

Development of Architectural Planning of Pharos Castle, Alexandria

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Abstract: *Egyptian castles along the coast of the Nile Delta on the Mediterranean up to the fortress of Pharos in the northwestern corner of the Delta, dating back to the reign of Merneptah and Ramses III, with the study of the architectural planning of these fortresses that lighthouse Alexandria was founded on it.*

The Ribat of the Abbasid Caliph al-Mutawakil on the island of Pharos, which is founded on the foundations of the Egyptian castle. Ribat of Alexandria (Pharos) and Ribat of Rosetta (Boulbitine) which takes similar architectural planning.

The works that took place in Rabat Al-Mutawakil in the Mamluk period, beginning with the work of Zaher Baybars, who repaired the castles in the Levant and Rosetta, Nasir Muhammad and Al-Ashraf Barsbay. The modifications to the work of Sultan Qaitbay were in accordance with the use of the cannons.

The study follows the descriptive approach through the architectural development of the castle in the light of field study and historical sources. The analytical and comparative method is also followed to achieve the objective of the study. This is a re-correction of the history of this fortress, which dates back to Merneptah, Al-Mutawakil, Al-Zaher Baybars and Qaitbay in the Islamic era.

Keywords: Qayet-Bey Castle, Alexandria lighthouse, Merneptah, al-Mutawakil, Pharos. Rosetta, Al-Zaher Baybars.

First: Egyptian castles on the coast of the Delta

Pharos Island is located the north of Alexandria, it is far from the city in ancient times, its length facing the beach is about 2,600 meters, while its width is between 400 and 500 meters, at its end is a rock (2,300 meters long and 200 meter width), above this rock, the castle was built.

More than three thousand years ago, Homer spoke in *Odysée* about this island, he mentioned the safe port from which ships sail to the Mediterranean Sea, the port had two entrances [1], [2], which attest to the importance of this island.

Therefore, it was not acceptable to believe that the island of Pharos with its important strategic location did not witness the creation of any fortifications before the lighthouse which was built by Ptolemy II Philadelphus (282 BC) and that it did not attract the attention of one of the Egypt kings until the Ptolemaic discovered that, the northern coast of the Delta since the modern state era has been a military event in the form of threats and external invasions aimed at controlling the country's capabilities through the estuaries of the seven Nile branches from Pelusium in west to Pharos in east, especially during the reign of Merneptah and Ramesses III who fought many wars in the western region of the Delta coast.

We cannot ignore the strategic location of Rhacotis, which led Alexander to choose a base for the capital of his kingdom, protected by Pharos, at the time he did not start to create fortifications, where there were Egyptian fortifications.

Therefore, it was necessary to conduct analytical and comparative studies based on the historical foundations, to

reach the beginning of the establishment of fortifications on this island, with the conviction that the Lighthouse were not the first fortifications, but it was built on the foundations of an Egyptian fortress, To protect the western entrance of the Delta, especially when foreign invasions focused on this entrance since the era of King Merneptah in the modern state, and that was the first axis in the research.

The second axis focuses on what the historians said: Sultan Qaitbay established his castle on the foundations of the Lighthouse, and mentioned works by the Abbasid, Ibn Tulun, Baybars, Nasir Muhammad and Ashraf Barsbay. However, the importance was limited to the Lighthouse and Qaitbay Castle, which were built on the foundations of Pharos fortifications.

Even, when the references mentioned the Ribati which was established by Al-Mutawakil in 239 AH (854 AD), and did not specify the work done by this caliph, as well as the architectural and defense elements, it did not specify the work done by Al-Zaher Baybars, which is no less than the work of Al-Mutawakil, although it exceeded the work of Qaitbay.

We cannot believe that the northern coast of the Delta is empty of fortified cities and fortified points that can deal warily and humanly with any invasions that threaten the country's security. Egypt was exposed to two large sea peoples, the first in the era of Merneptah (1213-1203 AD), and the second occurred about thirty years later in the reign of Ramesses III (1184-1153 AD) where the danger appeared on the northern border of Egypt and the attack by land and sea [3], [4].

Therefore, the reasons for the start of the fortifications on the northern coast of the Delta were available, where the fortification of this region represents a strategic target to address these invasions, and then the fortifications were established on the estuary of the Nile branches [5], [6], and Diodorus [7] witnessed the cities with high walls on the top of the estuaries of the Nile, and on each side of the branch port, and linked by arches, and around the castles and fortresses in several directions, and the lakes of northern Egypt was a defensive barrier (Fig. 1).

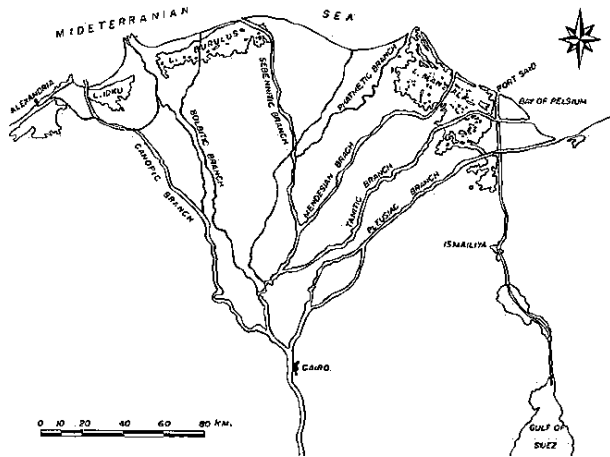


Fig. 1. Ancient branches of the Nile

Threats to the country have intensified, such as the threat of the Libu, Meshwesh, Kehek and their allies of the sea people, who first appeared on the stage of history in the fifth year of Merneptah (1208 AD), where they intended permanent stability in the Nile Valley [4].

Therefore, the fortresses were established in all the areas located on the estuary of the Nile branches in Pelusium, Tennis, Damietta, Burullus, Boulbitine (Rosetta), Canopus (Abu Qir), Pharos and other areas. These are the same sites that Al-Mutawakil built (239-248 AH / 853-862 AD) when he was attacked by the Egyptian coasts, particularly the city of Damietta.

As for the architectural planning of these fortifications, the Egyptians - as a result of their wars in Asia - quoted some architectural influences on the fortress buildings of Syria and South Asia Minor, and used them in the Egyptian fortresses, which consisted of a defensive network in the Canaanite style, The construction of the fortresses is not limited to wages, but is covered with stones. The impact of Asian architecture is evident in the buildings of Merneptah Palace in Memphis and Jawsaq of Ramesses III in Habu, where the military architecture reached the height of its perfection [8].

The Jawsaq of Ramesses III in Habu is characterized by the structure of the entrances to the castles, and has two towers in the middle of the door, and there are semi-circular

carvings battlements from the stone top towers and the outer wall, which serves as the arrow slits [9].

Also, the Egyptians took the model of the common fortress in Asia, known as Migdol, which is not unlike the medieval European fortress with the outer wall with arrow openings and the same guard and the same small towers [10].

When Herodotus visited Egypt in 445 BC, he spoke about this visit, using the words of his teacher Hiktiyya El-Malti, who had visited many of the known parts of the earth in his day, and recorded it in his book "Around the Earth", he mentioned that the Delta represents the part that is trapped between my arms and the Canopic branch (Abu Qir branch) was a watchtower called Perzyus lighthouse [1], [3], [5], [10]. In the Modern Kingdom, this section was called "the Great River" [3] or the water Ra' branch [1]. (figs. 2).

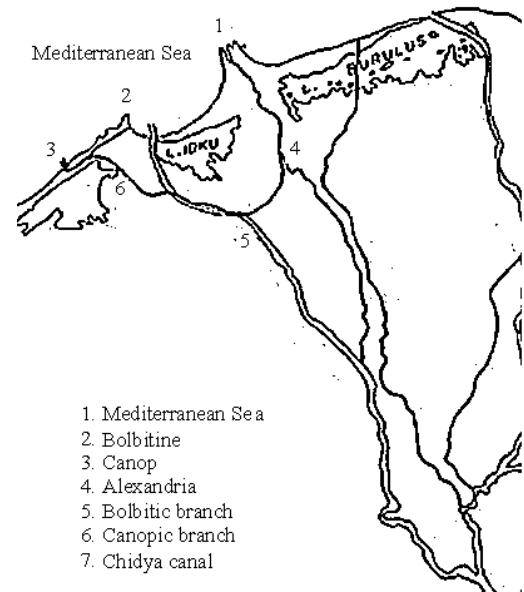


Fig. 2. Bolbitine and Canopy branches and Chidya canal

Al-Falaky [2] mentioned in his talk about the track of the Canopic branch that it runs parallel to the beach from Pharos up to the Canopus estuary to 150 stadiums (25 km), and after Canopus lies Heraclium (Red Comet) with the temple of Hercules and then the Canopic estuary, ending with a series of hills that extend over a high area and form a narrow, And the sea. These highlands were a natural barrier to the waters of the Nile and prevented them from spreading in the basin of Lake Mariout. It was also a delta on the north-west side.

Faros was about twenty-five kilometers away from the Heraclium, so it was the western limit of the Delta, where Chidya canal ran in the west [2], and the mouth of Abu Qir, on which the Perseus watch was located, is about to leave Pharos about 18 kilometers (11 miles) away.

In 1208 BC, the Libyans arrived in western Egypt until they reached the western shore of the Canopic branch. Therefore, Merneptah ordered the establishment of a fortress on the mouth of Canopic branch, later called "Perzyus Lighthouse". This was not the only castle built by Merneptah, he established a fortress on the mouth of the Boulbitine branch (Rosetta Branch) [11] and other castles on the estuary of the Nile branches. This is evidenced by the fact that the castles of the West Delta were in the days of Merneptah under the command of a commander in direct contact with the king [3].

In the reign of Ramesses III, the Libyans conquered Egypt from the western road as they did in the days of Merneptah, encircling Hatshe Fort, which is about eleven miles away from the delta border, and near the branch of Ra' (Kanobi), The castle that Merneptah built at the Kanobi Bogus at a distance of eleven miles from the mouth of Chidia canal (west of Pharos).

Ramesses III attacked with his army on his enemies a fierce attack, and took the garrison mentioned enemies raining at the same time until they fled Harbin, then followed by Ramesses III armies of 11 miles to the delta border until they were sure to leave the land of Egypt, (Fort of Ramesses III), which he had built at the head of the roads extending from the west of delta to the desert [3].

From this, it is confirmed that Cheddia canal, which flows to the west of the island of Pharos, represented the western limit of the delta, which is located on its head. This island was the point of defense on the north-east side.

Therefore, we can attribute the fortress that existed there to the era of Merneptah and Ramesses III, because of the importance of this strategic island to protect Rhacotis (Raguda), which had an important location, and the Egyptians allocated the Rhacotis tower to protect this village, which Alexander chose to be the base of his city, and became alive from the neighborhoods of Alexandria, as was the Mediterranean and Pharos Island is bordered by Rhacotis in the north and bordered by a canal which extends to meet the Canopic branch eastward in the south and west [1].

As mentioned above, the three castles located on the estuary of the Boulbitine branch at Rostta, the Kanobi branch at Abu Qir and Sikhidya (Chidya) ranch at Pharos took the forms of Asian castles, each of which took an architectural planning consisting of a high tower that is used as a lighthouse, which is equipped with towers arrow slits, overlooks the lighthouse with a shed that is mounted on a row of columns in the four directions.

The walls, the inner tower and the external towers are crowned with semi-circular battlements, the shape of this semi-circular battlements remains at the top of Alexandria's citadel and crowns the outer façades of the inner tower, which we believe to be the origin or derived from. It is due to the era of Merneptah and Ramesses III and resembles the semi-circular battlements on the façade of Ramesses III Palace in Habu.

The lighthouses has been used for a long time, most notably the Canopus lighthouse, which Herodotus saw when he came to Egypt, it was called (the Perzyus lighthouse).

The architectural design of the three lighthouses was similar, as evidenced by the fact that two of them are still present. Comparing the ground planning of the Pharos and Boulbitine lighthouses shows the truth of what we have reached.

The ground floor of the Pharos lighthouse consists of a longitudinal and cross-section of five sections. The central four-poster hall is the central area of lighthouse. The other sections are occupied by halls on the four sides. The central hall on the south side is the entrance hall, with two guard rooms open to the hall.

The external facades, the length of both the eastern and western fronts is (29.75 m), while the length of both the northern and southern fronts is (29.87 m).

The two lateral sectors in the east and west represented two long corridors, with two entrances surrounding the main entrance. Supporting foundations and Slanted and sloping walls was surrounded by walls on both the eastern, western and northern sides [13].

The open courtyard was surrounded the outer walls, which is surrounded by a penthouse on a row of columns in the four corners of the lighthouse, the facades of the tower and the walls are crowned with semi-circular battlements.

Boulbitine lighthouse consists of five longitudinal and transverse sections. The central hall represents the center of the watchtower. It has four columns. The halls are occupied by the other sectors. The entrance of the watchtower is located in the south. It has two lateral entrances leading to the eastern and western sectors.

The length of the northern and southern facades (24.80 m) and the length of the eastern and western façades (23.15 m). The eastern, western and northern facades are slanted and sloping wall to support the tower, as well as supporting foundations of stone (0.50 m) in width [11].

We can confirm that the Boulbitine lighthouse was previously constructed by the Pharos lighthouse, as the latter is the largest and most sophisticated area of its architectural elements. These lighthouses were fortified in Ramesses III era, and its facades culminated in semi-circular battlements.

The analysis and comparison study between the planning of the ground floor in the two lighthouses of Pharos and Boulbitine (Fig. 3), which dates back to the era of Merneptah, and on each of them - along with the fortress of Canopus - lighthouse later, as well as planning the palace of King Merneptah in Memphis (Fig. 4) the first and the second palace of Ramesses III in Habu (Figs. 5-6).

Five buildings were erected in the period from Merneptah to Ramesses III (Figs. 4:8). The architectural elements of the Boulbitine and Pharos squares were already identified. Each floor consists of five longitudinal sections and the central hall represents the center, the two sides sectors were long stretches along the length of the building,

each with a separate entrance on either side of the main entrance on the central axis.

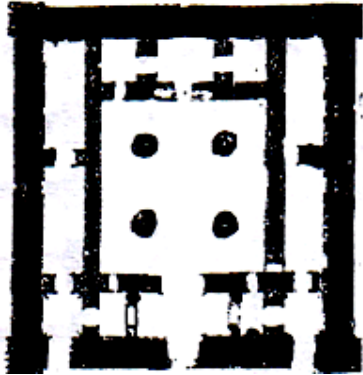


Fig. 3. The central hall in the ground floor of Pharos and Bolbitine lighthouses

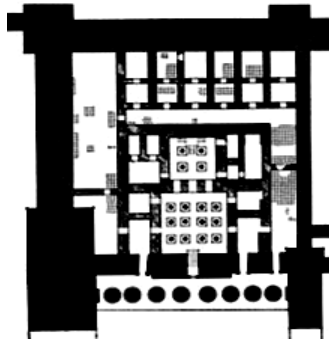


Fig. 5. First palace of Ramses III in Habu

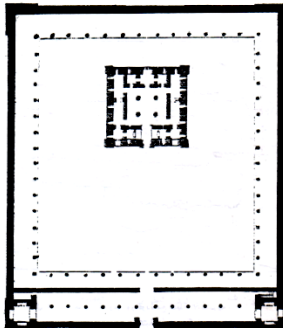


Fig. 7. Merenptah Castle in Pharos

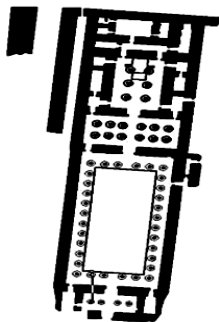


Fig. 4. Merneptah Palace in Memphis

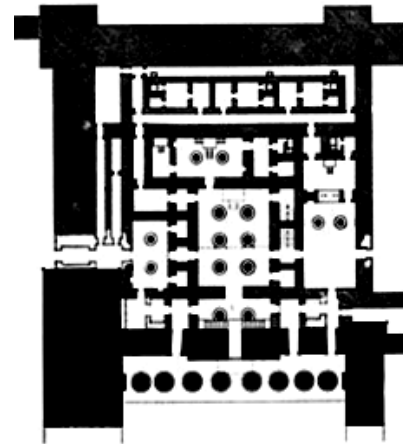


Fig. 6. Second palace of Ramses III in Habu

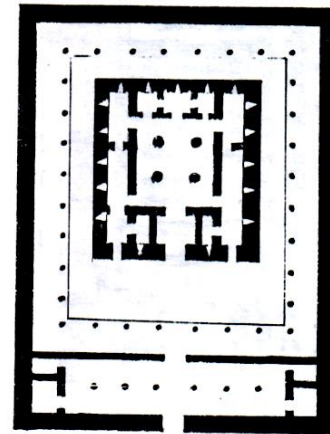


Fig. 8. Merenptah Castle in Rosetta

To confirm the above, these three castles (Boulbitine, Canopus and Pharos) date back to the era of Merneptah, we find clear evidence of this in the palace of Merneptah in Memphis, whose entrance consists of a four-column lobby in a row, and the courtyard consists of three sections. The front section has a transverse hall with 12 columns in two rows. The middle section includes the throne room, side rooms and staircase. Leading to the roof, and extends the throne room on the main axis of the palace, and has six columns in two rows.

The main section of the palace, which includes the throne room and adjacent halls, represents the most important architectural assets that have been based on it, and has two other entrances, and this section consists of five longitudinal sections and five cross sections, and the Throne Hall occupies the center of this section.

The two palaces of Ramesses III in Habu represent two important examples, the first palace is characterized by the fact that the central part of the façade stands a little forward, it has two large towers. The front part of the palace consists of a large reception hall with twelve columns in three rows, each side with a hall leading to it. The middle section contains the square throne hall, which has four columns in

two rows. The main entrance has two entrances leading to on the sides of the reception hall.

Second Palace: the entrance leads to a narrow lobby with two columns, which was the entrance to the throne room and the balcony, and the two sides are surrounded by two side guard rooms. The middle section includes a large six-column throne hall in two rows. This planning features the main entrance and the two side entrances, the main plan consists of five longitudinal and transverse sections, and the two lateral entrances in longitudinal to the first and fifth sectors.

We can emphasize the similarities between planning the three deficiencies in the following points:

1. The main section consists of five longitudinal and transverse sectors, the most important of which are the two lateral sectors, accessed by two entrances on either side of the main entrance.

2. The central section represents the Throne Hall and includes the central sectors.

3. There are two towers on either side of the main entrance in Ramesses III palaces.

4. Two guard halls were found in the second palace of Ramesses III.

5. At the top of the towers and the outer wall in the palace of Ramesses III was a semi-circular battlements of stone carvings representing the arrow slits [9].

The similarities in the architectural elements between the Egyptian palaces of the reign of Merneptah and Ramesses III in the castles of Boulbitine and Pharos can be summarized as follows:

1. Merneptah Palace and two palaces of Ramesses III consist of five longitudinal and transverse sections, with similar reception hall in each of them, and we find this in the squares of Boulbitine and Pharos.

2. The entrance leads to the central sector in the three palaces and the two hills, with two doors on either side leading to the lateral sectors (I and V longitudinal). There are two guard rooms in the second palace in Habu, and we find this in the Boulbitine and Pharos castles.

3. The length of the southern side of the castle of Boulbitine (24.8 m) and thickness (2.25 m) and the length of the same rib in the fortress of Pharos (29.75 m) and thickness (2.50 m) and each of the two entrances, and in the palace Merneptah length of the rib with the entrance (30 M) and thickness (2.50 m) are fairly close measurements.

Therefore, we can compare the towns of Boulbitine and Pharos (as well as the castle of Canopus) to the era of Merneptah, and fortified in the era of Ramesses III, and was surrounded by the island of Pharos at the time sidewalks revealed near the island [14], [15], confirming that it was used as an old port, From the tyranny of the inhabitants of the sea and protected by a fortified fortress.

We can recall that the castle of Merneptah in Pharos was preceded by - as in the case of his palace in Memphis - a courtyard surrounded by a shed based on a row of columns,

around which the walls of the workshops and rivets, and the entrance of the castle in the south, the internal tower is accessed by a main entrance in the middle of the southern façade. This entrance leads to the central hall, which has two long sections in the east and west, each with a private entrance in the southern façade; these are located on either side of the main entrance.

According to the sources [7], the fortress of Boulbitine was transformed during the reign of Psametik I (663 BC) into a camp of Melizians from the Greek islands and other mercenary armies, which was used by the Egyptian army to repel the invasions of the Libyans and the Assyrians. The castle was called the "fortress of the Millizians," as the fortress of Canopus was called "Percius lighthouse", especially when the influence of the Greeks increased in the northern delta.

The Delta opened its ports to the Greek trade, as were the Greeks who established their own city, Nekratis [1], [16] on the eastern shore of the Canopic branch, near Sikhidia (Chidya) between 613-610 BC. Trade goes on its way to the Mediterranean countries, they set up temples next to the Egyptian temples, and they built a wall around the port.

As Amazis took power (570-526 BC), this city became the only place where the Greeks could freely trade, he sided with the Greeks more than his predecessors, so that the palace of Nile navigation on the Canopic branch increased its star.

Nekratis remained the largest commercial port until the advent of Alexander (332 BC), where it was linked between the Egyptian and Greek civilizations, and despite the sovereignty of the Greek character, but Alexander passed through the Canopic branch on his way to Rakoda, there was no better place to establish his new city.

Rakoda was the home of the Greek merchants, the province, which was part of it called Metelite, was called in Egyptian language (Ra Amante) or (Nefert Amante), called the "Milet", a country of foreigners, referring to the Greek immigrants to the north-west Delta on the west bank of Kanobi branch [17], [18], [19].

Therefore, the Egyptian castles in Bulbatin, Canopus and Pharos took the camps to assemble these foreigners, especially the mercenary soldiers, and took the observer to guide the ships and the defense at the same time, and then, Greek labels were issued on them.

Alexander chose a site to build his city [20] because of its strategic importance. It was protected by the island of Pharos from the north and the Chidya canal from the west and the south, which extended up to Canopus. Fifty years later, when Ptolemy II (Philadelph), 282 BC decided to establish the lighthouse on the foundations of the castle built by Merneptah and completed by Ramesses III. This building was created by architect Sostratus of Cnidos, using the Egyptian architectural design without change, but he added its several square, octagonal and circular stories and surmounted by a statue of Poseidon (Neptune) [24], [10].

The Greeks used the ancient foundations of the castle of King Merneptah in Pharos and in the same planning (Figs. 9-10), consisting of five transverse longitudinal sections. The two lateral sides, each with a special entrance on either side of the main entrance, used this planning as a base for the building of the lighthouse, which was present and mentioned by Herodotus (445 BC).

The Greeks added rooms around the lighthouse in the eastern, western and northern directions. They were built on a row of columns, they built a shed on two rows of columns on the southern side without building rooms, they reinforced the central hall and removed the columns to withstand the height of the palace, the upper, also added a shed on four columns leading the main entrance of the lighthouse.

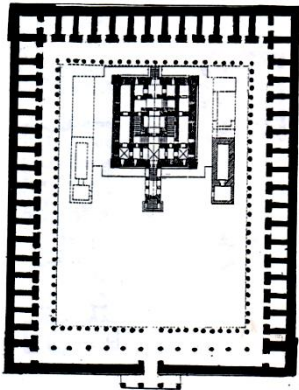


Fig. 9. Alexandria Lighthouse (Thearch)

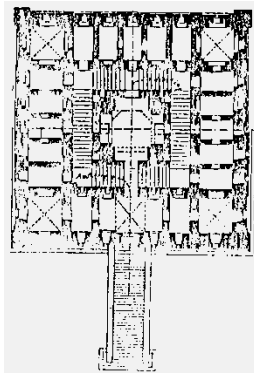


Fig. 10. Inner tower of Alexandria lighthouse (Thierch)

Second: the Ribat of Al-Mutawakil

The Alexandria lighthouse retained its place after the Islamic conquest, where Muslims linked it in defense of the city until it was seen by Johannes von Nikiu in 680 AD and Epiphanius in 143 AH (760 AD) [13] [25]. We can confirm the role played by the Alexandria lighthouse in determining the shape of Ribat, was a model of architectural planning, which was established in Ribats in North Africa and Andalusia,

The shape of the Ribats can be drawn from the novels of historians and their talk about the function of construction and the life of soldiers are there, as well as in this regard the

system of fortified Byzantine monasteries and monasteries that went on the same planning, and most probably the Islamic Ribat was built on a square or rectangular area, In the middle, surrounded by four separate rooms on one or more floors, it also had a place for prayer, a small mosque and a high ceiling. Its outer walls were thick and high, containing a mill, a water tank and stores for arms and supplies, so that it can resist the blockade [25].

These are architectural elements of the lighthouse, from which the elements of the Islamic Ribats were derived. Surrounded by thick outer walls, the rooms are joined by soldiers from the four sides open onto an open courtyard. The inner tower is used as a weapons storehouse. And the mosque, which is topped by the lighthouse, which represents the watchtower for the ships of the aggressor, and the warning of coming, and sending signals to other Ribats, in preparation for the meeting with the enemy, in addition to its role in the announcement of prayer times[26].

The Arabs followed the Roman system derived from the Egyptian system, in terms of the number of fences around the inner tower, and the walls were made up of the paths of the warriors and semi-circular battlements and protection walls, so that soldiers hide behind them[27].

At the beginning of the Abbasid period, the Byzantine threat continued to threaten the state that fortified its borders. The caliphs came to restore the strongholds and fortresses in the border area overlooking the Byzantine territories [28].

On the day of Arafa from 238 AH (853 AD), the city of Damietta was subjected to a fierce Byzantine naval raid that caused corruption in the city, prompting al-Mutawakil to issue orders to build rafters on the coast during the month of Ramadan in 239 AH (February 854 AD), Otba Ibn Isaq oversaw the establishment of Ribats on the coast in: Qus, Shata, Damietta, Burullus, Rosetta, Ekhna, Beheira, Alexandria and Hammam [24]. The Alexandria lighthouse was an example of these Ribats - as well as the light of Rosetta, As was the largest area and the strongest in terms of immunization, Ibn Rusta has stated that he was the most famous of all these Ribats [29] [30], where the rectangular courtyard is shown in the center, surrounded by the raised bows, which advance a series of small, narrow rooms that are free of openings and windows except doors, as in the construction of laces and Islamic agencies, surrounded by huge, thick outer walls and high interspersed with a number of prominent towers.

When Al-Mutawakil started building the Ribat in Alexandria (Fig. 11), he relied on the foundations of the lighthouse to be the base of this Ribat, the earthquake, which occurred in 177 AH (793 AD) has led to the destruction of lighthouse [6]. Ribat was evaluated for the same architectural planning of the square floor of the lighthouse; he built a wall around him on the old foundations as well.

From the planning study developed by the scholars of the French expedition [31], [32] (Figs. 12-13), we find an Abbasid wall supported by semi-circular towers. The

thickness of the fence is 4 meters, while the towers are two meters tall and four meters in diameter, and the walls and towers have arrow slits^{iv} and stone machicoulis^v for throwing darts, arrows^{vi} and spears, stone launcher (mangonel)^{vii} boiling water and Greek fire lava^{viii} [11], [33], [34], [35], [36], [37], [38], [39], [40], [41], [42], [43], in defense of Ribat.

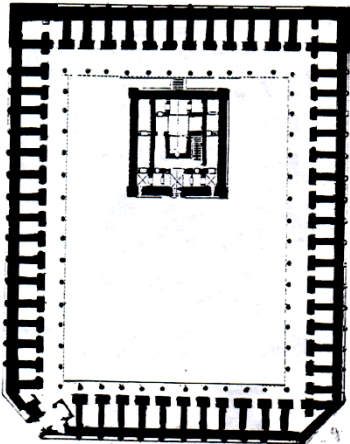


Fig. 11. Ribat of Al-Mutawakil in Alexandria

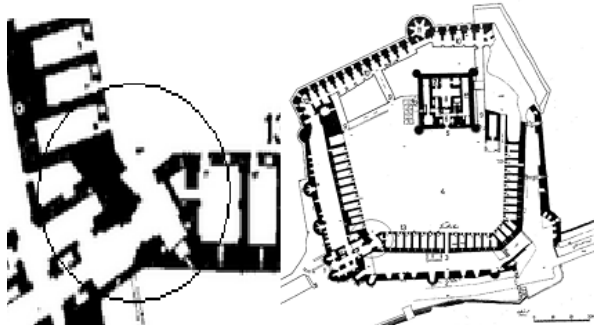


Fig. 12. Qaitbay Castle in Alexandria (description del'Egypte)

The entrance of Ribat is located in the southwestern corner and is surrounded by two-quarter-shaped towers. This entrance is characterized by the fact that the curvature of the two towers is inward and not outward, as we used to, and between the two towers is a rectangular hallway. This entrance is unique in its design and therefore played an important role in the architectural investigation of Ribat. It was confirmed that it dates back to the era of Al-Mutawakil, we found a similar example in one of the palaces in Samarra, which was revealed adjacent to the tribal wall of Abu Dulaf Mosque (Fig. 14)

The entrance to this palace consists of a hallway between two square towers that look exactly like the entrance to the Ribat [44]. The entrance leads to a hall with a cruciform plan representing a bent entrance^{ix} [32] towards the left ending to the courtyard of Ribat.

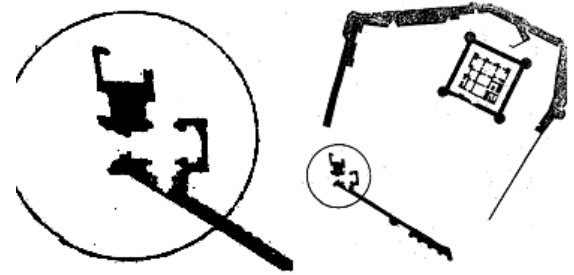


Fig. 13. Castle of Alexandria before Qaitbay (entrance of Ribat of al-Mutawakil) About the astronomical maps of the French campaign

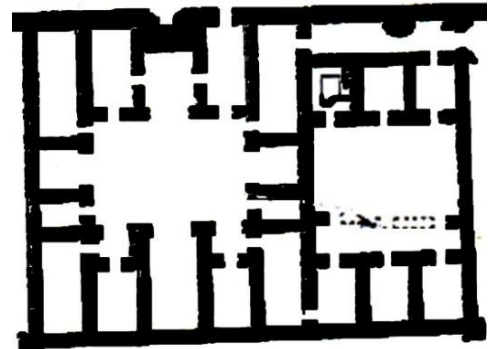


Fig. 14. The palace of al-Mutawakil next to the qibla wall in Abu Dulaf Mosque in Samarra

This bent entrance is more sophisticated than the one in Baghdad, where the latter drains a hall that is accessed by an outside door and takes a rectangular shape and inspects the interior to the left of another door towards the city.

This entrance is a unique example of the entrances. If we did not find it in the entrances before, we found it in the reception halls in a number of Umayyad and Abbasid palaces; Associated with the architectural composition necessitated the preparation of niches where the gate guards sit in the right and front niches.

In Samarra, the hall with a cruciform plan appeared in the reception hall of Balkuwara palace from the era of Mutawakel, which dates back to al-Mutawakel era [45], [46], and is a great example of what we have already said. Rather, it emphasizes that hall with a cruciform plan, which was converted into a mosque in this period, also dates back to the era of al-Mutawakil, and this hall, the highest dome in the era of Ahmed ibn Tulun later.

We can confirm that the internal tower in the era of Mutawakkil was composed of the entrance leading to the central hall with the cruciform plan, on both sides of the main entrance are two entrances leading to two vestibule occupying the eastern and western sectors. In the corners of the hall with a cruciform plan, four halls complete the square reminiscent of the reception hall in balkuwara palace, there are two sectors, the first one is the entrance hall and the two

guard rooms, the second is the vestibule leading right and left up the ascending ladder to the tower's floors

The semi-circular battlements were crowned by the tower, its origins are from the Egyptian battlements of the Ramesses III era, which is similar to Ramesses III palace in Habu, and continues to be used in the lighthouse and then in Ribat. The tower's interior is still crowned, (1.20 m), width (0.80 m) and semi-circular radius (0.40 m).

The architectural elements of the Ribat of al-Mutawakil are:

1. The external walls with semi-circular towers equipped with the operator, which is four meters in thickness, and the towers are two meters wide, there is certainly a corridor inside the walls with arrow slits, similar to the second floor, and the third floor represents a wall with semi-circular battlements.

2. The south-west entrance, which consists of a lobby with a cruciform plan and swerves to the left as a bent entrance.

(3) The axes those are adjacent to the outer wall, which are preceded by an archbishop carrying a shed from the four sides.

2. The southwestern entrance, which consists of a cruciform plan hall with and deviates to the left as a bent entrance.

3. The joints adjacent to the outer wall, which are advanced by the arcade bearing a shed from the four sides.

4. The cruciferous plan, which occupies the center of Ribat, was converted into a mosque, where the southern entrance was blocked so that the mihrab could be erected in its place. It was entered from the other entrance located in the north. The eastern and western sectors represent two long corridors, each with an entrance on either side of the main entrance.

Therefore, we can confirm what Thiersch [13] said and what he drew in relation to the flint is inaccurate, since there are common elements between the castle of Merneptah and Ribat of al-Mutawakil overlooked planning the lighthouse are:

1. In the drawing of the lighthouse, he ignores the existence of two passages in the east and west, each with its own entrance, and we find these two passages in the castle of Merneptah and Ribat of al-Mutawakil together.

2. It was overlooked that Al-Mutawakil reconstructed the lighthouse after it was destroyed after the earthquake of 177 AH (793 AD). It also did not pay attention to the semi-circular towers that were still standing on the southern side, and Merneptah castle [13], and these towers remained until the French expedition.

3. It did not occur to him that the architectural planning of the palace was the same as the architectural planning of the castle of Rashid, each of which turned into a Ribat in the era of the Mutawakkil, both of which date back to the era of Merneptah. This confirms the great similarity between planning and architectural elements in terms of the five sectors, to the central hall, and other elements.

4. He did not inspect the southwestern gate, which dates back to the same period of construction of the wall with half-circular towers [47]^x.

When Ahmed ibn Tulun took over the rule of Egypt in 254 AH (848 AD) he re-built the walls of Alexandria [48] and restored the lighthouse, which was not completed in the era of al-Mutawakkil. He built a dome of wood to climb up from inside it [24], [49], he established it above the Mutawakel Mosque, which occupied the center of Ribat.

Where the historians of the work of Ahmad ibn Tulun only mentioned the dome that he built of wood, no one mentioned the mosque which was in Ribat, and it was confirmed that this dome was erected in the lighthouse position of the tower instead of the statue of Poseidon (Neptune), not the mosque built by Ibn Tulun there, and that the mosque is back to the work of al-Mutawakil. This dome was erected on top of the walls of the central section of the central hall, which is represented by the mosque established by al-Mutawakil. It was a site where Egyptian soldiers and others were stationed [24].

The western corner of the lighthouse was demolished. It was rebuilt by Khumarawih ibn Ahmad Ibn Tulun (269-282H / 882-895M). In 18 Ramadan 344 AH (955 CE), about thirty cubits were destroyed from the top of the lighthouse as a result of the earthquake that occurred in Egypt and many of the Levant and Morocco in one hour [24].

The Ribats al-Mutawakil took a similar architectural planning derived from the Alexandria lighthouse. Ribat al-Mutawakil in Damietta was one of these arches. It was a high defense fortress, which was built with stones. It consisted of two towers spanning a series, to defend the city, and was equipped with weapons [50], [24], [51], [48], and this was a link consisting of several floors, the upper floor ends with a dome, and interspersed with walls and occupations and projections and topped by semi-circular battlements and observer to monitor the enemy ships [52].

The Ribat of al-Mutawakkil was built on a similar architectural planning, surrounded by walls from the four sides. The walls were also equipped with works and projections; the tower takes the square layout and consists of several floors topped by the watchtower. It takes the same layout as the Ribat of Alexandria. It has a mosque on the second floor characterized by a cruciform plan [11]. Abbadi [53] pointed out that the Alexandria mosque is the lighthouse mosque.

Third: Ribat in the Mamluk era

When Salah Eddin visited Alexandria in 566 AH (1171 AD), he ordered the restoration of its walls and fortifications. It ended in 577 AH (1182 AD) [24], Ibn Jubayr [56] mentions that he saw the light of Alexandria, and talked about the large number of houses included in the multi-storey and the mosque, which is above (the dome).

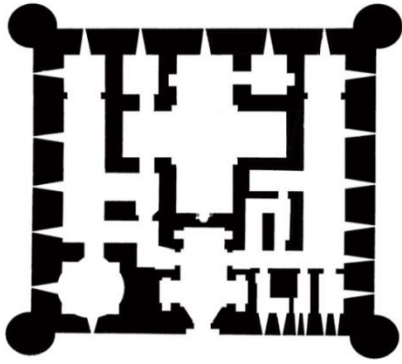


Fig. 15. First floor of the Lighthouse of Baybars

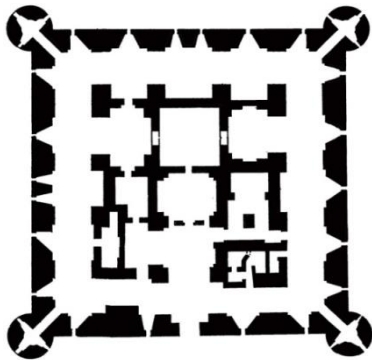


Fig. 16. Second floor of the Lighthouse of Baybars

Al-Zaher Baybars visited the fortresses in 664 AH (1265 AD), he ordered the restoration of the lighthouses of Alexandria in 673 AH (1274 AD) (Figs. 15:17) and Rosetta (Figs. 18:20), he also set up a wall around the two lighthouses. He took care of the Damietta port and repaired many of the fortifications of the Levant, especially after the earthquake that occurred in the same year to undermine the pillars and ceilings of lighthouse of Alexandria, there was destruction in lighthouse of Rosetta, Damietta and the citadels of the Levant.

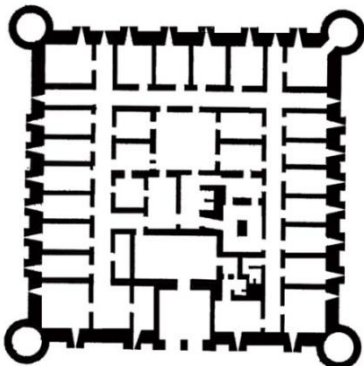


Fig. 17. Third floor of the Lighthouse of Baybars

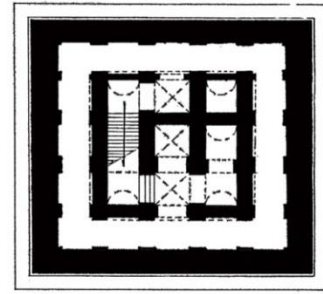


Fig. 19. Second floor of the lighthouse of Baybars

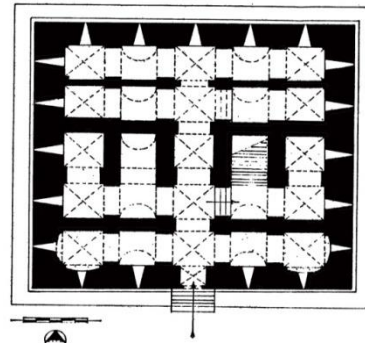


Fig. 18. First floor of the lighthouse of Baybars

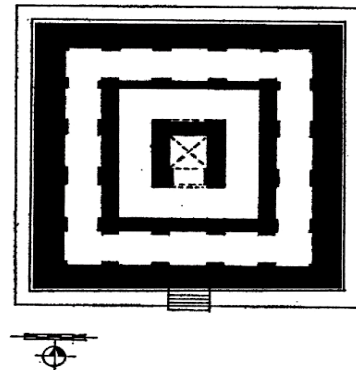


Fig. 20. Third floor of the lighthouse of Baybars

The study of the architecture planning of the Mamluk fortifications in ports indicates that there has been a shift in the low-fortification offensive bases on the defense strongholds, there has always been a tendency to strengthen the defense capabilities of individual castles, and increased interest in strengthening the walls, which is the backbone of any defense system, so that the resistance to the bombing or mine or earthquakes by increasing the thickness of the building, and the erection of the walls, which gradually start to rise, and use old columns as your pillars inside the walls.

and derived the architectural elements that he used in fortifications of existing elements, but on a large scale, the development of weapons has been a reason to expand the factories, as well as to deal with the thick walls that cannot be mined or hit by tanks [59], [54], [55], [39], [11]^{xi}, he also

took care of the circular towers equipped with the three functions, each of which represents a square or circular diagonal with a cross vault or a shallow dome, the other three are the operators that end with the three-hole openings, and the walls are provided with similar features with tower operators, therefore, we can attribute to Baybars the second outer wall in Alexandria.

Also, we can attribute the outer wall and the circular corner towers with a rational link to it, it has been built to monitor the ships of the Frankish [60], [61], while the outer wall of the Ribat of Alexandria extends in the south and west and is characterized by the presence of semi-circular towers, and opened in the lower half of the fence and towers openings for throwing, and above that a number of other openings indicate the existence of a corridor inside the fence, this architectural element was also found in the walls of Rosetta Castle, where there was a corridor with a workshop inside the walls [11].

The southwestern entrance is also due to Baybars, it is a rectangular entrance topped by a door topped by a semicircular semicircle topped by rectangular narrow openings, above it is a frieze topped by another pressure-reducing stone contract. On both sides of the door there are two alternating towers and the upper half is visible on stone supports, the two towers were equipped with the work in the first two rows in the lower half and the second in the upper half connected to the corridor, which represents the second floor of the walls, the semi-circular battlements were above the walls and towers.

We can attribute the pillars that advance the western wall from the inside in the area that represents the prison of the castle to Baybars, where these pillars are held with advanced contracts and the operators, and between them and the wall corridor of two floors reminds us the Ribat of Rosetta of the era of Baybars, in addition to strengthening the walls of the internal tower of both the castles of Alexandria and Rosetta, and provide them with columns and pillars granite and basalt, which represent the crossroads that increase the walls strength and durability.

Thus, the architectural and defensive elements of the city of Alexandria, which was created by Baybars, is a development of the elements that were created by the castles of the Levant between 666-669 AH (1268-1121 AD), and even if in 672 AH (1274 AD) The towers or the works of the towers, and we can recall that the restoration of Baybars to Alexandria has already restored the Ribat of Rosetta, its elements were defensive and architectural more sophisticated and the towers are larger.

The entrance of the inner tower can be attributed to Baybars era, as it is a large entrance that is 3 m wide and ends in a knotted top surrounded by a lobed joint. The entrance of this door is 1.50 m wide, (2.50 m) bordered by three pieces of granite on both sides and above, and above the thresholds there is a contract topped by a small window, and on both sides of the door are two lazy seats (Maksala).

The entrance to the tower is topped by a triangular area (reminiscent of the Frenton) and surrounded by a frieze (Metop), which represents a pressure relief zone. This element is located at the top of the Southwest gate entrance, which leads us to assert that the entrance to the tower dates back to Baybars [11], this entrance is similar to the one found in Rosetta, which also dates back to Baybars, lazy seats were erected on both sides of the entrance opening, which is topped by the granite thresholds, and the entrance of the entrance is as large as the one in Alexandria.

We can also attribute the four constellations erected at the corners of the tower to the work of Baybars, similar to the planning and architectural details and defense with the similar to the castle of Rosetta, which dates back to the same period, as well as similar to the castles of the Sham, and crowns towers - as in the Southwest Gate - and the four facades - semi-circular battlements. The mosque lost the age of Baybars [24], where it increased the areas of Iwans and implemented the vestibule leading to this mosque, which occupies the second sector to the west and ends to the western Iwan.

The earthquake in 702 AH (1303 AD) caused the destruction of the palace. In the year 1303 AD, Baybars Al-Jashankir (1303) rebuilt the inner tower and the mosque during the second mandate of Nasser Mohamed bin Qalawun, and extending the chain to the tower chain to close the port, Ibn Battuta [62] mentioned in 725 AH (1325 AD) that he saw the lighthouse destroyed, and it was destroyed in 750 AH (1349 AD),

Ibn Iyas [63] states that between 882 and 884 AH (1477-1479 AH) Sultan Qaitbay supervised the restoration of lighthouse. It had a mosque, a mill and a furnace, arms carriers and rooms full of weapons and guns.

This was not the first restoration that took place in the Mamluk era, but it was preceded by many works, most notably the work of Al-Ashraf Bersabai (825-842 AH / 1422-1438 AD), where he repaired the external wall dating back to the reign of Baybars.

Ibn Iyas [11] in his talk about the work of Qaitbay, a new type of weapon that was used in this period is a defender, which was to have a significant impact in changing the forms of defensive elements, was the use of artillery^{xii} [64], [33], [40], [37], [65], [63] limited in Mamluk Egypt in the fourteenth century is mentioned only in In the year 784 AH (1382 AD), as well as 791-792H (1389-1390 AD) [37], and limited until the end of the reign of Qaitbay (901 AH / 1496 AD), his modifications were to change the forms of the operators to suit the use of guns, which necessitates changing the shape of the narrow operator from outside to expand To allow the movement of the barrel of the cannon, as in the castle of Rosetta.

Qaitbay has also raised these concerns, in order to build the barricades outside, which was found in the castle of Bodrum in Greece in 1480 AD, the fortress has appeared in the air-conditioned cannon, especially in the wing adjacent to

the sea, and was strengthened by large bulges such as the France tower with its two arrow slits, the square tower of Italy, we notes that the arrow slits of the North wall and the Caritou tower [66].

Ribat of Rosetta and Alexandria was greatly influenced by the castles of the Levant [57], [58], where it was confirmed that Baybars was interested in immunizations great interest,

Sultan Qaitbay repaired the inner tower, which remained in ruins since Ibn Battuta saw it a century and a half ago. The work of Qaitbay included the mosque's marble mosaic tiles [47]. The text reads [47], [67]: " عز لمولانا السلطان " الملك الأشرف أبو النصر قايتباي عز نصره The greatness of our master Sultan Al - Ashraf Abu Al - Nasr Qaitbay great his victory".

Ibn Iyas[68] wrote an important description of the castle during the reign of Qaitbay, which is considered a major reason for attributing it to this Sultan^{xiii} [69] [25] [70] [71] [67]. He said: "The structure of this part that its vestibule was held on the arches of the salty sea from the coast to the end of the tower, and established this tower seat overlooking the sea seen from the march of the day to the boat and inside to the port and made a mosque in this tower, In this, Ibn Iyas talked about the bridge or the vaulted road that was held between the city and the castle[63], and the lighthouse which represents a seat on the sea and the mosque.

Al-Ghouri [63] ruled when he took over in 907 AH (1502 AD) he made changes to the castle and especially the walls and towers, where he expanded the operator and change the features of the tower to the north-east to include four operators instead of three in each role of the league, also raised some of the operators due to the need to put the defender in the job, especially when he shipped a large number of guns to the ports of Egypt in the Mediterranean and Red Sea to strengthen the coastal fortresses, in 924 H (1518 AD) he sent 200 cannon to protect the Egyptian coast against an Ottoman attack that threatened the country [63].

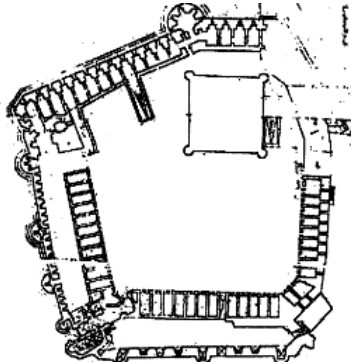


Fig. 21. Qaitbay Castle, Alexandria (about the registration center)

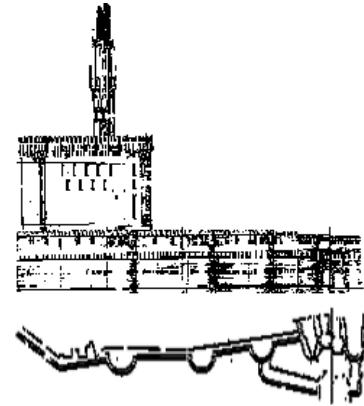


Fig. 22. Qaitbay Castle, Alexandria

The plan of the citadel (Fig. 21-22), which was included in the Hertz report submitted to the Committee for the Preservation of the Arab Antiquities in 1908 [47], is the most accurate of what was drawn. The tower's features were identified in this period, which appeared in the plan of the castle of Merneptah, and the walls of the mosque's durqa'a (hall) rise up to the roof of the tower.

There is no doubt that the castles included in this study, starting from the castle of Merneptah, passing through his palace in Memphis, Ramses III palace in Habu, Alexandria lighthouse, Ribat al-Mutawakil, castle of Baybars and Qaitbay in Alexandria and Rosetta, were the central hall consisting of five longitudinal and transverse sections, which includes the main element which represents the central square, and the hall with the columns, which turned into a hall around which four Iwans in Ribat Al-Mutawakil and Baybars castles, where the mosque is located, the walls - were erected around this central building - provided with square towers, Semi-circular in Ribat of Al-Mutawakil and Pharos castle in Alexandria (Fig. 23-24).

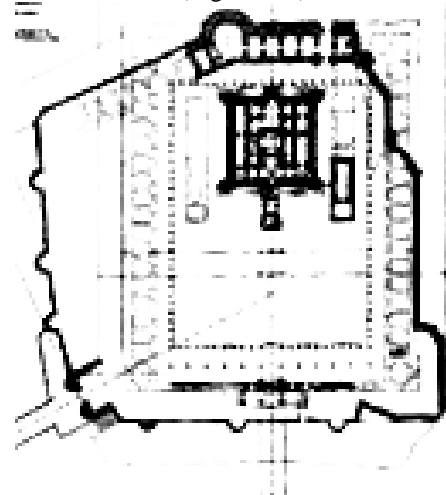
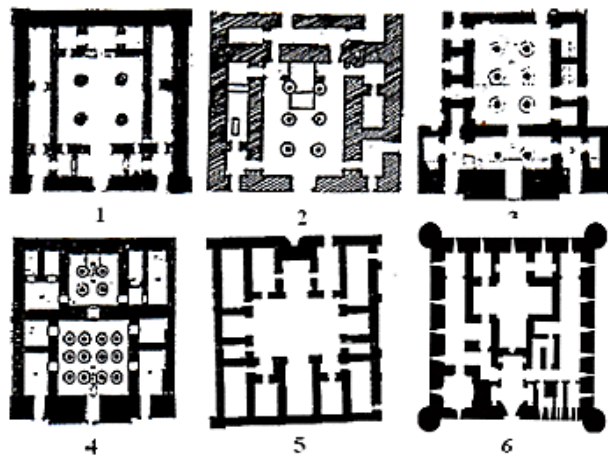


Fig. 23. Horizontal portico of the base of Qaitbay Castle on an imaginary drawing of the Pharos Lighthouse (Merneptah castle - Alexandria lighthouse - Ribat of al-Motawakil - Qaitbay Castle)



1. The castles of Rosetta and Alexandria
2. Merneptah Palace in Memphis
3. The First Palace of Ramses III in Habu
4. The Second Palace of Ramses III in Habu
5. Al-Mutawakil Palace in Samarra
6. The Lighthouse of al-Zaher Baybars in Alexandria

Fig. 24. The central units in the castles of Pharos and Bulbiatine,

The palaces of Merneptah, Ramses III and al-Mutawakel in Samarra

Conclusion

In the northern regions of Egypt, a large number of fortifications were established, especially during the reign of Merneptah and Ramesses III, when foreign raids began on the Delta coast. These fortifications were concentrated on the estuary of the Nile branches, due to the nature of these raids, this is a natural obstacle, For this reason, fortified fortresses with various defensive means were erected on all the estuary of the Nile from Pelusium branch to the Kanobi branch and the Sikhidya (Chidya) at Pharos, It is topped by semi-circular battlements on Egyptian traditions since the pre-family era.

The towers were built in the middle of these fortifications, which played an important role in observing the ships coming at sea and warning them to come, where the floors were set up and the highest observer was established. Herodotus (445 BC) supported this statement when he mentioned the "Perseus Monitor" Kanobi branch (Abu Qir Branch).

King Merneptah took the planning of his palace in Memphis as a model of the castles that he set up on the estuary of the Nile branches. The reign of Ramesses III also took place. We find a clear similarity in the architectural elements between the palaces of Merneptah, Ramesses III and the other castles, (Rashid).

The architectural planning of these castles was represented by the high tower, which is used as a multi-storey observatory. The plan consists of five longitudinal and transverse sections. The center of the building is a central

hall with four pillars. The eastern and western sectors are two long galleries and each has a private entrance.

It is surrounded by semi-circular battlements. The courtyard is surrounded by a row of columns on the four sides of a shed. The search proved the return of the Pharos monitor (later Alexandria) to the reign of Merneptah, and the Greeks used the foundations of this watchtower to construct the lighthouse, they built it there and built several floors above it.

The research also proved that they did not change anything in the architectural features of the ground floor, which remained until the beginning of the twentieth century when painted by Hartz (1908).

Al-Mutawakil built a Ribat on the foundations of the lighthouse in 239 AH (845 AD) and erected other ribbons like him. Ribat al-Mutawakkil was composed of the inner tower surrounded by walls with semi-circular towers. The thickness of the walls was four meters, and the walls and towers were semi-circular with semi-circular battlements and carried out by arrow slits and Machicoulies.

The Ribat also had an entrance in the southwestern corner, which has a distinctive layout, which helped us to identify the architectural and historical features of Ribat Al-Mutawakkil, which is surrounded by a quarter-circle tower that is tilted to the inside, and we found a model for this in Al-Mutawakil Palace north of the Abu Dulaf mosque in Samarra.

It dates back to the era of Al-Mutawakil Al-Haskal, which was adjacent to the walls and opened its doors to the courtyard, where it is preceded by a shed on the four sides. The internal tower represents the cruciform plan hall, the most important elements of the architecture, which was taken as a mosque, and the tower was semi-circular battlements.

The architectural works that Ribat witnessed in the Mamluk period were the most important of the works of Baybars. The lighthouse was transformed into a fortress where the development of weapons was a major reason. A wall was erected outside Ribat, supported by semi-circular and busy towers. Al-Mutawakel Gate the study of the architectural elements of the Syrian citadel, which witnessed the renovation of Baybars, has helped to pinpoint the exact works he has done.

Al-Zaher Baybars built the towers of the circular tower of the internal tower, which was supplied with the work and topped by a spiral on stone cables, similar to the same - which dates back to the same period - the top towers of the outer gate.

And he built the entrance of the internal tower on the form now, which is similar to what was done by the castle of Rosetta, where he renewed this castle after the completion of the restoration the lighthouse, created external walls with semi-circular towers, and these walls and towers of three floors as is the case in Alexandria, An entrance to the internal tower, similar to its entrance in Alexandria, along

with the pillars of the West Wall, in the location of the fortress prison.

The mosque dates back to this period as the opening of a vestibule leads to the western Iwan after filling the southern entrance to be replaced by the mihrab. The lighthouse underwent renovations during the reign of Nasser Muhammad, who ordered a series between him and the fortress of the chain to close the port. Other works were also carried out during the reign of al-Ashraf Barsbay in the restoration of the walls.

The most important work witnessed by the lighthouse was carried out by Sultan Qaitbay when he ordered the repair of the men and the fences and the change of the defensive elements as a way to cope with the development of this period, especially in the defense means in terms of the use of the guns so he changed the form of the operator and became wide outside to allow the movement and the mosque was paved with marble after the completion of the reconstruction of the internal tower, and established a bridge between Ribat and Medina on both sides of the contracts, and we find that the amendments made by the Sultan Qaitbay in the forms of the arrow slits also in the castle of Rosetta.

References

- [1] Kamel, W. (1953). Strabon in Egypt, Cairo, pp.48-55-76-79-157.
- [2] Al-Falaki, Mahmoud (1967). Ancient Alexandria, translated by Mahmoud Saleh Al-Falaki, Alexandria, p. 90-148-153-155-158.
- [3] Breasted, J. H. (1999). History of Egypt since ancient times to the Persian era, tr. by Hassan Kamal, Egyptian General Book Organization - Cairo, pp. 254-256-444-448-454-455.
- [4] Kadri, Ahmed (1985). Military Establishment in the Imperial Era, Translation by Mukhtar Al-Suwaifi and Mohammed Al-Azab Musa, Egyptian Antiquities Authority, pp. 285-286.
- [5] Khafaja, M. S. (1966). Herodotus speaks of Egypt, Cairo, p.88-89-108-310.
- [6] Jolwa (1978). Studies on Egyptian Cities and Regions, Description of Egypt, translated by Zuhair Al-Shayeb, Cairo, pp.328-357-375.
- [7] Kamil, W. (1974). Diodore in Egypt, Cairo, p.47.
- [8] Zaki, A. R. (1968). The Army in Ancient Egypt, 1, Cairo, pp.92-93.
- [9] Marabet, M. F. (1953). Fine Arts in the Ancients, Cairo, p.41.
- [10] George Posner et al. (1996). Dictionary of ancient Egyptian civilization, tr. by Amin Salama, Egyptian General Book Organization - Cairo, pp.73-81-107-137-138-143-150-151-153.
- [11] Darwish, M. A. (1991). Military fortifications in Rosetta in the Mamluk era until the era of Muhammad Ali, Ph.D., Faculty of Archeology, Cairo University, pp.79-82-83-88-89-94-96-100-114-181, Figs.32-33.
- [12] Thiersch, H. (1908). Der Pharos Von Alexandria, Friburg, pp.38-39-52, T.11-12
- [13] Jandet, G. (1916). Les ports submerges de l'ancienne ile de pharos, M. L. E., IX, Le Caire.
- [14] Ali, Zaki (1944). Alexandria, its establishment and some aspects of civilization in the Ptolemaic era, Journal of the Faculty of Arts - Alexandria University, 2, pp.34-112-122-135.
- [15] Ghorbal, M. Sh. (1996). Composition of Egypt through the Ages, Egyptian General Book Organization - Cairo, 76.
- [16] Sonnini C. S. (1807). Travels in upper and lower Egypt, Undertaken by order of the old government of France; Printed for J. Stockdale – London, p.144.
- [17] Serhanak, Ismail. News Facts and States of the Sea, The Amiri Press – Cairo, p.8.
- [18] Hassan, S. (1944). Egyptian Geographical Departments in the Pharaonic Age, Cairo, p. 7.
- [19] Briccia. *Alexandria and Egyptum*, pp.24-78.
- [20] Faraj, F. (1942). Alexandria, Cairo, p. 5.
- [21] Nushi, I. (1046). History of Egypt in the Ptolemaic and Roman Periods, Cairo, pp.13-14.
- [22] Al-'Abadi, M. (1977). Bibliotheca Alexandrina, Cairo.
- [23] Al-Maqrizi (1854). Preaching and consideration of plans and effects, 1, Cairo, 1, pp.144-147-157-156-157-198-244-214-359. [24] Maqrizi.
- [25] Balbaa, M. T. (1952). Antiquities of Sultan Qaitbay in Alexandria, Qaitbay Castle, Manuscripts Master of Arts Faculty - University of Alexandria.
- [26] Balbaa, M. T. (1968). The origin and development of Ribat and the importance of the system of standing in the history of Muslims, Association of Antiquities in Alexandria, pp.19-20-31.
- [27] Salim, Mr. Abdelaziz. Mosques and palaces, Read Series, p.136.
- [28] Ramadan, A. History of the art of maritime fighting in the Mediterranean, Egyptian Antiquities Authority - Cairo, pp.7-20-21.
- [29] Ibn Rusht (1893). *Precious relationships*, London, p. 118.
- [30] Balbas, T. L. (1950). *EL Castillo del duger de la Puente en la isla de Cadia*, articulo en la Revista de AL - Andalus, XV, pp.202-211.
- [31] Description of Egypt (1994). Paintings of Modern States, 2, Cairo, pl.87, Fig.4.
- [32] Shafei, F. (1970). Arab Architecture, 1, Walis era, Cairo, p.191-195, figs. 92-133.
- [33] Al-Qalqashandi. Sobh al-A'sha in Al-Ansha Industry, Cairo, 2, pp.137-145.
- [34] Al-Ramah, Najm el-Din (1984). Equestrian and military positions, the celebration of Eid al-Abadi, a series of heritage books, Ministry of Culture and Information - Iraq, 122, pp.1515-171.
- [35] Ibn Abdullah, H. (1878). Effects of the First Order of States, Cairo, p.197.

- [36] Tartousi, M. (1947-1948). Manuscript of the insight into how to escape wars and the spread of media flags in the number and machines concerned to meet enemies, the Museum of the War in Cairo, published by Claude Cahen and commented in Bulletin Etudes Orientales, XII, p.118, paper 142 A-B, 148 b.
- [37] Zaki, A. R. (1946). The Evolution of the Cannon in Brief, Army Magazine, No.35.
- [38] Zaki, A. R. (1951). The Weapon in Islam, the Egyptian Society for Historical Studies, Cairo, p.59.
- [39] Hendi, Ch. (1964). Military Life in the Arabs, Damascus, p.153.
- [40] Maher, S. (1976). Maritime in Islamic Egypt, pp. 231-232-235-237.
- [41] Joseph, J. N. (1969). Crusader aggression on Egypt, Alexandria, p.157.
- [42] Hussein, M. M. (1986). The Ayyubid Army in the era of Saladin, Beirut, pp.292-296.
- [43] Creswell. K. A. C. (1989). *A short account of Early Muslim Architecture*, Revised and supplemented by James W. Allan, the American Univ. Press, p.370-372, fig.240.
- [44] Francis, B. and Ali, M. (1947). Abu Dulaf Mosque in Samarra, Sumer Magazine - Iraq, 3, pp. 76-90.
- [45] Sameh, K. D. (1964). Architecture in the early days of Islam, Cairo, Figs.43-44.
- [46] Al-'ameed T. M. (1976). The Abbasid architecture in Samarra in the era of Mu'tasim and al-Mutawakil, Baghdad, Fig.42.
- [47] Committee for the Conservation of Arab Antiquities. Group 24 of 1907, pp.109:112. Group 25 of 1908, pp.103-108:110. Group 26 of 1909, pp.12-94-139, pl. 2-3-5-6.
- [48] Shayyal, M. J. (1949). Alexandria, Topography of the City and its Evolution from Ancient Times to the Present, Historical Journal, 2, pp. 11-94-210.
- [49] Salem, S. A. (1961). History and Civilization of Alexandria in the Islamic Period, Cairo, p.52.
- [50] Al-Kendi, A. (1908). Governors and Judges, Reffen Kast Inquiry, Beirut, pp.418-419.
- [51] Ibn al-'Emad, (1921-1932). Gold nuggets in the news that went, Cairo, 1, p.334.
- [52] Mursi, J. (1996). Again on the fort of the Caliph al-Mutawakil in Damietta, Journal of History and Future, Faculty of Arts, Minia University, p.233 Fig.2.
- [53] Abadi, M. (1968). Studies in the history of Morocco and Andalusia, Alexandria, pp.299-229.
- [54] Abu Shama (1870). Al-Rawdatain Book in the News of the Two States, Achieved by Mohamed Helmy Mohamed, Cairo, 1, pp.269, 2, p.162.
- [55] Ibn Wasel (1953). Mufrij al-Kroub in the news of Bani Ayoub, Achieved by Jamal al-Din al-Shayyal, Cairo, 1, p.56, 2, p.334.
- [56] Ibn Jubayr (1955). The Journey, published by Hussein Nassar, Cairo, p.41.
- [57] Wolfgang Mueller-Wiener (1984). Castles in the Crusades, tr. by Mohammed Walid Al - Jallad, review Said Tayan, 2, Dar Al - Fikr – Damascus, p.76. Figs.5-14-15-24.
- [58] Salim, S. A. (1968). History of the City of Sidon in the Islamic Period, Alexandria, pp.177-178.
- [59] Al-Tabari (1939). History of the Apostles and Kings, Cairo, 2, pp.354.
- [60] Ibn Daqmaq (1893). Victory for the medium of the decade, Cairo, 5, p.114.
- [61] Al-Maqrizi, (1956). Behavior to Know the Kings States, by Muhammad Mustafa Ziadeh, Cairo, 2, pp.74-129.
- [62] Ibn Batuta (1983). Masterpiece of the minds in the strangeness of the wonders and wonders of travel, Cairo, 10.
- [63] Ibn Iyas (1893). Bada'id al-Zuhour in the Chronicles of the Ages, Bulaq, 2, pp.173-174-189-196-427, 4, p.12.
- [64] Ibn Khaldun (1991). The Book of Lessons and the Diwan of the beginner and the news in the days of the Arabs and 'Ajam and Berbers and their contemporaries of the Sultan's greatest, the Scientific Book House - Beirut, 5, p.465.
- [65] Ibn Taghri Bardi (1926-1975). The Stars of Zahra in the Kings of Egypt and Cairo, 3, Achieved by Muhammad Mustafa Ziadeh et al., Cairo, pp.474-476.
- [66] Harding, L. (1971). The Monuments of Jordan, tr. by Solomon Musa, ed. 2, Jordan, fig.33.
- [67] Berschem M. Van Chateaux du Sultan Qayet Bay à Alexandrie, Corbus Inscip., Egypt, pp.473-474-492.
- [68] Zaki, A. R. (1947). Qaitbay Castle, Army Magazine, 36, p.214.
- [69] Al-Sukhawi (1896). Foundry in the tail of behavior, Cairo, 6, p.209.
- [70] BRIGGS, M. S. (1924). MUHAMMADAN ARCHITECTURE IN EGYPT AND PALESINE, OXFORD UNIVERSITY PRESS, p.125.
- [71] Touson, O. (1939). Note sur les forts d'Alexandrie et des environs, B.S.R.A., Alex.,34.

Notes

ⁱ Ribat: A military facility with a fortified point on the seashore or inside the country. It is defended in important locations or serves as an advanced observation post for a fortified city, where warnings are sent to the danger; every gap in the Islamic era has a Ribat defending its people.

ⁱⁱ Ancient branches of the Nile from east to west: Pelusiac, was hurt at the Ferma (Belluz), Tanitic (or Saitic), Mendesian branch (Mendes) and is known by the sea of Ashmoun pomegranate and is poured into the lake of the house, Mendesian, Tennessee branch (Tannis), known as the Sea of Mois, Phatnitic (or Phatmetic), Fatimid branch (Damietta Branch), Sebennytic, (Samanodi) branch, Bolbitic

Branch (Rosetta Branch), Canopic branch, which has two branches of Shidiya canal (Alexandria Canal), which flows west of the island of Pharos.

ⁱⁱⁱ Perzeus is the son of Zeus, and has been allowed to come with paranormal miracles. Zeus is the greatest deity, and this name was called Amon the Egyptian or Min, symbolized by the Egyptians in the form of a human head with a ram, The Greek community established a temple in the Siwa oasis where they sanctify Amon and Zeus Amon, and Alexander did so in 332 BC. The Greeks used to hold or celebrate the great celebrations.

^{iv} An arrow slit is a narrow vertical aperture in a fortification through which an archer can launch arrows. The interior walls behind an arrow loop are often cut away at an oblique angle so that the archer has a wide field of view and field of fire. Arrow slits come in a remarkable variety. The thin vertical aperture permits the archer large degrees of freedom to vary the elevation and direction of his bowshot but makes it difficult for attackers to harm the archer since there is only a small target at which to aim.

^v The Machicoulies is a balcony that stands out from the walls of the fence, carried by protruding lanterns, and the porch floor is so hollow that the defenders can not prevent enemy forces from trying to break through the fences and doors down Machicouly, and fell on their heads stones and boiled oil and arrows. These were found in the Abbasid Al-Ahkaydir palace in Iraq.

^{vi} An arrow is a shafted projectile that is shot with a bow. It predates recorded history and is common to most cultures. An arrow usually consists of a shaft with an arrowhead attached to the front end, with fletching and a knock at the other.

^{vii} Mangonel was a type of catapult or siege engine used in the medieval period to throw projectiles at a castle's walls. The mangonel threw projectiles on a lower trajectory and at a higher, with the intention of destroying walls, rather than hurling projectiles over them. It was more suited to field battles. The Arabic term manajaniq comes from the same word, It is also possible that it referred to more than one kind of engine, in different times or places, or was a general term. The hybrid mangonel might be loaded by lowering a rope with a hook at its end; this hook was tied to another rope connected to a "pulling" system (this could be a pulley compound, a gear compound, or even an animal traction system) to pull the rope and lower the main beam. Once the beam was lowered a few workers were responsible for the attachment of a sling where the projectile was placed. When the mangonel was loaded the leader gave the order to release the main rod, and at the same time several men (usually around 20) pulled the ropes attached to the counterweight. Well-trained crews could control whether the projectile traveled in a low or high trajectory, which is set primarily by

the fore-aft position of the sling. Poorly trained crews faced the risk of the projectile killing friendly troops or even the crew itself.

^{viii} Greek fire was a firearm used by the Eastern Roman Empire (Byzantine), first developed in 672 AD. The Byzantines used them mostly in naval battles to a large extent, where they can continue to burn them while floating on water. It has provided a technological advantage and has been responsible for many of the major Byzantine military victories, in particular the salvation of Constantinople from two Arab enclaves, thereby securing the survival of the empire.

The impression of Greek fire on the Crusaders in Western Europe was that this name was applied to any kind of incendiary weapon, including those used by Arabs, Chinese, and Mongols. However, these mixtures were different and did not have the same formula as the Greek-Byzantine fire, which was a tightly guarded state secret. Byzantine use of combustible mixtures was also used in compressed nozzles or swords to show liquid to the enemy.

The warships that were manufactured in Alexandria were supplied with Greek fire and used by the Byzantines for the first time during the siege of the city of Constantinople in 54 AH (674 AD)

The Greek fire consists of a mixture of rapidly inflammable substances such as sulfur, oil, lime, pine resin, veneer, calcium sulphide, sulfur or nitride in the form of liquid thrown from a rectangular copper cylinder or fired with burning balls or oil-flavored linens. The cylinders are placed in the catapult and then thrown at the enemy.

The manufacture of this weapon advanced level where it was placed in pottery vessels and placed in the hand of the catapult to throw at the enemy, and was reached a kind of bombs or bottles of oil, which is a pot in which the oil thrown at the forts and castles for burning and added to the combinations make it more deadly.

^{ix} bent entrance is a defensive feature in mediaeval fortification. In a castle with a bent entrance, the gate passage is narrow and turns sharply. Its purpose is to slow down attackers attempting to rush the gate and impede the use of battering rams against doors. It is often combined with means for an effective defense, in effect confining intruders to a narrow killing zone.

This bent entrance is more sophisticated than the one in Baghdad. The latter represents a hall that is accessed by an outside door and takes a rectangular shape, and the interior turns left into another door towards the city.

^x On October 1, 1907, Eng. Thiersch the teacher at engineering school in Munich, Germany, and his son Terch, a teacher at Freiburg College, and Dr. Max van Berchem of Switzerland, submitted a request to the Committee for the Preservation of Arab Archeology to excavate inside the Qaitbay castle in Alexandria. For the maintenance of the

effects and for eight months from 23 November 1907 after the payment of insurance of 100 pounds.

On November 17, 1908, the Commission was informed that when Thiersch and his colleague reached the conditions under which they were permitted to dig the Qaitbay Tabernacle in Alexandria, Van Berchem wrote on 7 July 1908 that he had had private reasons for not being able to participate in the excavation.

On January 30, 1909, Thiersch sent a letter stating that his acceptance of the conditions imposed by the Commission in return for his license to excavate was dependent on the reduction of the sum of the insurance to 50 pounds. The Commission accepted this request in return for Thiersch giving the committee copies of his book *Pharos*.

On May 20, 1909, Thiersch requested the expansion of the agreed drilling sites, but the Committee did not agree with the request and considered that when the work specified in the contract began, it was possible, in agreement with the competent authorities, to consider whether the excavation work requested could be carried out elsewhere, and Thiersch apologized for the possibility of sending the *Pharos* book requested by the Commission on the pretext of the effectiveness of copies he had.

On October 17, 1909, he sent a letter informing the Commission that he hoped to start work in March 1910 and that he had written to the Alexandria municipality to share with him the expenses. Therefore, he did not carry out any excavations at the castle, although the committee did not reject this.

^{xi} Tanks (rams): It is a great machine that enters beneath it from the fighter. A great creation, clad in iron sheets, with a calf under it. It has a great head with a heavy iron neck. It is called rams (kebash). And when they reach their target near the walls, the warriors would climb on it or enter its cavity, and now they would destroy the walls and demolish them as well to climb the walls with their hands and arrows and spears and throw the enemy soldiers inside the fortress.

^{xii} Although the guns were known to the Chinese since 618 BC., the Arabs used them in several wars and they made them of wood and strap them with ropes and coating them for durability but the oldest picture of the cannon in an ancient manuscript dating back to 1226, was a vessel And the shell was a copper arrow stuffed from the mouth of the cannon and behind it the gunpowder was ignited by igniting a piece of charred coal and putting it into the ignition. The shells were fired, and the first projectiles were also heavy stone balls known to the Arabs In Spain during the century Olathe ten, and did not invalidate the fourteenth century only swept the guns of European armies.

The most recent date of the earliest history of health was the use of or invention of the gun between 1320 and 1325. There were no indications that firearms were used by Arabs, Moroccans, English, Scots, Germans and others during the

second quarter of the fourth furnace ten, and there is a cartoon drawing of cannon in the shape of a pot with a nozzle in one of the English manuscripts at the Christchurch Library in Oxford in 1327.

^{xiii} The guns were first used in Cairo in the spring of the second of the year 768 (December 1366), where Prince Yalbugha near the castle of the mountain on the opponents of the oil and used oil balls of iron and oil in the Mamluk era as well.

Al-Qalqashandi describes the defender as saying: The oil spills are the guns that are thrown at the oil and its condition is different. Some of them are thrown away with bones that almost burn the stone. Some of them are thrown with a ten-pound nut to more than 100 pounds. I saw in Alexandria in the era of the Ashrafia state Shaa'ban bin Hussein Salah al-Din ibn 'Arram was cannon made of copper and lead and tied with iron ends, which he threw in the field with a great iron gun, which fell in the sea of the chain outside the sea door, which is a long way away.

It can be concluded from this that the cannula was used in Egypt in the middle of the 14th century, but its use was limited, and it remained until the era of Sultan Qaitbay when the manufacture and use of the ankles was mastered. Short and these were shipped to the ports of Egypt in Bahrain Red and White Mediterranean to strengthen the coastal fortresses and for use in warships.