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Defensive arrangements in Coptic architecture

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Abstract Roman persecution to Copts started as early as the first century. Even after Christianity had become official religion in Egypt, as they refused to espouse the Emperor's sect.

Another critical relation was arising in Eastern and Western Deserts between the monks and the Bedouins, who started to regularly attack them.

For four centuries following the Arab conquest, Moslem rulers retained relatively peaceful relations with the Copts, but at the beginning of the second millennium, Copts started to live in some expectation of hostility, which periodically flared into violence.

Therefore Coptic architects developed peculiar religious architecture with exceptional defensive arrangements and this research is an attempt to overview those peculiar arrangements inside churches as well as in monasteries. It concluded that -unlike any other religious architecture- safekeeping was a determining factor in Coptic buildings' design and that the development and the distribution of these arrangements had followed certain patterns and characteristics.

1. Introduction

As early as the first century, Coptic Churches had been always subject to persecution and aggressiveness from Romans, Bedouins, fanatic rulers and even some mobs. As never been under the total protection of governors, they were instantly burnt or stolen by hoodlums, especially in Mamlouks era. Evidence to that are the 2084 churches and 834 convents in Egypt mentioned by Abu Saleh the Armenian in the thirteenth century, which were decreased during the Mamlouks era into 193 churches and 74 convents.

Safekeeping was hence one of the most important factors that influenced the design of both churches and monasteries. In churches, some specific arrangements concerning the openings and the interior arrangements had taken place due to the need for defense. Even more precautions were needed for monasteries due to their -usually- isolated locations. Early monasteries were nothing but scattered cottages. But, monks had to start living in groups when the Bedouins started to attack them in early fifth century and they needed to protect themselves by building additional defensive elements such as keeps, fences, huge gates and underground-cells.

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Site selection and site organization were also largely influenced by these defensive needs.

Based on the above considerations, *the hypotheses of this research* is that Coptic architects had developed a very peculiar religious architecture with exceptional defensive arrangements and that these arrangement had certain pattern and were carefully planned as an inseparable part of the overall character of Coptic architecture and not only a secondary additions.

The objective of the paper is to analyze these unique arrangements and trace their development and distribution throughout the centuries and how they differed from region to another. It aims to reach and determine the pattern they followed from one era to another and from one region to another.

It concluded that -unlike any other religious architecture- safekeeping was one of the most determining factors that influenced Coptic buildings' design, especially in desert convents, and that the development of these buildings and compounds (in form, inner components, site selections, ... etc.) had followed certain pattern owing to the influence of this factor.

2. Premise

Roman persecution to Christians had started as early as the first century. Therefore, for the first three centuries, they did not have any chance to build real churches. Ceremonies were conducted in remote places; *i.e.* caves, mountains, pagan temples, ancient tombs and cemeteries, or in any houses in which an apse was added. The severity of persecution differed from an emperor to another and perhaps from time to time within the age of the same emperor [1].

Yet, the Roman emperors paid great attention to afford proper defense to the convents in Eastern and Western Deserts, defending the monks was not of course the real issue here, but the location of these monasteries as the gates for Bedouins into Egypt. One example was St. Catherine convent, which was erected by order of Emperor Justinian I (reigned 527–565)[1], enclosing the Chapel of the Burning Bush ordered to be built by Helena, the mother of Constantine [2]. Justinian added a new keep to the same convent later. He had also built fences and keeps for *Anba Bola* and *Anba Antonyous* convents [3].

In theses deserts a critical relation had developed between the monks and the Bedouins, who started to regularly attack them. But, by becoming the most convenient place to replenish their stock of food and water, the convents had become safe from Bedouins' attacks and by paying them regular salaries to guard the convent and purchase their requirement, the monks of St. Catherine convent had developed a relatively organized relations with them [4].

For four centuries following the Arab conquest of Egypt, the Coptic Church generally flourished, Egypt remained basically Christian and Coptic language remained the language of the land almost until the eleventh century. Despite additional sumptuary laws imposed on them in 750–868 and 905–935 under the Abbasid Dynasties, Copts prospered and their Church enjoyed a peaceful era. The Christian face of Egypt started to change by the beginning of the second millennium, when Copts, in addition to the head tax '*Gezya*', suffered from some specific disabilities. By the end of the twelfth century, the face of Egypt was converted into a predominantly Muslim country and the Coptic community occupied an inferior position and lived in some expectation of Muslim hostility, which periodically flared into violence.

It was not rare that the monks had to handle the problem of lack of income by giving up some properties. The Syrian convent was given to the Syrians as a lien [5], and the church of Angle Michel was sold to the Jews (the Jewish synagogue) to pay the very high head-taxes imposed by Ahmed Ben Tolon [6]. The priests, although would prefer to give their lives up than to give churches' vessels to enemies, had sometimes to sell these vessels, or anything else, to rich tourists to feed poor people or pay the tax on their behalf [7].

As never been under the total protection of governors, Coptic Churches were instantly burnt or stolen by hoodlums, especially in Mamlouks era. Evidence to that are the 2084 churches and 834 convents in Egypt mentioned by Abu Saleh the Armenian in the thirteenth century, which were decreased during the Mamlouks era into 193 churches and 74 convents [6].

The position of the Copts began to improve early in the nineteenth century under the stability and tolerance of Muhammad Ali's dynasty and by 1855 the main mark of Copts' inferiority, the '*Gezya*', was lifted and shortly thereafter Copts started to serve in the Egyptian army [8].

3. Churches' design

Safekeeping was one of the most important factors that influenced Coptic Churches' design. Some specific arrangements had taken place due to the need for defense. In the following are some examples of such arrangements:

3.1. Entrances

The arrangement of having three western doors was doubtless the ordinary one in Egypt. But when the Copts were harried with incessant persecutions, it became a necessity of existence to fortify their churches, hence, the absence of windows other than small skylights, and the early disuse of the triple western doorway. A. Butler mentions many churches that have had two entrances blocked up such as Abu Saifain Church, the White Monastery and Abu Mina Convent in Cairo; the one left was usually one of the side entrances, not the central one [9]. These entrances were usually indirect or hidden entrances and in some cases the area of the opening was even reduced. Nowadays, most of these churches have the original arrangement of the three entrances back. It was probably a temporary situation that was dispensed of when it was not needed anymore.

3.2. Sanctuary screens

Although were found in almost all the Eastern Orthodox Churches, but they served a different function in Coptic Churches, where there is not the slightest sign of any screen other than a lofty and opaque iconostasis. These screens were most probably meant to hide the people inside the sanctuary from attackers [10]

On each side of the main sanctuary's door was a small square opening with a sliding shutter, which might exist in

[1] In another source, *i.e. Coptic Defensive Architecture by* I. Hagagi, it is said that it was built by Emperor Zenon at 474 AD

the choir screen as well, though in either case could they ever allow a glimpse from outside, as they were meant for observation from inside. [11]

3.3. Narthex

Outer narthex had almost disappeared around the 11th century, as the number of people getting into Christianity had been decreasing and there were no more catechumen (to whom this area was reserved), hence, no need for Large baptisteries or epiphany tanks. The space between the pillars of the returned aisle has, in most cases, been walled up as a defensive necessity and the western aisle has become rather inner narthex [12].

3.4. Baptisteries

It is scarcely out of question that baptisteries were originally located outside churches in most countries. This rule does not apply to Egypt, where the need of secrecy was felt very early, and where the font was always found inside. Except for that at Abu Mina complex, there is no instance of entirely isolated baptisteries in Egypt [13].

3.5. Secret rooms and corridors

Secret corridors leading to places for hiding valuable things, or to secret chapels, were so common in Coptic Churches. They also served in convents to connect churches with each other or with the keep to allow the monks reaching the keep easily if they were attacked during services. In general, stairs and corridors inside keeps were designed in a way that any stranger will certainly get lost. Small holes were provided in the upper part of the eastern wall for lighting.

3.6. Openings

Most of the Coptic Churches have only few small openings. A lot of them did not have any openings, such as the small church of El Moalakah. So that, providing small openings in the roof -whether it is a dome, a gable, or a flat roof- was the ideal arrangement for lighting and ventilation, as it allows no glimpse to the inside.

Most of Old Cairo Churches' main facades were devoid of windows [15]. Even in building of non religious function, *i.e.* cells or keeps this rule was followed [16].

3.7. Accessory buildings

The western side of the church, which is generally exposed to view, instead of ending with the limits of the church, was nearly always prolonged and lost in the neighboring houses. Coptic Churchs' outside never shows any outline; around it, is huddled a mass of haphazard buildings showing that the architect's idea was the concealment of the exterior rather than adornment. It was meant that there should be nothing to delight the eye of the enemies prowling without [15].

Another external peculiarity is the arrangement, or want of arrangement, in the accessory chapels, which open from the aisles or the triforya. They are usually grouped three or four together under one roof occupying an upper or a lower story indifferently, and are sometimes pilled in almost impossible positions one on top of another [17].

3.8. Structural systems

As churches were frequently burnt by prosecutors, most of them had their wooden roofs replaced by brick domes or vaults in order to resist fire, although this replacement usually needed totally different distribution for loads.

The church at Abu Hannas convent shows most clearly the changes that had been made from a church roofed with wood, to one roofed with domes and obstructed by clumsy masses of brickwork in order to support them. Those massive piers, in some cases obviously and conjecturally in all cases, enclose marble columns of fine properties. In one or two places Corinthian capitals are still visible in some corners [18]. In this church we see that the width of the nave was reduced while the width of side aisles was increased that they became almost equal. To sustain the very small domes, masses of wall were inserted, so large that the subdivisions of the structure only communicate by doorways and the effect of length is lost giving way to one of height.

3.9. Campaniles

It was until the nineteenth century that not one church in Cairo had any spire or tower due to the official prohibition of their usage. They were still standing in the desert monasteries and other remote places, where there is no chance of governmental interference.

At the time of Alfred Butler's visit to Cairo churches in 1884, he found only two churches with bells, but not bell towers. The first was in Angle Michael convent towards '*Turah*' and the second was at Mari Mina convent, as they were standing in open country where the ringing of the bell can wound no body's prejudice. Even a board struck with a mallet was forbidden in 1352 (A formal prohibition of the bells was issued in 850AD) [19]. Campaniles had begun to come into view in Coptic Churches only in the nineteenth century.

4. Defensive elements

Early monasteries were nothing but scattered cottages. Monks had to live in groups only when the Bedouins started to attack them in 407 and they needed to protect themselves by building additional defensive elements. Table 1 overviews the most remarkable instances of these elements.

4.1. Keeps

Numerous differences are obviously realized between convents, which were defended only by fences – nucleus defense and those, which had keeps (Fig. 1). It is almost reliable that the former type was more common in urban or rural places, while the latter type was used in remote places [20].

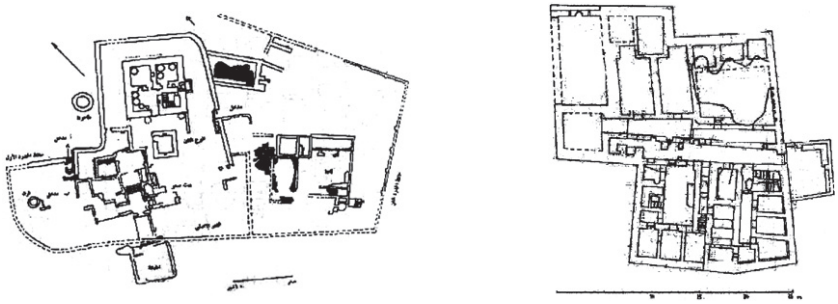
The idea at first was to build a castle inside the convent; after the eighth century it had turned to be to build a convent is to be, itself, a castle (Fig. 2). This was first applied is Abu Makar convent and from this time on, it had become dominant. Each monastery had, either detached or not, a large keep

Table 1 Defensive elements in convents.

Convent	Fences			Keeps			Entrances	
	Height[a]	Width[a]	Material	Form[a]	Accessories	Entrance	Entrance	Guard rooms
Anba Antonios	7–10 m	1.25–2.5 m	Rough stone covered with stucco	16 m height	Storages	By movable bridge at the first floor	The original entrance was by pooling the person	
Anba Bola	5.5–7 m	1–1.75 m	Rough stone covered with stucco with an earthy barrier	4 stories	N.A (the building is in a dangerous situation)	By movable bridge at the second floor	The original entrance was by pooling the person	
Abu Makar	14 m	3.5 m	Rough stone covered with mortar with an earthy barrier	21.5 m^2 area – 61 m height – 3 stories – no openings at G. Fl. (11–12th century)	Grinder – well – secret room – library	By movable bridge at the first floor	2 Entrances one of them was blocked	"Sokkata" and a G.R.
Anba Bishoy	10 m	2 m	Lime stone with supports and an earthy barrier	21.5 m^2 area – 3 stories – the last story was destroyed – (11–12th century)	Grinder – oil press – well – oven	By movable bridge at the first floor	1 Entrance	"Sokkata" – back corridor – G.R.
Syrian convent	9.5–11.5 m	2–3 m	Rough stone covered with mortar with an earthy barrier	17×14 m^2 area – 15 m height – 3 stories (9th century)	Well – library	By movable bridge at the first floor	1 Entrance	Guard room
El Baramous	10–11 m	2 m	Rough stone covered with mortar with an earthy barrier	3 stories (7th century)	Storages	By movable bridge at the first floor	1 Entrance	"Sokkata" – back corridor – G.R.
Anba Hedra	6 m	2–1.5 m	Rough stone + crude brick with an earthy barrier	18×24 m^2 area 3 stories (remaining)	Storages – water tanks	On the ground floor of the high level	2 Entrances (indirect entrances)	The entrance leads to a corridor
El Mohawk	NA	NA	The fences are rather new	Two keeps – 10.5×10.10 m^2 area and decreases into 9.6×8.8 m^2 at the top – 16.57 height & 3 m^2 area – 6.5 m height. (12th century)	Oven – well	By movable bridge at the first floor	1 Entrance	G.R.
Cilia convents	NA	70–80 cm	Burnt brick + crude brick	Two keeps – 2 or 3 stories – no openings at G. Fl. (6th century)	N.A (the building is almost ruined)	At the first floor	1 Entrance	

It is more probable that the two entrances at Abu Makar convent were not used simultaneously, but they were used reciprocally, The reason for having two gates at Anba Hedra convent is that the convent was erected on two levels, so that each of the two gates used to serve for one of the two levels. But connecting the two gates makes this reason is not very convincing but it is more probable that the entrance of the higher level was added to serve the domestic area and the other one for the use of the public since the convent was opened to worshippers., The keeps at both of Anba Beshoy convent and Abu Makar convent are almost the same and it seems like they belong to the same period, There were some other keeps in El Ezam convent, El Dair el Bahary, Mostafa El kashef convent (*El Kharga Oases*), … etc. but they are almost all in ruins that no accurate description could be given about them.

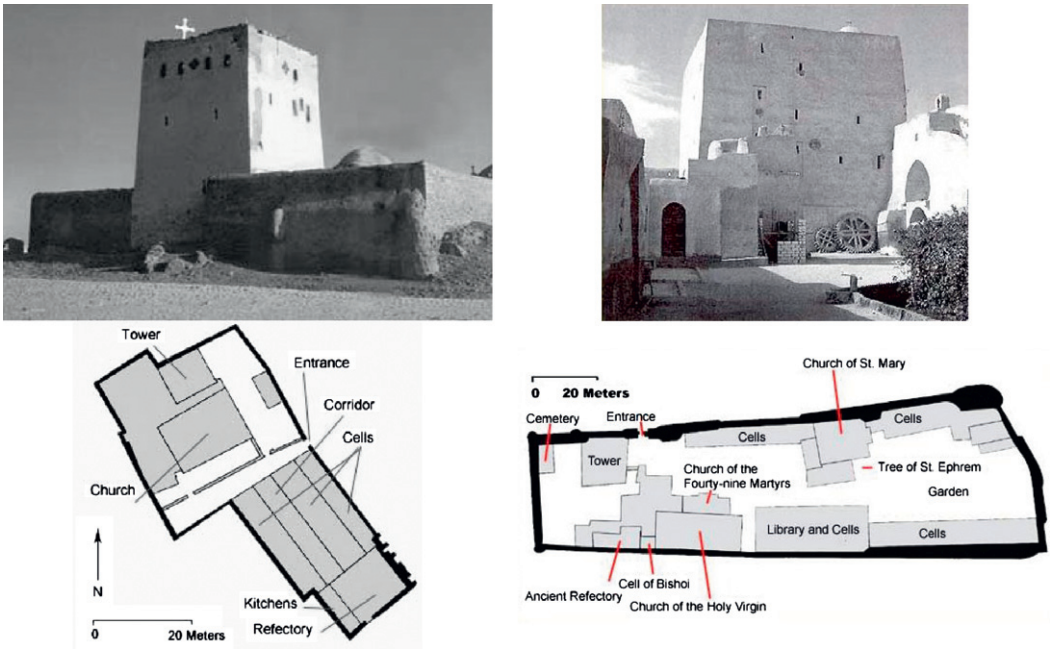
[a] Walters, C. *Ancient convents in Egypt*. E. Salama (tr.) Cairo, 2001, 130-153.



(A) Nuclear defense: Mostafa El Kashf convent – El Kharga (6th C): fences only–populated areas

(B) Keeps' Defense: Abifanios convent – Luxor (6th C.): keeps –isolated areas

Figure 1 Early convents (5–7th C.) (Walters, Ancient convents in Egypt, p. 168, 36).



El Fakhory Conv.- Esna (12th C.)

Syrian Conv. Wadi El-Natrun (8 thC.)

Figure 2 Keeps, http://www.touregypt.net/featurestories/surian.htm, http://www.touregypt.net/featurestories/potter.htm.

or tower. Some convents had more than one keep. El Kalamoon convent, for example, once had four keeps.

In addition to the well, which supplies the convent with water in ordinary times, the keep should have its own well. They even had tombs to bury the monks, if one of them died in the time of the siege. The water tanks inside the keep of Anba Hedra convent were not enough for providing water for a long time. Digging a well in this land, it is almost impossible to reach the water level. So that, the monks had to abandon the convent in the twelfth century and the Bedouins took it [21].

The entry to the keep, in most cases, is at the first floor through a drawbridge between the church and the keep, which is pulled inside the keep after all the monks get in. In other cases, it is through a movable ladder, or even by climbing the fence [22]. The walls should have a platform that runs around the whole circuit, with a parapet, but the defenders seem never to have used any other weapon but stones [23].

4.1.1. Early type

In the following are the characteristics of keeps between fifth and seventh centuries:

- Limited defensive qualifications.
- Entrance in the ground floor.
- Scanty volumes, too small to accommodate a large number of monks.
- Very weak buildings.

Even so, the French mission had described two keeps in Cilia, which date from the fifth century with no doors or windows in the ground floor and entries at first floor [24].

4.1.2. Late type

At the middle of the seventh century keeps had been developed as the following:

- Better defensive qualifications.
- Larger volumes.
- The keep was built to take the shape of a quadratic tower.
- Each floor was divided by a middle corridor into two sections of side rooms.
- The entrance is at the first floor.
- Higher stories could not be reached from ground floor (in most of them).
- Stronger buildings with three to five stories.
- Smaller areas for openings and a ground floor almost devoid of openings.
- Wells for providing water.
- Isolated keeps, away from the rest of the convent.
- Supported by food storage, accommodation places, lavatories, mill, oil press, secret rooms, and a small church.
- Secret rooms and special places for guard [25].

Monneret de Villard confirms that this late model with its drawbridges and first floor entry is an original model that was developed precisely for this monastic use [26].

The keep at El Moharak convent is particular for having two towers with a movable bridge between them. One cannot enter the high keep without passing through the low keep. The pulley of the bridge here is at the end of the corridor opposite to the entrance and not upon it. When the bridge is lifted, the pulley of the well moves inside, so that the keep is completely separated from the rest of the convent. Similar to this is the keep at Anba Antonyous convent. One should first enter another building called '*El Robatya*', from which there is a movable bridge into the keep [27].

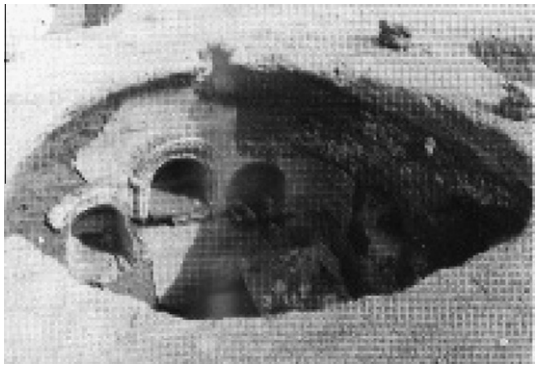


Figure 3 Underground cells (El Suriany, Churches and Convents IN Cairo and Lower Egypt p. 8).

4.2. Fences

When the Bedouins started to attack convents, fences were built to surround the main components of the convents and keeps were erected, but cells were still outside the fences. Later on, fences were made around each group of cells to protect them. Finally, one fence was built around the whole assemblage of the convent [28].

4.2.1. Early type

Cilia settlements are considered the first models of monastic settlements with fences. These first fences could not have been meant for defense, as they were very poor and low with a thickness of about 70–80 cm and no gates. This means that the inhabitants of these settlements were getting inside by climbing the fence, or using ladders. They were probably meant to avoid that monks keep connections with the outside world.

On that account, it could be said that they were meant to define the area of the settlement not to defend it. They could also help for resisting sand movements [29].

4.2.2. Late type

Trapezoid-shaped fences with a solitary entrance are characteristic in medieval convents, *i.e.* the Syrian convent, Anba Hedra convent and El Fakhory convent [30]. These fences were usually built to be so high (at least 10 m), not to be easily climbed. They usually had single entrance with towers on both sides and supports all around. Loopholes and small openings, especially upon entrances, were provided to pour corrosive substance on enemies when they try to assail the convent [31].

Further accessories were added to these fences as the following:

- Small openings shaded by projecting cornice all over the fence.
- A back walk in the inner side of the fence.
- Small oblique opening for observation to allow both view and protection to the observer.
- '*Bashoura*', which is a twisted corridor leading to the entrance.

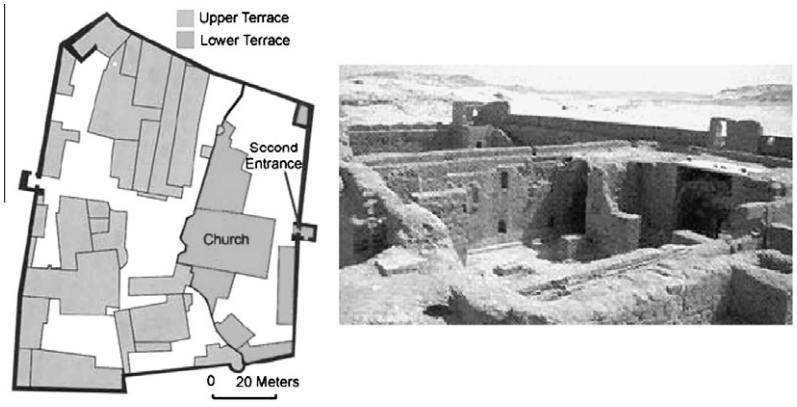


Figure 4 Site organization: Anba Hedra convent – Aswan (11–12th C.) http://www.touregypt.net/featurestories/simeon.htm.

Table 2 The distribution of defensive elements in coptic buildings.

Century	Name of the church	Openings	Defensive Elements
Survey of defensive elements in coptic buildings			
(A) Upper Egypt			
18–19th	The convent of the five	Small	×
5th	Anba Armya convent	NA	×
NA	The virgin church (El Adawya)	In the dome	×
12th	Anba Barsum convent	Moderate	Duxar + bent entrance
8th	Helwan old churches	NA	×
18–19th	The apostles convent	Moderate	Hidden room (save)
15th	El Maymoun convent	Moderate	Bent entrance
12th	El Azab convent	In domes	×
5th	Angle Gabriel convent	Very small	Bent entrance
NA	The Virgin conv. (Fayoum)	Very small	High fence
7th	Anba Samuil conv (Magaga)	Moderate	Bent entrance
18–19th	El Sankorya convent	Moderate	×
18–19th	Mari Mina conv. (samaloot)	Moderate	×
18–19th	Anba Athanathious (Matay)	Large	×
NA	Abu Saifain ch. (Samaloot)	small	×
NA	Mari Mina ch. (Samaloot)	small	×
7th	The Virgin ch. (Gabal El Tair)	Very small	Rock cut + entry by tunnel
NA	Abahor convent	×	Rock cut + entry by tunnel
6th	Abu Fana convent	Very small	High fence
18–19th	Anba Bagoul convent	Very small	×
5th	Ashmoneen Basilica	NA	×
18–19th	The Angle church (Malawy)	small	×
NA	El Diek convent	Very small	High fence
NA	Antinoe convent	NA	Rock cut
6th	The church south of Antinoe	NA	High fence + keep
6th	Abu Hanas conv. (Malawy)	Moderate	×
12th	El Borsha convent	Very small	High fence + caves inside mountain
18–19th	The Virgin ch. (Dair Muas)	Moderate	×
18–19th	Anba Serabamon conv	In the dome	×
NA	El Kasier convent (El Kosya)	NA	Rock cut
13–16th	El Moharak convent	Very small	High fence + keep
18–19th	El Shaheed Taudrous	Moderate	×
6th	Mankabad churches	NA	×
18–19th	The Virgin ch (Manfalot)	In domes	×
14th	Suspended conv. of Mari Mina	Very small	Rock cut
18–19th	Mari Girgis ch. (Bani Mur)	Moderate	×
NA	Basri convent	In domes	Very high fences
15th	Anba Hermina	Very small	×
5th	The Virgin ch. (Dronka)	×	Rock cut
5th	Rifa convent	×	Rock cut
5th	Anba Athanathious church	Very small	×
6th	El Balayza convent	NA	Rock cut + levels + deep well with no fence 60 m
6th	El Ganadlah convent	×	Rock cut
15th	Virgin ch. (El Ganadlah conv.)	In domes	Rock cut
16–18th	Abu Makar	Moderate	×
NA	Keryakous &Yolita church	Very small	×
18–19th	El Shaheed Felosaus church	Very small	×
5th	White monastery	Very small	High fence
6th	Red monastery	Very small	High fence + keep
16–17th	Anba Shenuda (Akhmym)	Very small	×
14th	Anba Tomasa (Akhmym)	Very small	×
6–7th	Anba Bakhom (Akhmym)	Moderate	×
15–17th	Abu Saifain (Akhmym)	Small	×
15–17th	St Demyana (Akhmym)	small	×
15–17th	The virgin ch. (Akhmym)	Very small	High fences
15–17th	El Shohadaa conv. (Akhmym)	Very small	High fences
15–17th	The angle conv. (Akhmym)	Very small	High fences
15–17th	The seven mountains convent	Very small	Rock cut
15–17th	Mari Girgis conv. (Akhmym)	In domes	High fences + on a hill
16–17th	Anba Besada convent	Very small	×
NA	The virgin ch. (El Manshaa)	Moderate	×
16th	The angle conv. (Gerga)	small	×

(*continued on next page*)

Table 2 (*continued*)

Century	Name of the church	Openings	Defensive Elements
NA	The virgin ch. (El Belina)	Moderate	×
NA	El Naghamish convent	Moderate	×
15th	St Demyana & Anbba Moyses	Moderate	×
16–17th	Anba Badaba	Small	×
4–5th	Anba Bakhomyous Basilica	NA	×
6th	Dandarah basilica	NA	Bent entrance
18–19th	Mari Girgis (Nakada)	Moder. (few)	×
6th	El Hayz convent	NA	Bent entrance
6th	Mari Matta (El Dakhla)	NA	×
17th	Abu El Lief convent (Nakada)	Very small	High fence
14–16th	Angle Michaael (Kamula)	Very small	×
12th	El Mogamaa conv (3 churches)	Very small	High fence
15–19th	The cross convent	In the dome	High fence
9–11th	Mari Boktor convent (Nakada)	Very small	×
NA	Abu Saifain (Nakada)	Moderate	×
18–19th	Mari Boktor convent (Hegaza)	Small	×
17–18th	El Shayeb convent	Moderate	×
6th	Churches beside Luxor temple	NA	×
15th	El Mohareb convent	Small	High fence + deep in desert
NA	El Romy convent	Small	Rock cut
8th	Inside Habu temple	NA	Bent entrance
16–17th	All saints convent (Tod)	Small	Fences (ruined)
6th	Basilica Armant	NA	Bent entrance
18–19th	Mari Girgis conv. (EL Rozaikat)	Small	High fence
12th	El Fakhory convent	Small	High fences + keep
11–12th	El Shohadaa conv (Esna)	Moderate	×
NA	Anba Bakhomyous (Edfo)	Small	High fence
12th	El Kobanya church	Small	×
11–12th	Anba Hedra	Small	High fences + keep
(B) - Lower Egypt			
6th	Basilica Abu Mina	NA	×
8th	Burial church	NA	×
6th	The church at Ain Makhura	NA	×
7–8th	Mari Saba church	Moderate	×
6th	Tapoziros church	NA	×
4th	The church at Marina	NA	×
4–5th	The church at Burg El Arab	NA	×
4–5th	The church at El Farama	Very small	Rock cut
5–6th	The church at Tal El Makhzan	NA	×
5–6th	The 3 churchs at Austrakin	NA	×
19th	Mari Girgis Ch. (Sandabis)	Small	×
18–19th	Angle Michel (Kafr El Dair)	Moderate	×
18–19th	Angle Michel (Seberbay)	Moderate	×
18–19th	The Virgin ch. (Ashfin)	Moderate	×
18–19th	Mari girgis (busat)	Moderate	×
18–19th	The Virgin ch. (Raydanya)	Moderate	×
18–19th	Mari Girgis church (Mit Ghamr)	Moderate	×
18–19th	Mari Girgis church (Sahragt)	Moderate	×
18–19th	El Sitt Refka church (Sonbat)	Small	×
18–19th	Mari Mina church (Abyar)	Small	×
18–19th	The Virgin church (Abyar)	Moderate	×
18–19th	Anba Serabamon (Batanon)	Small	×
18–19th	The Virgin ch. (Sobk El Ahad)	Moderate	×
18–19th	Anba Serabamon (Mlig)	Moderate	×
18–19th	St Abanoub (Samanood)	Small	×
18–19th	The Virgin ch. (Fisha)	Moderate	×
12–13th	St Demyana (Belkas)	Very Small	×
(C) - Old Cairo			
7th	St Sergious (Abu Sergah) ch.	Small	Bent ent (changed)
7–8th	St Berbarah church	Moderate	Secret room for vessels and precius things
9–10th	El Moalakah church	Moderate + Mashrabya	Suspended + 2 narthexes
9–10th	Kasryat El Ryhan church	Moderate + Mashrabya	Bent entrance
10th	Abu Saifain Convent	Moderate + Mashrabya	Heigh fence with ponderous gate plated with iron bands
8–10th	Anba Shenuda church	Moderate + Mashrabya	Within the fence of Abu Saifain convent + dim passage

Table 2 (*continued*)

Century	Name of the church	Openings	Defensive Elements
8th	El Damsherya church	Moderate + Mashrabya	Within the fence of Abu Saifain convent + dim passage
11th	The Virgin ch (Bablon El Darag)	Moderate + Mashrabya	Bent entrance
11th	Prince Tadrous	Moderate	Fence + a gate with ponderous lock and iron bollets
10–11th	The angle ch. (Bablun El Darag)	Moderate	×
11–12th	The Virgin ch. (Harat Zwaila)	Moderate + Mashrabya	×
18–19th	The Virgin ch. (Harat El Rum)	Small	×
8th	Mari Mina ch. (Fom El Khalig)	Moderate + Mashrabya	Double doors of thick wood + Row of jarsin fence
(D) - Nubia			
7th	Wady Gahzaly	NA	×
7th	Fila church	NA	×
7th	Sitt Gashma	NA	×
7th	Qirush	NA	×
7th	Suba	NA	×
7th	Mahndy	NA	×
7th	Kasr Abrym	NA	×
7th	Gabal Addah	NA	×
7th	Sera	NA	×
9–11th	Fakir Deeb church	Very small	×
9–11th	Garf Hosain	Very small	×
9–11th	St Rafaeel church (Tameet)	Very small	×
9–11th	Qau church	Very small	×
9–11th	Gandinary church	Very small	×
9–11th	Abdallah Nirqi church	Very small	×
12–14th	Madique el Nuba	Very small	×
12–14th	Shayma Amalica	Very small	×
12–14th	North of Kasr Abrym	Very small	×
12–14th	Basilica Tameet	Very small	×
12–14th	St Rofaeel	Very small	×
12–14th	Faras	Very small	×
12–14th	Adendan	Very small	×
12–14th	Gandal Arki	Very small	×
12–14th	Fakir Antawi	Very small	×
E - Easten and Western Deserts			
14th	El Kosair convent (Red sea)	In the dome	In the mountain
9–13th	Anba Antonios conv. (Red sea)	Small	High fences + keep
4th	Shams El Deen church (el wahat)	NA	×
12th	Anba Bola conv. (red Sea)	Small	High fences + keep + rock cut
4–5th	Cillia churches	NA	×
8th	The Syrian convent	Small	H. fence + duxar + keep
9–14th	St Mariam ch. (Syrian conv.)	Small	H. fence + duxar + keep
8–10th	Anba Beshoy convent	Small	High fence + keep
14th	Abu Makar convent	In domes	High fence + keep + movable ledder
7th	El Baramous conv	In vaults	High fence (11 m) + keep
5th	St Catherine convent	Moderate	High fence + keep

Upper Egypt (95 total)			Lower Egypt (34 total)			Cairo (13 total)		
2b summary of the survaye's statistics								
Openings								
Small	Moderate	In domes	Small	Moderate	In domes	Small	Moderate	In domes
46	20	9	10	13	2	2	11	0
16 churches not available (ruined)			9 churches not available (ruined)			0 churches not available (ruined)		
4 churches has no openings at all			0 churches has no openings at all			0 churches has no openings at all		
Defensive elements								
Keeps and fences		Ent. arrangement	Keeps and fences		Ent. arrangement	Keeps and fences		Ent. arrangement
24		11	6		0	2		6
14 rock cut churches			1 rock cut church			0 rock cut church		
Percentage of defended churches 52%			Percentage of defended churches 20%			Percentage of defended churches 61%		

This sample includes almost all the Coptic Churches that were built between 5–19th century. Only some churches of irregular shapes or completely ruined were neglected. Original structural systems had been mentioned as much as possible. The openings in most of the churches, even if they are of a moderate size, are very high.

- '*Mashkolia*', which is an opining in the back walk the function of which is to throw fire on the enemies.
- '*Manakhes*', which are small towers for observation around the fences that consists of a small room with a stair inside.
- Ejector or '*Sukatta*', which is a balcony projecting from the fence and located directly upon the corridor that leads to the solitary entrance of the convent. It is usually surrounded by walls and carried on cantilevers with a hole in the floor from which the defenders can watch the enemies and drop stones or corrosive substance on them [32]. It could also be used as a lavatory in the time of siege. In the time of peace it was used to give food for strangers, therefore, it is also called '*Mat'ama*'.

Alfred Butler tells us a very curious arrangement for the walls at the ruined Virgin Chapel of Mari Mina convent (Old Cairo). When the chapel was intact, the walls rose some way above the roof; and instead of being capped with coping stones they had great pitchers or jars of rather frail red pottery embedded into the masonry and forming a parapet. He says: '*From outside one can count as many as six rows [...] the jars are about 3ft high, of course hollow, and all have a hole broken in the shoulder, apparently with the design of weakening the resistance. For they are intended as a defense against secret assaults and were arranged to break and give the alarm in the case a robber or other enemy tried to scale the walls*' [33].

4.3. Gates and doorways

An explicit difference is to be noticed between the simple entrances of early convents and those immune gates in late convents. Extremely massive iron-plated gate was the most common type in convents and churches, especially in Old Cairo. Some convents, *i.e.* Anba Antonyous convent and the suspended convent of Mari Mina, had no entrance at all, and were entered only by means of a lever [34].

At this latter convent, an artificial platform, onto which a cave opens by walls, about 20 m high. The entrance, facing the bridge, was replaced by a higher one, over which hangs a pulley with a chain. Entrance is by clinging to the chain and the foot–holes in the wall. Entering the lower door there was a room with a doorway of 2 m height, with a shaky ladder leads to a tortuous passage on a steep slope, a winding stair reaching the platform at the top [35].

Natural environment was also employed for such defensive purposes. At Gabal El Tair convent the entry was by a deep natural shaft, 'cleft through the solid rock from the summit to the *base, where a cave opens on to the river [...] the ascent was generally made by a pulley*' (Butler 1970, 348). Another old convent was built inside the mountain called '*El Shakaliel*', in which similar arrangement was made [36].

The entrance at most of Natrun Valley's convents, was a recess in the wall ends with a secret entrance with wooden door and iron wires leads to a guardroom in which is a stair leading to an upper corridor with an opening in its floor for lifting the monks. This opening was, normally, locked with huge stones in the time of danger [37].

The entrance at Anba Hedra convent is a unique one, as being hidden inside a projecting squared tower with bent entrance. Its plan looks like '*El Magaz*' in Islamic houses. Privacy is not the issue here but defense. A parallel arrangement is found also at Abu Hanas convent [38].

4.4. Monastic housing

The first appearance of cells at populated convents probably dates from the medieval age, in spite of some evidences that might refer to former dates. The arrangement of the cells in Esna (sixth century) is very unique, being built 3.5 m underground (Fig. 3). They were prepared in a way to offer protection from both man and nature, although there is no evidence of any trials to surround them with fences. The central open court was to insure:

- Protection from wind.
- Maximum warming.
- Protection from Bedouins.

The cells are reaches by a flight of steps, at the base of which is a semi circular wall to prevent sand getting into the entrance. Each of these units contains a kitchen with oven and storage places, and a bedroom with beds fixed to walls [39].

5. Sites

5.1. Site selection

Convents should have been mostly located in remote places, which Alfred Butler described as '*the silence and gloom in which they fall during the night would quicken the dullest imagination*' [40]. He describes the site of the nunnery at Abu Saifain as; '*one of the most out of the world places imaginable. Even the door has no knocker*' [41]. Somers Clarke had also described those sites as '*strange and inaccessible places*' [42].

El Moharak convent is the only convent that was built within a cultivated area. The five convents for nuns in Cairo were also built within the city. The rest of the convents: Abu Makar, Anba Beshoy, The Syrian, El Baramous, Anba Antonios, Anba Samuel, and Anba Bola, all were built either in the deep desert or deep inside the mountains.

5.2. Site organization

When being attacked, the monks started to collect their buildings inside one fence. Fences were built away from the keep to allow it being fully isolated from all sides [43].

Anba Hedra convent has a special site arrangement. The western end of the church is built against a rock terrace surmounted by a wall in a way that the space within the enclosure was divided into upper and lower courts (Fig. 4). Even when the lower court is being broken into, the upper -in which was the keep- could have been defended for a considerable time [42].

5.3. Rock-cut churches

In 1673, Vanslib had referred to many rock-cut churches that he had visited [44]. The number of rock-cut or subterranean-churches already discovered in Egypt till now is 17 churches, in which the whole church, or part of it, is cut out of the solid rocks of mountains.

6. Conclusion

Coptic Churches were rarely built to be sumptuous, being clearly an outcome of the rather poor material that the artifi-

cers were compelled to make use of. The small multi-domed churches with multiple chapels (transverse axis), is evidence on this fact.

Coptic Churches and monasteries had some peculiar characteristics, which were unparalleled in any other place, the most important of which were the defensive arrangements and elements, which had certainly taken place due to sociological and political factors, and not due to religious rituals. It is also notable that those defensive arrangements had obviously varied from one region to another; the churches of Old Cairo are so different from those in Delta, and those in turn differs obviously from their correlates in Eastern and Western Deserts.

A study was accomplished in Table 2 examining some defensive characteristics, namely openings and defensive elements. The chosen sample represents different regions and different epochs as much as possible.

Out of this study and the correlative table the following results are to be concluded:

6.1. Openings

- In Delta (Lower Egypt): moderate openings are rather dominant.
- In Cairo: moderate openings with *Mashrabya* screen are the usual arrangement.
- In Desert: small openings (most of them are in domes or vaults).
- In Upper Egypt: small openings are universal.

It is to be noticed that the few churches in Lower Egypt, which have small openings or openings in domes or vaults, all are located in remote places or on mountains, which means that those small openings, in addition to their being climatic treatment, had also occurred due to defensive needs.

6.2. Defensive elements

- In Delta: no keeps are to be found in cultivated areas. Only small fences were made.
- In Cairo: no keeps but only small fences.
- In Desert: strong keeps with very small openings (loopholes) and massive fences.
- In Upper Egypt: south to Suhag, having no fences is very rare. Bent entrances are very common between Cairo and Menya and very rare northwards and southwards.
- Most of the rock-cut churches are found between Menya and Suhag.

It is to be noticed that Old Cairo has the largest percentage of defended churches, as they were the richest churches and therefore most likely targeted by thieves and hoodlums, fences with strong gates and heavy doors were almost universal in those churches. Also Desert monasteries, being unceasingly targeted by Bedouins' attacks, all were defended with strong keeps and huge fences.

From here it could be concluded that those defensive elements were a decisive need in all times and all regions, but in certain cases they were more crucial than in other. The monasteries in the Eastern Desert are considered to be the most crucial case, then come the monasteries in the Western Desert and then comes the churches in Cairo. The buildings in Lower Egypt were obviously the least fortified, keeping in mind that they were also the poorest building.

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