

## **An Unpublished Water Cistern at Akoris**

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### **Abstract**

This article is the first publication of a water cistern at Akoris. It gives a preliminary architectural description of the water cistern and suggests that it dates back to the Roman Period on the basis of its location near Roman-date quarries at Akoris and architectural similarity with Roman-period water cisterns uncovered at Tal Aviv, which is known as the pool of Solomon. Also, in Jordan one can find similar cisterns datable to the Roman Period.

### **Introduction**

Although neglected in comparison with other archaeological features, the study of ancient Egyptian water supplies can add immensely to our understanding of ancient Egyptian technology related to water supply resources, on the basis of a diachronic overview of the structures that have been found in different areas like Alexandria, Tanis, Mons-Porphyrates, and Akoris.<sup>1</sup> There is no archaeological evidence for water wells or cisterns all over Egypt prior to the Amarna Period. At the rise of the Nineteenth Dynasty, especially during the reign of Ramesses II, many remains indicate the existence of water supply resources.<sup>2</sup> Difference between ancient Egyptian civilization and earlier Greek civilization are not confined to cultural issues, but also extended to infrastructure conditions related to water supply resources. The ancient Egyptians relied on the Nile as the main source of water, but Greeks built wells and seem to be the first in history to use the pressure flow. When the Romans

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<sup>1</sup>Zaghloul 2016: 19.

<sup>2</sup>Habachi 1980: 13-16.

conquered Egypt, they introduced a new source of water, namely rainfall that was collected through the cisterns, as well as more convenient life style in dry climate and the distance from major water bodies led to the development of advanced hydraulic systems for the collection and transport of water as well as sustainable management practices.<sup>3</sup> The Romans were more pragmatic than their Greek predecessors in the manner that they planned and constructed the water supply system. They, for example, built what can be called mega water supply systems including many predominantly ground water, but the Greeks avoid surface water because of hygienic reasons.<sup>4</sup>

The first water cistern was dug in the middle of the bronze age, about 2200-1200 BC, where rainwater that was collected in them during the short rainy season would be enough for at least one dry season.<sup>5</sup> Cistern construction and use varied in intensity over time and space like the cistern of Mons Porphyrites (figure 9), also some remains from the cistern of Tanis, it is built not cut like Akoris (figure 8), to separate mud and sand before the water was let into the main cistern. Water quality is of concern especially when the rainwater is to be used for drinking. Rainwater and atmospheric dust that are collected by roof catchments contain certain contaminants which may pose a health threat to those consuming the water. Lead and other pollutants may accumulate in cistern bottom sediments, and untreated rainwater is quite corrosive to plumbing system.<sup>6</sup> Measures must be taken to minimize these and other water-quality problems in cistern system. Rainwater cisterns can provide water of adequate quantity and quality if proper steps are taken in the planning and construction stages and periodic maintenance is performed throughout the life of the cistern.<sup>7</sup> A cistern should be located where the surrounding area can be graded to provide good drainage of surface water away from the cistern.

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<sup>3</sup>Koutsoyians 2008:23.

<sup>4</sup> Larry 2008: 278.

<sup>5</sup> Adams 2012: 10.

<sup>6</sup> Ronald 1996: 43.

<sup>7</sup>Zaghloul 2016: 13.

Avoid placing cistern in low areas subject to flooding. Both of the above steps will reduce the chance of storm runoff contaminating the stored cistern water. The interior walls and the floor of the cistern should be smooth to make cleaning easier.<sup>8</sup> The cleanout drain line should be at least 5 inches in diameter to avoid clogging. Cistern should be vented to allow fresh air to circulate into the storage compartment. Cistern design depends on the amount of rainfall available for collecting that rainfall; the daily water requirements of the area; and the economic activities if it was trading, mining, or irrigation.

### **The Water Cistern at Akoris**

Before going into a full architectural description of the water cistern at Akoris, it is essential here to start with a short discussion of the stone quarries at Akoris since it highlights the importance of the construction and function of such a water cistern at Akoris. Many unfinished Greek and demotic graffiti are confirmed on the ceiling of the hewn gallery uncovered to the north side of the water cistern at Akoris, suggesting the presence of both Greek and Egyptian quarrymen at the site. The first documented evidence that refers to the exploit of the quarries at Akoris dates back to the reign of Emperor August.<sup>9</sup> The quarries of Akoris are located to the south of the site between Akoris and the necropolis of the Old Kingdom, which is better known as Fraser tombs.<sup>10</sup>

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<sup>8</sup>Dialynas 2005: 15.

<sup>9</sup>Fitzler 1910: 95.

<sup>10</sup>Kessler 1981 248.

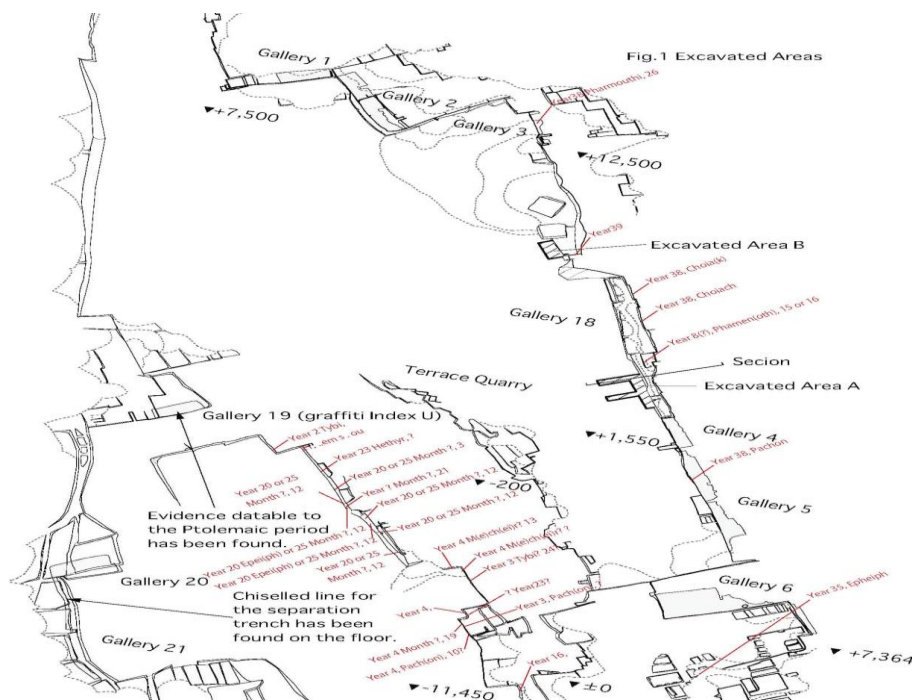


Figure 1. The plan of the Akoris quarries, illustrates the location of the cistern (Hori 2008: 81)

The presence of extremely large unfinished limestone blocks at the site confirmed that the export of such stone from Akoris was decisive in generating such close contact of the local inhabitants with the Greek world via Alexandria. The size of these blocks indicates that they were intended not to be used locally, but to be shipped out to the most prosperous city of the contemporary world, Alexandria.<sup>11</sup> Stone blocks are defined by cutting separation trenches along the back and sides with a pick, and then they were split from the bedrock by using wedges or by applying levers to a continuous groove. Here quarrymen actually began to cut a horizontal separation trenches following the cracks, which have been produced by wedges in the Roman Period (figure 2).<sup>12</sup> This method is similar to the one used in Saint Catherine area.<sup>13</sup>

<sup>11</sup>Suto 2012: 22.

<sup>12</sup>Suto 2012: 13.

<sup>13</sup>Petros 2013: 8.



Figure 2. The method of cutting the stone blocks at Akoris (author)

The Japanese investigations of the site strongly indicate that the main industry of Akoris in the Graeco-Roman Period was the mining of the nearby limestone quarries and the dressing of the large blocks from them for shipping in the vicinity of the village port.<sup>14</sup> The workforce in Akoris had to be supplied with food and water. Apart from the monthly supply of grain rations as part of the wages for the employees, the analysis of botanical and faunal remains give us an idea of the range of imported goods.<sup>15</sup> Hirte mentioned that the collection of barley and wheat for the quarry workers in the eastern desert was organized on similar lines to the grain supply of the Roman army; the barley was collected from the village by the soldiers of the unit.<sup>16</sup> The animal bones discovered near the quarry suggested that various animals, such as pigs, camels, goats, sheep, and chickens are domesticated for food, while horses and donkeys were used for work. Fish and molluscs were mainly imported from the Red Sea, but some freshwater fish from the Nile was also available.<sup>17</sup> Judging from a Greek inscription at Akoris, which was carved near the water cistern on the ceiling of the Roman quarry, Titus Egnatius Tiberianus, a centurion of the Legio III Cyrenica, was in charge of Akoris quarries, which supplied stone for

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<sup>14</sup>Suto 2012: 22.

<sup>15</sup>Peacock 2007: 34.

<sup>16</sup>Hirte 2001: 214.

<sup>17</sup>Hirte 2001: 214.

paving Alexandria during the second year of the Emperor Domitian. The inscription is a dedication for the great god Zeus the source of welfare, and the great gods, who dwelled in the temple.<sup>18</sup> As it is illustrated in (figure1) the plan of the quarries at Akoris, in the south west of the plan (fig 1) when can dedicate the location of the cistern beside the Roman quarries area.

Akoris is a small village located in Minia governorate on the east bank of the Nile , about 243 km south of Cairo, and 12 to the north of the modern city of Minia, the current name of the city called Tehna, Akoris was an important village during the whole history of Egypt, as it was dated back to the pre-dynastic Period, because many flint tools and burial places were found on the west side of the crag.<sup>19</sup> The village called R-int, which means the mouth of the valley, during the Old Kingdom.<sup>20</sup> Upon the rise of the Middle Kingdom the village received a new name, which was called Mr-nfirt, which means the fine canal, when the rulers of Thebes evacuated the foreign rulers, Hyksos, out of Egypt the village was called Pr-Imn-mei-khenty, which means the house of Amon the foremost lion.<sup>21</sup> At the close of the Twenty-nine Dynasty the name of the village changed in on Akoris.<sup>22</sup> The water cistern at Akoris is located on the south of the city, about 45 minutes walking to the south of the main temple, on the top of a flat plateau opposite the mausoleum of Sorufin Pasha. It was dug near the Roman-dated quarry, suggesting a Roman date for the water cistern. In comparison with other water cisterns in Egypt, one can suggest that the cistern at Akoris is different in its architectural design. It consists of three different water basins: the first is rectangular, the second is circular, and the third has an irregular shape. They are engraved in the stone of the mountain and their walls are covered with plaster to prevent water leakage. The surrounding area is still unearthed. Next year the Japanese mission will undertake some excavations in this area, which hopefully may provide more information about

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<sup>18</sup>Bernand 1986: 35.

<sup>19</sup> Kawanishi 2005: 8.

<sup>20</sup> Kessler 1981: 238.

<sup>21</sup> Gomaa 1986: 123.

<sup>22</sup> Drew-Bear 1974: 47.

the site. Judging from the shape of the complex and the location of the basins, they are located on the top of a flat plateau to catch the rains, to decrease the evaporation of the water, and to be away from any pollution. I like to suggest that the basins are water reservoirs to supply the quarrymen with water as one can find the draining pipe in the western basin; it is pottery pipe penetrating the west wall with a diameter of about 7cm.



Figure 3. General view for the Roman water cistern (author)

### ***The Western Water Basin***

This basin is rectangular in shape and measures 4m from the east to the west (figure 1), and 3.5m from north to south (figure 2). It has three dummy doors, one on the east side and two on the south side. In the middle of this basin, there is a small structure that looks like a water fountain. The basin is partly filled with rubble and debris.



Figure 4. The southern water basin (author)

### ***The Main Water Basin***

The main basin is nearly square in shape (figure 3), measuring 5.75 from north to south and 5.55 from east to west. It has 8 steps leading down to the floor of the basin. The walls of the water basin are originally covered with plaster, some remains of which still exist on the walls.



Figure 5. The main water basin (author)

### ***The Third Water Basin***

It is circular in shape and measures 5.90 in diameter (figure 4), it has a rectangular opening leading into the eastern basin, and its walls are covered with plaster. It seems that the water basin has a staircase, which is still unearthed.





Figure 6: The circular water basin (author)

### ***The Eastern Building***

It is a small square building, looking like a house and measuring 6.70m from north to south and 6.40 m from east to west (figure 5). This structure is perhaps the changing room, it has staircase on the north-western corner, and this staircase leads to a narrow corridor. It has three rooms, two in the east part flanking each other and one in the west part. Also it does not have any connection with the water basin. Comparing with other water cistern, we can note that Akoris water cistern is very unique than the other cistern around the area.



Figure 7. The eastern part of the water cistern (author)

When compared with other water cisterns at Mons Porphyrites and Tanis, the basins of the water cistern of Akoris are cut in the heart of the rock, but other cisterns in Egypt are always built of fired brick. The water cistern at Mons Porphyrites dates back to the Roman Period. When compared with the water

cistern of Akoris, one can conclude that the water cistern at Mons Porphyrites is very simple in its architectural design. It consists of a square basin which is cut in the ground and is covered with a thin layer of mortar; it has also a small structure which was built around the water basin to keep any pollution away from the basin.<sup>23</sup> Similarly, the water cistern of Tanis dates back to Roman times; it consists of different water basins of burnt bricks, which are connected to each other through thin water pipe, but it was renovated during the Islamic Period.<sup>24</sup> Judging from a similar cistern at Tal Aviv,<sup>25</sup> though larger in scale, one is inclined to suggest that the water cistern at Akoris is Roman in date, with no evidence of earlier Ptolemaic activities. Both the water basins at Akoris and Tal Aviv are rectilinear in plan and often comprise basins segmented into three compartments; they have small channels near their bases that permitted water to flow from one basin to the others.<sup>26</sup> In the western main basin of Akoris, we can find the remains of a pottery pipe that has been used as a draining system, washing the basin to remove any silt remains out of the basin. Most of the Roman water cisterns are built near the forts or the quarries, suggesting that the government, primarily through the military, took responsibility for most aspect of water acquisition and also for its storage and distribution. The government collect revenues through an official called *hydreumaton*.<sup>27</sup>



Figure 8.A water cistern at Tanis (Zaghloul 2016: 5)

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<sup>23</sup>Peacock 2007 37.

<sup>24</sup>Zaghloul 2016 7.

<sup>25</sup>Avraham 1962: 23.

<sup>26</sup>Avraham 1972: 34.

<sup>27</sup>Adams 2012: 35.



Figure 9.A water cistern at Mons Porphyrites (Peacock 2007: 34)



Figure 10.The water cistern at Tal Aviv (Flavius 2014: 186)

## **Conclusion**

The water cistern at Akoris is unparalleled in Graeco-Roman Egypt, being consisting of three rock-cut interconnected water reservoirs. It was carved on a flat plateau to catch the rainwater and supply the quarrymen with their daily needs of water. It can be dated to the Roman Period, probably to the reign of Augustus, because of its location near the Roman-dated quarries and architectural similarities with Roman-period water cisterns at Tal Aviv and Jordan.<sup>28</sup>

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<sup>28</sup> Oleson 1986: 43-51.



Figure 11. The water cistern in Jordan. (Oleson 1986: 43)

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## خزانات المياه فى أكوريس

### الملخص العربى

فى ضوء هذا البحث سوف نتعرف على خزانات المياه فى أكوريس التى تقع فى الناحية الجنوبية للمدينة فوق الهضبة الجيرية الأكوريس وإلى جنوب المنطقة الحرفية للمدينة القديمة، وكان الهدف الرئيسى لهذه الخزانات هو تجميع مياه الامطار وتزويد عمال المحاجر بمياه الشرب وقد تم بناء هذه الخزانات فى منطقة مسطحة قريبة من محاجر العصر الرومانى، ومن خلال مقارنة بسيطة بين خزانات أكوريس وبعض المناطق المحيطة فى داخل مصر مثل تانيس، وهو عبارة عن ثلاث أحواض متصلة ببعضها البعض ومغطاة بالطوب الاحمر، وبعض مناطق الصحراء الشرقية وهو عبارة عن حفرة مربعة الشكل مغطاة بطبقة من الملاط وبعض خزانات المياه فى الدول المجاورة التى ترجع إلى نفس الفترة كما فى الأردن و فلسطين وهى عبارة عن أحواض مربعة الشكل بنيت فى مناطق منخفضة لتجميع مياه الامطار، ولكن تتكون خزانات أكوريس من أربع أحواض مختلفة الأشكال والأبعاد يقع الحوض الرئيسى إلى الناحية الغربية وهو عبارة عن شكل مستطيل متصل بالحوض الثانى الذى يقع فى الناحية الشمالية ويتصل بالحوض الدائرى الشكل من خلال فتحة فخارية صغيرة والحوض الشرقى الغير منتظم الشكل وكان بغرض تدفئة المياه. ومن خلال هذه المقارنة يمكن إثبات أن خزانات أكوريس هى الفريدة من نوعها فى هذه الفترة حيث أن كل حوض كانت له وظيفة تختلف عن الآخر.