag el-Hagar considered the western wall as its main fasade; that is why we give so many views of it in this work. People coming into the fortress through the main gate could see the impressive *Via Praetoria* with colonnades on both sides and the road leading to the *principia*. The palace which had a very significant place in this ensemble was an interesting example of a residence belonging

to a late antique noble or a high-ranking military officer. Nag el-Hagar fortress was not as magnificent as Luxor and Babylon, but along with them it is undoubtedly one of the best examples of Roman military architecture in Egypt.

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List of Abbreviations

AA	–	Archäologischer Anzeiger
AJA	–	American Journal of Archaeology
AnTard	–	Antiquité Tardive
ASAE	–	Annales du Service des Antiquités de l'Égypte
BAR	–	British Archaeological Reports
BIFAO	–	Bulletin de l'Institut français d'archéologie orientale
BSAA	–	Bulletin de la Société archéologique d'Alexandria
CRIPEL	–	Cahiers de recherches de l'Institut de papyrologie et d'égyptologie de Lille
DAIK	–	deutschen archäologischen Instituts, Abt. Kairo
IFAO	–	l'Institut français d'archéologie orientale
JARCE	–	Journal of the American Research Center in Egypt
JRA	–	Journal of Roman Archaeology
JRS	–	Journal of Roman Studies
MDAIK	–	Mitteilungen des deutschen archäologischen Instituts, Abt. Kairo
MIFAO	–	Mémoires de l'Institut français d'archéologie orientale

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