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The architectural elements and the features of urban planning of the Desert Coptic Monasteries

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Abstract

The objective of this study to highlight the architectural elements and the evolution of the Urban planning of the Desert Coptic Monasteries. this research includes analytical study of architectural elements and the Stages undergone urban planning.

This researchconsists of the architectural elementsincludes the Entrance and pulley, the walls,the keep, food rack, diksar and refectory, the mill, the olive oil, the spring water, the cells,the churches.Beside the architectural elements as: arches andvaults.

the Stages undergone urban planningincludes: the engineering design of the monastery, the materials, the church was the first foundation of planning, the convergence of buildings, the compilation of buildings in groups of high-density construction (increased building densities), directing buildings appropriate guidance to exposing them to air (building orientation and sitting) , the internal courtyard, The high walls, the narrow streets between elements of the monastery, provide the service entrances of buildings covered or shaded,scarcity of external openings, the domes and vaults.

Keywards: Coptic Monasteries, architectural elements, urban planning, entrance pulley, churches.

1. The architectural elements of Coptic Monasteries in the Desert

The monastery is a building or complex of buildings comprising the domestic quarters and workplaces of monastics, monks or nuns, whether living in communities or alone (hermits). A monastery generally includes a place reserved for prayer which may be a chapel, church, or temple, and may also serve as an oratory, or in the case of communities anything from a single building housing only one senior and two or three junior monks or nuns, to vast complexes and estates housing tens or hundreds. A monastery complex typically comprises a number of buildings which include church, dormitory, cloister, refectory, library, balneary and infirmary. Depending on the location, the monastic order and the occupation of its inhabitants, the complex may also include a wide range of buildings that facilitate self-sufficiency and service to the community. These may include a hospice, a school, and a range of agricultural and manufacturing buildings such as a barn, a forge, or a brewery.
In English usage, the term *monastery* is generally used to denote the buildings of a community of monks. In modern usage, *convent* tends to be applied only to institutions of female monastics (nuns), particularly communities of teaching or nursing religious sisters. Historically, a convent denoted a house of friars (reflecting the Latin), now more commonly called a *friary*. Various religions may apply these terms in more specific ways.

The urban planning witnessed several developments during the period from the 4th to 19thcentury[1]; it consisted of four sections:

1.1. The entrance pulley (fatuli)

The monastery does not have a ground level entrance until the early of twinteanth century. It has one entrance which consisted of a square in the cavity wall covered with a room in the background slot[2].

Pulley is used to withdrawn visitors and goods up to the topofthe wall and into the monastery through the diksar[3], The bell tower is located to the left, flying corridor related to diksar which works as the main entrance.

There is an ancient hoist (Mat'ama) at the right tackle; the form of the triangle base consists of a horizontal wheel with a wooden handle that is based between two wooden columns rallied around the rope used to download food from the land slot[4].

Entrance andpulley like in St. Paul monastery, St.Antonymonastery and St. Catherine[5], the entrance also resembles that of Muharraq and St. Antony.

2.1. The walls

The monasteriesare surrounded by high defensive walls[6] with (10.0m) height and (2.0m) thick; It has a flat surface (footpath) was determined from the outside by a wall that allows and controls the movement of individuals, which is based on the rock-matrix building blocks, including small stones, gravel, sludge, and developed layer thick plaster on both internal and external sides.

The bastions were provided with arrow slits. The second floor contains the control room with a door leads to the corridor and connected to it and bastions by staircases; was supported from the inside walls, pillars and a prominent ramp adjacent to the lower part.

The old western wall is located at a distance (36.5m) from the church of angle Michael and advertising projections mud brick; the old walls have undergone

[1]Jean Coppen (1638) made first description of the church cave, and drawing Claude Sicard in the year (1716) outline of the monastery without any details as well as Richard Pococke in (1743), spoke about both the monastery Henry Tattam (1839) and Porphyrius Uspensky (1850) and George Schweinfurth (1876) see Butler, A. (1884). p. 346. Jean, C. (1971).Sicard,C. (1982). Lyster, W. (1999). pp. 31-32.

[2]Consisting of vertical wheel composed of six vertical pieces of wood installed in the column based installer from the bottom of the land is higher in occasionaltie extends between two walls.

[3]Visitors rang the bell to the monks of their arrival. A trap door in the floor of a projecting room on the top of the walls was opened, and a hoop, secured by rope netting, was lowered to haul up.

Waltz, k. (2005).fig. 14 p. 125.

[4]The modern gate (3.0m) closes supported by wooden door with nails rail.

[5]Samuel, A. (2002). p. 221.

[6]Sicard, C. (1982). p. 41.

renovation works at the expansion of the monastery at different stages[7]; not only left the wall separating the sections along the east and west (59.0m), as noted on the left inside the monastery and a portion of the wall in length (12.0m) was related to the northern wall from the pulley flying east through the mill, diksar and the churches of St. Paul, Abu Sefeen inSt. Paul monastery, noted that the impact could spread beside the bastion located in the northeast length (10.70m).

Where another wall had been added in the middle away from the old wall (10.0m) when they were building an entrance, resulting in a courtyard and east, thereby requiring the demolition of the old wall.

As demonstrated by examining the southern part of the monastery at the cells that there was a wall along the pulley flying to the southern wall of angle Michael church, where remained part of the wall south of the corridor down the bell tower, and extended the length of the wall (10.0m), even with respect to the bastion in south-western corner, and held the southern wall at a distance of the current (16.5m) south.

There is no doubt that there were not any walls at all in the first stage (4 A.D), monastery where started quoting St. Paul cave, and then the monks gathered and built their cells arround it, then started to build the church over this cave.[8]

After a number of raids on monastic communities (5-6 A.D) resulting in vandalism, looting and killing, derek groups began seriously consider establishing a solid bastion resort to be so equipped warehouse containing food necessary for a long time , spring water and church and thus necessitate the establishment of the monastic devoutness bastion, which became a haven for monks at the time of the raids[9].

During (5-6 A.D) there were a large number of building walls around monasteries, where the emperor J ostinean (530 A.D) the reconstruction of the monastery ha d also increased and built fortified walls[10],came persecution Kirsch (631 A.D), who banish huge number of monks, and so officials building on the establishment of monasteries guarded high walls, consisting of more than one layer to prevent attacks, as they fel t the monks and solidarity within the community [11] had been restoring the walls in the era of fatimid caliph Al-Hafiz[12](1130-1149 A.D), as well as by John the16th in (1701 A.D)[13].

[7]The restoration and expansion of the walls in the era of Caliph Al-Hafiz (1130-1149), Yuanis VI (1701), Ibrahim Al Gawhary (1781), and Christodoulos in 19th century. Abul-Makarem (1895). p. 78.Mohamed, I. H. (1984). pp. 129-165. Grossmann, P. (1991). 1, pp. 194-226 Lyster, W.(1999). p. 32. Meinardus, O. (2002). pp. 167-169.

[8]Al-Meskean, M. (1984). pp. 45-48. Abdel-Hamid, R. (2000). pp. 292-293-401-402.

[9]Although the buildingof walls around monasteries had begun in the5thcentury, however, risks started to St. Paul monastery in the 6thcentury, that was the cause of fencing around it.Al-Meskean, M. (1984). p. 394. Waltz, k. (2005). p. 32.

[10]Hanna Tadros (1947). p. 140. Hanna (1978). p. 43

[11]The walls are the basic element of each building sacred since ancient imperial era Bakhumeos even, for that was credited with developing the saint law guaranteed that the monasteries should be surrounded by high

A wall to fortify the nucleus, which represent ed the most important elements of the church as well as the bulwark and c ells and confined within the entire assembly monastic devoutness wall surrounding it, where was ready to be integrated city without the need to get out of it[14].

Monks were keen to be the nucleus far from the walls and isolated from all sides , so noone could enter it through the climbing wall or nearby buildings [15], and these walls are similar in all its elements as architectural walls of St. Antony monastery[16].

Groupings were priesthood in the early models to reduce the accommodation derek surrounded by walls erected in (5 A.D) and lasted into (7 A.D)[17] were unable to ever play the role of defensive which means effective .

The buildings feature are poor and relatively little thick , it did not reveal a great rise, the walls simply means reducing the area of residence and can not be considered immunized in any way.So it could rate the wall surrounding the area and placed the mud brick (6 A.D) as in the antiquities area about the christian cemetery of St. Menasin Maruit[18], Abi fanios[19], the City monastery in Thebes[20], Nitria[21], Fakhouri[22]and Albulayza west of Abu Teeg[23].

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walls and no monk right to get to the fields or hiking in the convent or monastery go outside without so requests chairman of the monastery.Hodges, G., (1915). p. 156.Torp. H. (1964). p. 181.

[12]Abul-Makarem (1895). p. 78.

[13]Meinardus, O. *Christian Egypt*, p. 167.

[14]De Villard, M. (1928). pp. 10-12.White, E. *The Monasteries*, 3, p. 8. (1932). p. 224.Crum, W. & White, E. (1962). pp. 10-30. Leroy, J. (1982). pp. 30-35.Moss, H. (1998). pp. 73-74.

Qadous, E. (2002). Al-Athar, p. 39.

[15]See White, E. *The Monasteries*, 3, p. 8.Worrell, A. (1945).pp. 8-9. Atia, A. S.*A History*, p. 61.

Shokry, M. (1948). p. 14. Nasseam, J. (1986). p. 416. Shiha, M. (1988).p. 200. Ramzy, N. Sh. (May 2004). p. 10.

[16]De Villard, M. (1927). p. 154. Muller - Viener (1963).pl.19, pp. 136-137, note2 p. 136.

[17]Daumas, F. (1967). p. 442.

[18]Waltz, k. (2005). pp. 27-29.Ramzy, N. Sh. (May 2005). p. 9.

[19]Winlock, H. & Crum, W. *The Monastery*, 1, p. 39.

[20]Qadous, E. (2002). Al-Athar, p. 41 figs. 38-39-40.

[21]Waltz, k. (2005). pp. 27-29.

[22]Shiha, M. (1988).pp. 239-242.

[23]Samuel, A. (2002). p. 174.

The stages through which the old walls [24]where occurred in the renovation and expansion in the era of Fatimid Caliph Al-Hafiz (1130-1149), St. John VI (1701), Ibrahim Jawhary (1781), and the Patriarch Christodoulos (19 A.D).

It only remains for only two walls interval between east-west and middle-eastern sections, it appears to the left of home and a part of the old eastern wall was related to the north through the wall east of churches, and the impact of this wall along the bastion, located in north-east of the monastery, had spread east walls of the keep.

It turned out that it was adding another wall in the middle when they were building entrance, the result that the courtyard in the east side of churches, requiring the demolition of the old wall with the exception of the areas which are related to the northern and southern walls, a mill and pulley in the south and the north-east of the northern wall, so we attribute this renovation to the stage that was held by the entrance.

When Meinardus[25] draw the outline of monastery, there was an error occurred in determining the direction of the remnants of the wall in this area where identified from east to west with the fact that it extends from south to north, had resulted in a mistake to become more widespread eastern courtyard was deporting all elements of a monastery to west and therefore contrary to reality.

The southern wall extends south-west pulley to the southern wall of angle Michael church, where remained for portion of the wall south of the corridor down the bell tower, the wall was extended until the connection with the bastion south of the separation wall between eastern and western sections.

3.1. The Keep

After entering the convent door, open court is found to the west of St. Paul church, Abu Sefeen and stairway between them which is (0.90m) in width, leading to the wooden drawbridge (4.0m) which is located on the second floor[26], and there is help in a wooden wheelwrapped rope used to lift the bridge.

The Keep is the last of the defenseve building and takes a systematic planning of the four floors[27], a length of the east (10.40m), west (9.50m), north (10.75m), south (9.25m), a height (7.0m).

The building blocks were from burnished stone was covered with gypsum, the under third was covered with gypsum, either two top thirds of stones and mud brick

[24]Abul-Makarem (1895). p. 78. Mohamed, I. H. (1984). pp. 129-165.Grossmann, P. *Architectural,* 1, pp. 194-226.Meinardus, O. (2002). pp. 167-169.

[25]Meinardus, O.(2002). p. 167.

[26]Grossmann, P. *keep,* pp. 1359-1396.

[27]Mallinson, M. (1998). p. 6.

fortified mindy wooden tie beams in two rows each, while the left phenomenon was in the rest of the building.

Entrance located in the eastern wall and was covered with whole course pulley .Crossing the cavity, leads to the first floor which was in the past, its ground floor served as a cemetery for the monks .The second floor was a storeroom for the food reserves which would sustain the monks through a period of long siege .

The third floor has a chapel dedicated to the Holy Virgin, which is roofed with a wooden cupola. There are also cells for the monks on this level of the keep.

At the outset of a small area was causing the capacity and inability to absorb large numbers of monks for long periods.

The entrances of the first keeps located on the ground floor, fortifies of Abu Faneus (end of 6 to Beginning of 7A.D) and marine, two of the oldest models despite the beginning of the rowers (5 A.D), were major of entrances of keeps located on the first floor (beginning of 7 A.D), which took the form of outer keep four-rib and is planning the biggest ground, and moved the entrance up.

This was the crucial difference between the keeps before (7 A.D) and beyond, as it was the case in monasteries and keeps in Nitria and Fakhouri, the keep was built on the wall and used for observation and protection together; which was vulnerable in the wall and this explained the addition of building a ramp to the lower part of wall[28].

A spot in the keeps, which was the original places in the second half of the 6th century[29], and showed how to build keeps externally and internally that pressed keeps and monasteries were established in the era of the Fatimid Caliph Al-Hafiz (1130-1149) [30] of St. Antony,Nitria [31], Muharraq, St. Simeon, Red monastery of Sohag and Fakhouri[32].

4. 1. The diksar and the refectory

Itis located in the east of the refectory[33]as a rectangular room, coveredby barrel vault based on two decades.Within the monastery, there is an ancient refectory that is no longer in use; it is situated in the east wing of the complex.

[28]De Villard, M.*Deyr el-Muharraqah*, p. 33. White, E. *The Monasteries*, vol.3, pp. 56-57.Waltz, k. (2005). pp. 310-311.

[29]Waltz, k. (2005). P. 137.

[30]Abul-Makarem (1895). p. 78.

[31]Al-Meskean, M. (1984). p. 591.

[32]The ea[illegible] (1895). p. 78.

[33]Budge, W. (1928). pp. 23-26-375. Ward, B. pp. 3-23-139. Meinardus, O(2002). pp. 39-40.

The refectory is entered by a way of a narrow passage, and on the west side with western entrance, The main axis of the refectory is covered by a barrel vault. Within, a heavy masonry table with a lectern fashioned on its west end, from which the sacred texts and the lives of the saints and martyres were read during the community meal, dominates the room .

Resembledikar of St. Peter and St. Paul church in St. Anto hny monastery, as well as Virgin church in Syrianmonastery.

A refectory part of the kernel was the central place south of St. Paul church, but not connected with the church located between Abu Sefeen[34].

The refectory resembling those in St. Antony, and in Nitria[35], where there wererefectories in the west of the main church in two cases in Anba Beshoy and Syrianmonastery in south-west in one case in Baramus[36],its list to the south west of the Virgin church, located in the north-west of the northern wall of the church of St. Antony, but in Muharraq, it was also not related to the old church, located in Saqqara west of the small church [37], and of St. Simeon, while the upper balcony w as the only church known in spot based on the lower terrace[38], and therefore excluded from the refectory at Abu Maqqar, wh ich is far from churches, and in all cases corridor away from the central nucleus [39].

A special preparation of bread oven which was near the refectory, was built of stone ovens or plaster-coated brick and took the form circular or rectangular [40]with a ventilation holes on the ground level were the form of pipes pots of ventilation chimneys and squinches of storage and conservation of fuel and benches, and models of these furnaces what characterized revelations in the oven Abufaneus, St. Simeon[41], Saqqara[42], Nitria[43], and Esna existence of a square to ignite fuel above a circular hole of bread, there are ventilation holes in the rear[44]. The food rack Resemble than of St. Antony monastery.

[34]Waltz, k. (2005). p. 70.

[35]Al-Meskean, M. (1984). p. 98.Waltz, k. (2005). p. 149.

[36]White.*The Monasteries*, III, pp. 142-143.

[37]De Villard,*II monastéro*, p. 107.

[38]Quibell (1907-1908). p. 15.

[39]White.*The Monasteries*, III, pp. 142-143.

[40] De Villard, M. (1969). p. 93.

[41]De Villard, M.*II monastero*, pp. 74-75, figs. 39-77-78-87.

[42]Quibell, J. (1907-1908). pl. .XV.

[43]Maspero, J. (1932). p. XII, fig. 34.

[44] Winlock, H. & Crum, W.*The Monastery*, 1,p. 53 fig. 13.

5. 1. The mill

In the west side of the narrow passage, there are two mills to grinding grain. The entry corridor is breadth and separate between diksar, refectory and mill, the corridor narrows at the dining room to (2.15m), there are two mills [45]. Within are big millstones which were operated by huge wooden gears turned by draft animals. There are examples in St. Simeon monastery[46].

6. 1. The olive oil

Is located adjacent to the northern wall at a distance (21.0m) from St.Paul church[47].There are examples[48] in Saqqaraand St. Antony[49].

7. 1. The cells

Were set up in south-western corner, they comprisesthe rooms for monks[50]which been held by the renovation work even they change the original landmarks .

Modern cells, which had been established after the expansion of the monastery south c ells, filled all the confined space between the wall and remnants of the current reality wall south of angle Mikhail church between church and bill tower, and a street extend ed between cells from the linear east to west and north overseesing the court and spreading to the alleys accidental.

The cave, which was resorted to by St. Paul quoting the first cell[51]had turned into a church later as the sanctuary St. Paul, were digging in front of the lobby of the cemetery and adding another sanctuary in the north (the sanctuary of St. Antony), and moved the monks to stay united within cells erected adjacent to the walls.

Therefore, can be regarded asthe cave, the church, the fortress and the cells the nucleus of the Monastery[52], as was the case in all monasteries[53], in St. Simeon reduce erected on the keep which was considered a last resort and safer in case of attack[54].

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[45]About Milling machines, Waltz, K. (2005).p. 311. Darwish, M. A. (1988). pp. 63-220-221.

[46]Waltz, k. (2005). pp. 310-411.

[47]Darwish, M. A. (1988). p. 58.

[48]see De Villard,*Il monastéro*, pp. 92-93, fig. 106.Woltz. (2005). p. 321.

[49]Waltz, k. (2005). p. 320.

[50]Budge, W. (trans 1928). pp. 18-19-20-195. Danielou, J and Marrou, H. (1964). p. 272. Ward, B. (Tr.1975). p. 3. Athanasius, S.(1992). p. 16.

[51]Shiha, M. (1988).p. 72.

[52]Al-Meskean, M. (1984). p. 203

[53]Al-Shaboshty (1966). p. 49.

[54]Villard, Du. (1927). pp. 10-11.

The cellswith vaulted entrances, thick walls and half barrel vaults withmud brick, as was the case in the c ells in Nitria[55](4-5 AD), Abufanios in Thebes[56], the building in the upper Kom Abu Gerga west Alexandria [57](6 AD), archeological buildings in the St. Apollo in Bawit[58](6-8AD), St. Simeon [59], the compound monastery [60],St. Beshoy in Nitria[61], city in Thebes [62], Jeremiah in Saqqara [63], Fakhouri [64] and St. Anton ywhich discovered two cells[65]near the Apostles church depth of (2.0m) to (2.50m) which the entrance beg an by some stairesof stone lead to two rooms inside the first traces of a small oven and the remnants of primitive stoves for cooking and some parts of walls still covered with a layer of mortar.

Still some parts of the room covered with mortar, in the second chamber can found stream of water and a small building of brick. It was believed that the oldest cells were used by the coptic monks of the worship [66], coverd with domes or built by log palm and it was built in the lap of rocky mountain area located north and south .The cells in Nitria were built from mud brick and sometimes mixed with sand, lime and sand was a land of syndication,gravel, gypsum and red ocher[67].

8. 1. Spring water

Wasnamed after St. Paul, which resides in the north wing of the complex[68].It continues to supply water at the rate of about four cubic meters per day. The water comes from a

[55]Palladios. *The Historia Lausiaca*, chaps.XXXV-XVIII-VIII.Jullien, M., (1901). 88, p. 205.*Comptes Rendus*, (1966). pp. 300-302.

Qadous, E. (2002). Al-Athar, pp. 47-48-49.

[56]*Comptes Rendus*, (1967). pp. 439-444 fig. 4.

[57]Qadous, E. (2002). Al-Athar, fig. 13. Ramzy, N. Sh. (May 1005). figs. 72-73.

[58]Darwish, M. A. (1988). p. 58.
[59]Villard, De. (1927).pl.III.

[60]Shiha, M. (1988).fig. 39.

[61]Jullien. (1901). p. 53.Al-Meskean, M. (1984). pp. 206-207.Qadous, E. (2002). Al-Atharwal-fonun, p. 89.Waltz, k. (2005). p. 153.

[62]Qadous, E. (2002). Al-Athar, p. 40. Al-Atharwal-fonun, fig. 119.

[63]Qadous, E. (2002). Al-Athar, fig. 59.

[64]Shiha, M. (1988).p. 155 fig. 457.

[65]During the mission the Supreme Council of Antiquities repairing the monastery.

[66]Found during operations to repair the monastery oldest model of the language under the Apostleschurch, which of the century (3 AD), quoting the discovery of two rooms and when cleaning the walls of one room were found on the second writing Coptic inscription.

[67]Al-Meskean, M. (1984). pp. 325-328-329.

[68]Al-Mqrizi (1998). 2, p. 34.Habib, R. (1978). p. 43.

mountain crevice and flows into a cemented reservoir tank that is used for drinking and cooking.

A small drain allows the surplus water into a second reservoir, which is used by the monks for washing, and a final drain carries off the remaining water into a large basin where it is distributed for irrigation[69]. A system[70] similar to that was found in clusters inNitria[71], around the main church in Saqqara and of St. Simeon[72].

9. 1. Churches

Across the corridor leads to the court, which mediates churches and keep, there are three churches of St. Paul, Abu Sefeen, angle Michail and the Virgin church engine in the keep.

In the last quarter of (4 A.D), monks began to establish the first church on the cave of St. Paul and the entrance of the south-western corner leading to the vastibule progressing sanctuary of St. Paul held in the north and another sanctuary of St. Antony, then held the northern part of the church, which was characterized as divided into three sections, as the northwestern vastibule and eastern sanctuary represents twenty-four martyrs, the three sections coverd with higher domes based on pendentives, this was similar in construction planning with St. Antony church where due to the Fatimid age (12 A.D).

The mode of building walls, ceilings and domes was the same method used in St. Antony monastery of twigs and scheduled by a layer of mortar, internally and externally had been strengthened in some places brick and stone or wood belts, the floors and arches of stone, and supported the wooden roof girders. The old churches in the monastery of St. Paul domes resemble cells bees, which resemble the domes of St. Antony, and angle Michael church[73]like the Apostles church in St. Antony monastery[74].

As for the date of churches had stated that the church cave had been expanded and renovated in the Fatimid age, Gabriel VII (16 A.D) reconstructed the monastery after the bedouin destruction[75].Although in 1701, St. John XVI rebuilt the repair of churches, cells,

[69]However, a second spring, known as Miriam is located about one hundred meters to the south of the monastery. It was named after the sister of Moses and Aaron, who according to tradition washed there during the Exodus.

[70]Waltz, k. (2005). pp. 315-317.

[71]White. *The Monasteries*, III, pp. 55-230.Daumas, F. & others. pp. 37-41-84-97-98, pls.21B,D-22-23B.

[72]Quibell, J. (1908-1910). p. 12.De Villard,*Il monastéro*, pp. 97-100. figs. 24-26-29.White, E. *The History*, p. 93. White. *The Monasteries*, III, pp. 55-230. Daumas, F. & others. pp. 37-41-84-97-98

[73]under the remains of the church building components were discovered different rules includes columns and remnants of gypsum covering the walls were built in the ages of the oldest of the current era of the Apostles church built on the ruins.

[74]Samuel, A. (2002). p. 220.

[75]Exposure to the monastery attacks in the Bedouin (1484) where the slaughter was destroyed and devastated most of the monks remained abandoned until after the renewal of life has been done by Gabriel VII. In the second half of the 16th century attacked the monastery and robbed twice and forced the monks to leave.

the bells, restore the keep and walls southward expansion would indicate a number of churches. In 1727, St. John XVII renewed Angle Mikhail church[76]. In 1781, Ibrahim al-Gawhary had the essential building Abu Sefeen church and renewed the walls[77].

We can determine the date of these churchesto the Fatimid age, angle Mikhail church had been rebuilt in 1727 and renewal abu Sefeen church in 1781.

St. Paul church characterized that there were no divisions this arrangement due to the nature of the site had set up by reliance on the cave after a nucleus which made it unnecessary addition of corridors, given the small size of the blanks had been the pillars of the core wall while leaving the body church without the whole works and were pillars in most cases without rules or capitals[78].

While in the churches of St. Antony and Abu Hinnis a narrow and rectangler planning, so the addition of columns or pillars would be filled limited from the outset. It also marked a three sanctuaries on a single line in the Eastern side, as a common situation in Nitria, Virgin church in Baramous, Virgin church in Syrianmonastery, St. Antony and St. Beshoy.

In the main church in Saqqara and Abu Hinniss, we found that the three sanctuaries of equal size, in St. Antony and St. Paul and the other two were rectangular[79].

Abu Sefeen church had taken the same architectural planning of Iwan, the sanctuary was an Iwan edged toward the west had been added to convene a narrow nave in the west and reiterates of angle Michael church to add another nave end of the middle sanctuary, either the narrow nave was established in the north corridor leading into the church in the south. This planning can be explained by the architect that did not want to make the entrance to the church overlooking the gardens, but near the cells.

We could mention that the number of sanctuaries was to govern the planning of Abu Sefeen and angle Michael that Abu Sefeen sanctuary to include either one church of angle Michael has been to include sanctuaries, architect had been keen that the entrance to the southern corridor linked to cells, so that direct entry without going out to the court.

St. Paul church form a transitional planning, didn't belong to the micro not square churches to series form of the rectangular that was linked to planning, but less extensively choir with a three sanctuaries on a single line at the eastern end, which was similar to the transition [80] churches of St. Antony and Virgin church in Muharraq[81].

[76]Lyster, W. (1999). p. 32.

[77]Grossmann, P. *Architectural*, 1, pp. 194-226.

[78]White.*Monasteries*. III, pl.134b.Waltz, k. (2005). p. 185.

[79]Waltz, k. (2005). pp. 50-51.

[80]Villard, De,*Deyr el-Muharraqah*, p. 12

[81]Waltz, k. (2005). p. 62.

We can find the particular importance in terms of planning that ha d changed little since its construction, and there were no naves in the churches of St. Paul andSt. Antony where each divided into three sections by prominent pillars of the side walls, although the sections of St. Antony monastery larger area, and constituted the eastern part in both cases a supplement containing choir and s anctuary.Choir inseparable from the court in either case as necessarily clear division with a catch.

Regarding to churches in Egyptian monasteries, the evolution of basic planning cold pursued to return to the church in transition, and reflect ed the internal arrangements to some extent hybrid models mentioned by the Egyptian monasteries represented the church and St. Antony, Muharraq and monasteries in Nitria[82].

The triple planning differ ed the eastern side of the transitional churches post as a single sanctuary that was common practice in early christianity, this was sanctuary in the church of St. Paul and mounted in the cave, has been expanded later to create other sanctuar ies in the north, therefore differs substantially from churches in the next stage where included stone sanctuary on both sides have been converted to other sanctuar ies, and supported the view that it had begun to spread significantly during the Fatimid age (10-12 A.D) as the Virgin church in the syrianmonastry (10 A.D) and the Virgin church in Moharraq[83](12 A.D), where this affected by the Iwan planning.

The idea of the trip le division of the architectural vocabulary employed in each business depending on the circumstances of us ing, style and materials created, which confirms the widespread use of this division in the Fatimid age as it was in the Abbasid and Tulunid ages, but different formulas were different patterns in architecture, the trip le partition was the idea of architectural notes replicated in Fatimid architecture [84].

The existence of the portico that connect ed in all cases by the sanctuar ies ha d been associated with elements and units that fall behind and noted that it included mainlwan s which represent ed the sanctuar ies and their rooms imposed planning area income ,naves or otherelements, which reveals the essential link between units , between Iwan and the presence vestibule led, and that the presence of the portico ha d been associated with architectural planning of unit, was a triple planning[85], this planning of its assets in Abbasid architecture and Iraq,it often received from Iraq to Egypt in the Tulunid Age[86].

The Fatimid additions in St. Paul church consists of three sections representing the first concourse entrance, choir and sanctuery represented twenty-four martyrs

[82]Waltz, k. (2005). pp. 62-65.

[83]Clarke, S. (1912). pp. 118-219. Villard, De,*Les eglises*, p. 12-14. White, E.*Monasteries*, pp. 42-46-84. Smith, W. & Cheetham, S.*Dictionary*, 1, pp. 67-68. Muller-Winner*Koptische*p. 13.Meinardus, O.*The Mediaeval Wall*, pp. 119-141. Meinardus, O.(2002)., p. 127.

[84]It is tripartite division models what we see in the role of Fustat,

Center for the Study of planning and architectural heritage and the Center for the revival of Islamic Architecture (1990). p. 36. Osman, M. A. (2006). pp. 263-267.

[85] Osman, M (2003). pp. 318-319-320.

[86]Shafi, F. (1994).fig. 232.

distinct a triple planning in the Fatimid houses (10 A.D), where the room knew that was planned by the two opposite Iwans[87],and influenced the planning of Fatimid churches scenes planning and residential architecture Tulunid and Fatimid, especially in terms of court, which mediated the building and located on the side by two Iwans[88].

A number of Fatimid churches planning of Iwan relevance to the exercise of the christian rites, where the church occupied by Riwaq supervised by the two Iwans in the east and west, the eastern Iwan was a sanctuary covered with a dome and a room on each side as was the case in the church of martyrs monastery and the continued emergence of Iwan planning in Kobbanya, St. Simeon and St. Antony[89].

Consequently, the internal planning of this church, which resemble d a church, St. Antony and Muharraq church was divided into three sections: nave, choir and s anctuary,there are three entrances from the choirto the sanctuaries in the St. poal church, the ceiling was built of brick and stone , sanctuar ies covered by domes and implemented openings for lighting domes and eastern walls, and used the mud bricks and pay also used stones in the floors and in strengthening the foundations .

The planning of the church which was the nave with the dome of as emerged internationally in Mesopotamia which found in Amud church in Diyarbakir, and spread in Italy, such as the church of St. Bosco and appeared in the armenian churches[90](13 A.D).

It was found in martyrs monastery, St. Simeon, Nuba churches, genia - Jandal, Sheikh Abdul Kader, Surra, church of west Basilicas in Maruit, the church of St. Arsenious in the the short Monastery[91], the angle church in Babylonians stairs, St. Beshoy in Nitria, the Virgin church which lies north of Abrim palace, Strait Corozico church, Mar Girgis monastery at sidment in ahnasia, St. Samaan, St. Victor in kamula, Virgin church at Hammam in Lahun and Fakhouri, so that Iwan is planning to nave in the east and west.

[87]Creswell, K. (1989). pp. 261-263.

[88]See Van Berschem, M (1894).1, p. 40. Marcais, G.(1903). p. 536Commission for the Conservation of the Arab monuments (1904). pp. 89-99. Saladin, H. (1907).p. 109.Herz, M. (1909). pp. 33-34. Fekry, A. (1965). pp. 126-127. Creswell, K.(1989). p. 146. figs. 85-147-236-240.Shafi, F (1994). pp. 128:125-261 figs. 231-258-263:270. Osman, M (2003). p. 438.

[89]Darwish, M. A. (under publication).

[90]Alishan, G. (1880). pp. 134. Lynch, H.F.B.*Armenia*, I, pp. 322-325. Abich, H. (1896). pp. 151-152.Strzygowski, J. (1918). I, pp. 174-178. Hovsepian, G. (1944). pp. 7-45.Jakobson, A.L. (1950). pp. 45-49.Arutjunjan, V.A&Safarjan, S.A. (1951). p. 40. Krautheimer, R. (1965). (1972). VI-VII, 30,pp. 3-17-30-36-43-46-47-50-52-58.figs. 37-56, XVI. Sarkisian, G.A& Vlasov, A.V. (1966). pp. 208-212-241-250. Giugno. (1968). Der Narsessian, S.*The Armenians*, pp. 103-104-137-138.*Architecttura Medievale Armena* (1968). figs. 85-86. (1970). pp. 102-104. fig. 102Khatchatrian, (1971). pp. 43-49-51-53-56-58-62-64-69-71-71-89-96.Hasratian, M. (1973-1974). pp. 241-243. Hasratian, M.& Harutrunian, V. (1975). pp. 46-49, 61.Giugno. (1977-1978). pp. 36-55-71-72. Der Neressian, S.(1978). pp. 36-51-52-63-66-68*Medieval Armenian Architecture*, (1978). pp. 87-88.

[91]De villard, (1927). p. 20.

This was confirmed by De Villard [92]that churches did not have the nave and choir are not authentic, despite the existence the sanctuaryand square or rectangular stone on both sides, found in Baramous and Beshoy, as is St. Paul and St. Antony within churches in transition.

The church of St. Paul has particular importance in terms of planning that has changed little since its construction, there were no naves in any churches and both were divided into three sections by prominent pillars on the side walls, an eastern section in both cases a supplement containing choirand sanctuary, inseparable choir in either case as clearly necessarily with a catch and possibly dividing the rectangular format of the church section procedure, which took the form of the cross church seem so short and sophisticated Egyptian pure, so we did not find in St. Paulchurch andSt. Antony church as we could find inNitriaand most churches in Cairo[93],Although they were a part of the original churches.

The bell towers are square plan, with vaulted windows, the square neck of vaulted windowstoo, and the bell tower above the helmet was based on squinches. This bell towers were similar to the minaret of Goyoushi[94] and all the monasteries of the Fatimid age.

2. The architectural elements

1. 2. Arches

The semi-circular arch has emerged in the entrance, churches, halls, cells and above the spring water .In churches, the arches based on the columns and pillars, with wooden tie beamsabove the capitals of columns.

The emergance of pointed arches due to the fatimid renovations of churches and monasteriesas Abu Serg ain ancient Egypt (10 A.D), St. Barbara (11 A.D), martyrs monastery (11-12 A.D), St. Beshoy, Fakhouri,Nitria(12 A.D), Virgin church in Syrianmonastery andthe church in northern Abrim Palace (12 A.D). the keepin Muharraq (12 A.D)[95].

2. 2. Vaults

In the church ofAbu Sef een, Angle Michael, the corridor leading to the court, which mediated churches , the corridor leading to Angle Michael church,diksar,refectory, the corridor leading to the spring water and rooms above, divided diksar roof and refectory

[92]De Villard, *Dayr el Muharraq*, p. 12.

[93]Waltz, k. (2005). p. 71.

[94]Van Berchem M. (1889), II, pp. 606-619. Creswell, K. (1952), 1, p. 155,fig. 79, pl.46Nowayser, M. H. (1996). pp. 192-198.

Fekry, A. (1965). pp. 89-94.

[95]Abul-Makarem (1895). pp. 31-33-35. Al-Mqrizi(1998). 2, pp. 293-495.Patricolo &Villard (1929). pp. 25-26.Al-Sakhawi (1935:1953). 7, pp. 118-474. Fekry, A. (1965). pp. 32-121-154 fig. 28.Lam'i S. (1984). p. 80. Mohamed, I. H. (1984). p. 128. Shiha, M. (1988).pp. 85-168 figs. 8-13.Doley, W. J. (2000). p. 17. Clark, S. (2002). p. 170.Meinardus, O. (2002). pp.92-93-107-108-247,fig. 53-103. Waltz, k. (2005). pp. 116-124-184 fig. 2 pls.19-33.

into three parts which feature two arches (It's Syrian feature), as in Virgin churchin Baramus, Virgin church in Syrianmonastery,St. Beshoy churchin Nitria and St. Barbara, all these churches ha d been renovated in the Fatimid age, this shift has been to build cellars portable decades since the century (12 A.D).

The vaults ha d emerged in many examples as Nahia monastery , MarGirgis next to Almartuty church, Gabriel in Fustat and Mar Yacoub south of Cairo. There was a vault covering the corridor leading to cells of Fakhouri, lateral sanctuariesin Simeon.

The nave of Virgin vhurch of the roman crew,Aba Moon church in Tukh Mattuor, Gabriel church in Fustat, Mar Girgis church in the trench monastery , Abu Serg achurch in ancient cairo and Virgin Church in zuela crew and Abu Sefe en church in ancient cairo.The Virgin church in zuela crew aesthetic of wood was based on the wooden tie beams, as Fakhouri,Martyrs church and Simeon monastery[96].

Cross vaults are appeared in the keepemerged as Muharraq, Simeon, Red monastery in Sohag, St. Antony, Fakhouri, Virgin in Syria nmonastery, Virgin church in Baramus,St. Beshoy, martyrs,St. Simeon and Kobbaniya[97].

Domes:

They were appeared In the churches, the hall above the first spring water and the sanctuar y of the St. Antonyin St. Paul church,pendentives on the spherical domes while at the other three churches on squinches.

Pendentives also appeared in Bajawatcemetery (4-6 AD), In the Sheikh Abada and domes in Aswan cemetery, used in Fotouh gate and Aqmar mosque, lime kilns near the white monastery in Sohag (12 AD) and the mud dome in it, a contemporary of Aqmar mosque, also found some domes cemetery Aswan[98].

Squinches[99] were appeared in the domes of St. Paul church, Ab u Sefe en,Angle Michael, Aswan domes[100], Hakim Mosque[101],Goyoshi and seven daughters domes, while churches in the Fatimid age had emerged in diksar of St. Beshoyin Nitria, which was located north of Virgin church in Syrianmonastery and its diksar.

Which indicates a clear indication that the squinches widely used in Fatimid architecture were distinguished and groves ha d found examples of christianity, which was established

[96]Abul-Makarem (1895). pp. 1-2. Meinardus, O. (2002). pp. 103-131. fig. 56.Samuel, A. (2002). p. 31. Waltz, k. (2005). pl.21.

[97]Fekry, A. (1965). pp. 25-26. Mohamed, I. H. (1984). pp. 129-165. Shiha, M. (1988).p. 173 fig. 6. Doley, W. J. (2000). p. 56.Clarke, S. (2002). p. 121. Samuel, A. (2002). p. 121.

[98]Osman, M (1988). p. 234. Shafi, F. (1994). pp. 139-169 figs. 84-87-89-109-110.

[99]Cresswell. (1959). fig. 70v.Shiha. M. (2000). p. 60Lam'i S. (1984). p. 82.Shafi, F. (1994). pp. 169-200-555-559 figs. 90-91-112-241-233-3654-365-367-372-374-377-385-392.

[100]Cresswell (1959). I, fig. 70 v.Shafi, F. (1994). figs. 364-365-367-372-374-377.

[101]Shiha. M. (2000). p. 60.

in the Fatimid age, was another feature of the spread of the Fatimid style elements in the groves of christianity.

3. The features of urban planning

Monastery consists of structured social status (the church), and a group of buildings utilities outstanding explained that the human capacity and reduced its reliance on the land where increased control over the environment[102],due to the presence of a monastery in the desert climate was continental, the monks in order to implement environmental treatments upswing and architectural, ha d been implemented and developed a view for maintaining energy and the temperature inside the buildings, because of the scarcity of means of heating in winter and summer natural ventilation methods. These treatments were reflected on some semblance of desert architecture[103].

Although the site was not available way of life only appointed water and palm trees, but the true meaning and career of architecture in this site wais to create a place of human activity and religious convent to be a centre for radiation civilization was not a place to escape, It was then the way to find this place and equipped to meet the humanitarian needs which were most important, which was the theoretical basis for the design of the monastery[104] as a social institution closely linked to land and their effectiveness[105].

1.3. The engineering design of the monastery

The most important conditions for the establishment of the monastery proximity to the water source that w ould help on the duration of water needed for its population.The plan was characterized that convent church is located at the center and the alleys and streets permeate the architectural blocks with inter-urban courts[106]. One of the conditions for establishing monasteries repulsed of the injured were brought benefits by establish ing walls around the monastery and choosing places where good air, and taking into account the terms of site selection to confront climate and environmental conditions [107].

2. 3. The materials

Monks used materials that help ed to conserve heat and to prevent the influence of solar radiation and thermal insulation mud brick, ha d been resorting to means of protecting the

[102] Lewis M. (1953). p. 383.

[103] Friedmann, A. (Septamber 1980). p. 4.

[104]Envoldesn, C. (Septamber 1980). p. 1.

[105] Lewis M. (1953). p. 383.

[106]Salman, I. (1982). pp. 7-8.

[107] Osman, M (1988). p. 12.

walls and foundations to build the lower parts by stones, which provide d defenseless thermally of spaces[108],and help ed to keep cold air in the internal spaces most daylight hours during the rise air temperature abroad.

The environmental architecture by using multiple layers to protect buildings and plastered by lime and processors [109],as white reflect ed sunlight and reduce the absorption surfaces heat (successive layers of plastering and selection of light color) ,the plaster isolate walls and to protect it from rain and strengthened. In the upper floors, there are narrow windowes to provide them by air.

3. 3. The church was the first foundation of planning

The building of first church of St. Paul in the centre became the basis of planning monasteries, other churches were built around or near it. Then, this influence extended to the planning of the monastery, where a whole then distributed components and plans around the monastery church[110].Itwas the first destination in the planning .

Therefore, the planning followed a unit in the design , architectural elements and it's biological, which led to the consensus models of buildings depending on the building in a desert environment, the sense of uniting elements, including architectural d id not preclude diversity in form or external engineering design without any material difference in style and construction, were based on architectural design convent of the components of the environmental conditions of the region [111].

The Urban Environment significant impact on the planning of the monastery ha d been respected the cave of the St. Paul and made it the focus of attention by the administration of other buildings around it included a refectory, Abu Sefeen church,keep,and the spatial orientation of streets and squares with the stricter guide the blanks according to internal planning of churches.

4. 3. The convergence of buildings

To represent the architectural and one block to resist climatic factors [112],due to space constraints and foremost by the monastery, located inside the walls, because of the design of narrow streets and narrow spaces free, so in order to establish a backyard architectural

[108]Michell, G. (1978). p. 135.

[109]Taiel, J. (1990). pp. 48-65.

[110]As Fustat, Baghdad and elsewhere, where the city adopted a plan to organize the main square of any mosque at the site of the whole same. Osman, M (1988). p. 263.

[111]Al-Rifa'i, Kh. (1991). pp. 171-185.

[112]Al-Khouli, M. B. (1977). p. 46-50.

Interior to provide air and natural lighting and provide privacy to residents reduce social. The thick walls helped to provide the shadows and reducing exposure to sunlight [113].

5. 3. The compilation of buildings in groups of high-density construction (increased building densities)

A number of environmental conditions that had governed the design according to two principles:

- It had a fortified walls and streets of major longitudinal and latitudinal converge at the center where the church and keep.

- To feeder roads and distribution sites of cells and buildings to reduce services as an area of the monastery, and took into account what might develop from the premises.

With built adjacent to each other so as to reduce the area of the external surfaces of the buildings and to reduce the area of open spaces,to achieve proper thermal insulation, and this was reflected in the central part which was the governing social center (the church), which attracts of the structure of society and included a group of churches , cells, and buildings and buildings to reduce services as mill, olive oil, refectory and keep.

There are two vaulted corridors, the first to three churches of St. Paul and Abu Sefeen moving to the north , the second to the Angle Michael church was heading to the west in order not to open the doors of churches directly on the court. The vaulted corridorin Angle Michael church oversees the court under the bell tower.

The visual effects between the church and its environment were one of the main axes of physical relationship between them in terms of visual composition divergence between the external spaces and court, it represented the biggest in a vacuum inside the monastery, which gave overwhelming sense of spatial disparity between the narrow spaces winding bustling and full of life and expanding the systematic annihilation of simple configuration.

The visual composition of the churches through the ratings dominance and control optical when the church dominated the pacific spatial and physical docked to the monastery where the surrounding urban environment [114].

6. 3. Directing buildings appropriate guidance to exposing them to air (building orientation and sitting)

The gardens in rhe northern section to improve the climate and environment helped to mitigate and reduce the air temperature in different parts. With intensive cultivation of trees along the embankment buildings were to protect them from wind and obscured

[113]Abdal Baqy (1982). p. 73.

[114]Sadiq, M. A. (1999). pp. 37-56.

summer sun (solar screening), these trees were to reduce the operating temperature moisturizing result of the physical environment (climate-micro vegetative cooling).

7. 3. The internal courtyard

For lighting and ventilation Interior units ma ight be kept closed when units of the four aspects open edor surrounded on three sides [115]. The climatic factors have a significant impact on the planning of the monastery and its basic design [116],which the area between Abu Sefeen church, mill, keep in east andAngle Mikhail church in west.

Cells in south as an internal courtyard of the monastery amid lighting and ventilation the interior units as it closed by units from the east,west and south,and open between the the keep and Angle Michael church.This court helping to extinction moisturizing the hot air.

The architect used backyard gardens, which help edto improve the environment of the areas of warm weather and increase the proportion of shading and help ed to mitigate and to reduce the air temperature (the shadows during summer 45% and winter 75%), and increased efficiency in shading where high walls, the temperature of less than outside the courtyard between four to seven degrees [117] of containment and efficiency of extinction repository for cold air. As it fork ed narrow corridors attract air currents inside where these corridors has big role in providing light and reduce d air also through the windows by performing at the top.

8. 3. The high walls

As windbreakers,it represents a buffer adjacent to the heat as a result of increased thickness, as in the cells beside the southern wall, which has been buil t to adjacenting this line of defense on this side.

9. 3. The narrow streets between elements of the monastery

Helped to lack of exposure to direct sunlight, especially with the higher buildings and widening diversity in terms of the respective particular posts, and varies in width between (4.0m) on the streets between the main doors and the centre for the monastery, (3:2m) of the special streets bustling main sections within the monastery, and (1.5:2m) street overlooking the cells.

The streets were directed from north to south, so that the facades of buildings and roads to sunlight.So, the streets were cast throughout the day and acquired north wind with the proportion of high shading, as characterized meandering streets and concluded places and a

[115] Al-Hussayn, M. (1995). pp. 13-91.

[116]Kheireddine, A. (1997). pp. 855-877.

[117]See El-Bakry, M. (1973).

bit wide (metaphorically) play as courtyard and work ed to moderate cold air storage at night and prevent its infiltration with the first storm of wind.

The narrow streets with open internal backyard most important manifestations of urban planning for the monastery ma ight increase the proportion of open spaces offer to rise from (1:5).

These spaces deep (deep outdoor spaces) are providing protection from the shadows and sunlight, allowing the movement of air from the narrow streets which were high-pressure areas to the inland backyard which represent ed low-pressure areas especially during the day and exposure to sunlight (unpaved path network).

The streets and lanes aim straight conversion to spend the cold or hot winds or the hot-laden dust and sand .The narrow streets would prevent so through zigzags and stoops and provide shaded areas as well byfollowing the architecture ha d the means to cover the streets to protect them from the heat of the sun and rain[118].

In the case of non-shaded streets, the architect implement rose faced buildings overlooking the street, and the implementation of these naples until receiving juts oversized shadows and the streets.

The emergence floors are overlapped which helps ed air traffic and its regeneration from the bottom to top.

Monks who clean ed streets to be daily workshops and miss had prevented the rain water drainage and street failure to implement were in the street so as not to hurt bystanders had been implemented tear in the wall to reach the water canal .

10. 3. Provide the service entrances of buildings covered or shaded

With limited aspects governed by walls or buildings surrounding the (entry vestibules). working to protect the door of the building from wind and from the sun, and limit the movement of air space between the internal and external, in addition to opening the door to the building itself a small rise in supply, we find that in St. Paul church.

11. 3. Scarcity of external openings

From windows and doors as the limited number of flattened too small was to achieve a great deal of privacy so that the external walls of buildings seemed as if they were deaf, and was designed to be used for guarding and observation.

The aperture narrow range of home and from abroad to broaden the perspective of vision, which gave a sense of security and lead to control the passage of light where alleviated direct sunlight and other direct and control the humidity of air, and the

[118]Osman, M (1988). p. 263.

location of each hole would be chosen carefully and wisely with shaded aperture and protection (scarcity of external openings and window location). The windows were narrow entrances of the air inside the rooms paid for out from the other side to complete the movement of air.

12. 3. The domes and vaults

Were used to cover most buildings were in addition to being a symbolic gesture, where they solved environmental, climatic, installation and functional, the high domes and vaults on horizontal surfaces allowed the assembly and the withdrawal of hot air inside the buildings located at the top and expelled outside, and a variety of forms and methods to move from aquare to octagon to circling by pendentives and squinches.

Conclusion

- Engineering design was the most important conditions for the establishment near the water source. It was planning to mediate the church and be introduced its alleys and streets of concrete blocks and inter-urban yards.
- The basis of design planning monasteries to be the first church building, were at the centre of the monasteries on the eastern side, other churches ha d been built around or near them, and then extended this to influence the planning of the monasteries, where a whole then distributed components and plans around the church .
- Capital planning unit in fashion design and architectural elements, which led to the consensus models of buildings, depending on the building in a desert environment, the sense of uniting elements, including architectural d id not preclude diversity in form or external engineering design without any material difference in style and construction, was based on architectural design of the components monastery on the environmental conditions of the region.
- Urban Environment significant impact on the planning ha d been respect ed for the first nucleus of the St. Paul church and ma de it the focus of attention the administration and other buildings around the spatial orientation of streets and squares with the stricter guide the blanks according to internal planning of churches.
- In order to establish a backyard architectural Interior to provide air and natural lighting and provide privacy to residents reduce social. The thick walls helped to provide the shadows and reducing exposure to sunlight.
- The establishment was followedby a number of environmental conditions that ha d governed the design according to two principles, first it was a fortified walls and streets of major longitudinal and latitudinal converge at the center where the church and keep, and the second was the feeder roads and distribution sites and buildings to reduce services as an area of the monastery and to take into account what might develop from buildings.
- Visual effects were between the church and its environment one of the main axes physical relationship between them in terms of visual composition divergence between the blanks of foreign affairs and court since it represented the biggest in a vacuum

inside the monasteries.

- The climatic factors significant impact on the planning of the monasteries and its basic design, which was the area between the churches , mill,keep and minimize the south amid internal courtyard flat lighting and ventilation units Interior, help ed moisturizing the hot air, up to the highest replaced by cold air.
- High walls surrounding the premises of the monasteries works for wind and increased thickness ma de it a buffer thermally adherent of the buildings as in minimizing the immediate vicinity of the southern wall.
- Cells were built on the south side adjacent wall to be a defensive bastion from this side and characterized as a small housing area on both sides of the alleys long roundabout.
- Directing street from north to south, the facades of buildings and roads to sunlight, would be observed with the apparent movement of the sun, as characterized meandering streets, narrow streets and the ends about the broad courtyard just play ed and worked to moderate cold air storage at night and to prevent its infiltration with the first storm for wind.
- The narrow streets helped on the lack of exposure to direct sunlight, especially with the rise buildings and widening diversity in terms of the respective posts in particular , narrow streets with open backyard internal most important manifestations of urban planning, which provide d protection from the shadows and sunlight was not to make the streets and lanes aim straight conversion to spend the cold winter winds or wind-fifths of the hot-laden dust and sand.

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