

## MN-111

### From Ancient Time to Present: Development of Drinking Water Resources System in Şanlıurfa

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## INTRODUCTION

Şanlıurfa (Urfa or El-Ruha or Edessa) is one of the most ancient settlement areas in the world. The first findings of the city go to 11500 (B.C). Before Christ, the city hosted Kingdom of Ebla, Acadian Empire, Sumerians, Kingdom of Assyria – Medes, Persians and Macedonians - Alexander the Great. After Christ, Soreness, Romans, Syrians occupied the city. The Islamic Period began by Turks in 1071 and continued by Ayyubidians, Ilkhanatians, Jalayirids, AqQoyunlu's, Mamluks, Safavids and Ottomans.

Due to old civilizations, there are several ancient water structures such as pipes, aqueducts, tunnels, reservoirs, cisterns and wells which deliver water to them. City centres are decorated with water structures such as Turkish baths, Çimecek (a Turkish bath for only one person), aqueduct, water gauges, maksems (water distribution structures), wells, fountains, public fountains, cisterns and charity structures in the region.

Most of the historical sources describe Şanlıurfa as a “city abundant in water” although it is located on the hot and arid region of Anatolia. One of the ancient names of Şanlıurfa “Orhay” is accepted as a distorted version of “Kallirrhoe” (beautiful city of watercourses), or a name derived from the themes in Sami language “wrh” (water), or in Arabic “wariha”(abundant in water).

Another claim put forward is that The Seleucids, who conquered Şanlıurfa and ruled the city between 334-136 B.C, noticed the abundance of water sources in Şanlıurfa and seeing the similitude between the city “Edessa” lying in their own country's map, they named the city as “Edessa”. The present name of Edessa in Macedonia “Vodena” comes from “Voda” (water) (Segal, 2002).

Both of these aspects show us that Şanlıurfa is abundant in water sources. Until very recent times, there were lots of water sources in the centre of the city and the vicinity of the area, such as ; Khalil-al Rahman and Aynzeliha Lakes, Karakoyun Stream (Daisan River), Water of Direkli, Devteşti, Bamyra, Cavsak, Kehriz, Karaköprü. Apart from these, water of Yukarıkoymat, Gölpınar, Anzelişınar, Germuş, Belih, Tülmen, Cülmen, Tatarhöyük, Yarımtepe, Esemkulu, Kırkpınar, and Köprülük were some of the most important water resources of Şanlıurfa. (Kürkçüoğlu, 1992).

Lessening of rain and snow due to the global warming and some other reasons have caused the majority of these water sources to dry up. It is understood from the acquired archaeological heritages that, in this city of ancient age, which has important water sources according to the historical sources, there had been important practices to solve the problem of using the water. Water, brought to the city from kilometres away, was gathered in tanks

and reservoirs drained from the glorious fountains and the big Turkish baths. The wastewater was disposed from the city by the settled sewage system.

The water resources and water structures of the city were partially mentioned in the studies and literary works about the history of the city. But researches made for the historical water structures of the city, especially in terms of engineering are so scarce. The aim of this paper is to define the technological details of the water structures in Şanlıurfa and create an archive of them. In the scope of this study, water structures in Şanlıurfa that were built since the ancient times were investigated.

## **MATERIAL AND METHOD**

This study is based on the field investigation of the physical remains of urban water systems of Şanlıurfa which is one of the historical cities hosted various civilizations through the history. The water system is documented by using the traditional measuring and recording techniques such as hand-measurement and photography.

## **WATER SUPPLY STRUCTURES AND THEIR FEATURES WITHIN THE HISTORICAL PROCESS**

Water Structures in Şanlıurfa consist of Charity Structures and Cisterns, Turkish Baths, Aqueducts and dams, Water Gauges, Maksems, Bridges, Public Fountains, Wells, Fountains, Karlıks (pits where snow is stored).

Structures, built for the benefit of the public are generally called as "Hayrat" (Charity Structure) such as schools, fountains, bridges, taverns. However in Şanlıurfa, only water structures that consist of a tank caved into rock soils, built to meet the need of water of passengers and animals on their ways routed in rural and mountainous areas are called as Hayrat. Rains help Hayrats fill the sources of them with water. Rain waters are stored in Hayrats by the various water shipments caved into rock.

Building dates of the Hayrats in Şanlıurfa are unknown as they don't have epigraphs except for the Hayrat of Firuz Paşa, but depending on their styles, it is possible to put them in two groups: "Pre-Islamic Age" or "Islamic Age". It is estimated that Hayrats of Pre-Islamic age belongs to Roman Age, while the ones of the Islamic Age belong to Ottomans.

The oldest Hayrat in Şanlıurfa is the one known as "Yakup Well" in Harran. Hayrats of Mehemed Han, Harapspor and Kırılık Village are estimated to belong to Ottoman era. Hayrats of both ages have the same characteristics as they were carved into rock soils.

Except for the Hayrats, there are also lots of cisterns carved into rock soils in Şanlıurfa. The two biggest ones are the Cisterns of Çardak and Deir Yakup Monasteries that belong to Roman Age. Both two cisterns later were used as a house by building a door on the base line.

### **Hayrat (Charity structure) and cisterns**

Hayrats (Charity Structures) are water storage structures built for use of passengers and animals and on the access roads. Hayrats are classified into 2 groups as those of pre-Islamic period and Islamic (Ottoman) Period.

*Charity Structures and cisterns in pre-Islamic period.* Well and Hayrat of Jacob: Well and Hayrat that were attributed to Jacob, were built long before Christmas and stands 10 meters distant to each other on the northwest of the city walls (Figure 1). The well on South has a depth of 5 meters and is surrounded by gems. On Bilezik Stone of the well there are some

abrasions made by the ropes of the buckets. Bilezik Stone was built to 1 meter up from the bottom, on a platform made of stone. Jacob's Hayrat is on the North of the wall. There is a stairs of 8 flights in the Hayrat. Hayrat has a length of 5 meters to the South and a shape that gets narrowed by its edge. Well and Hayrat of Jacob is a natural water source and does not get provided by the rain waters like the other Hayrats in Şanlıurfa.

The only visual document about the Well and Hayrat of Jacob we have is the gravure published by George Percy Badger (Figure 2; Badger, 1850). Figure 3 shows the villagers of Harran near the well and Hayrat of Jacob at the end of 19<sup>th</sup> Century (The source of the picture is not known).

*Hayrat of Mehemed Han.* It is in the village of Mehemed Han (Dağyanı) of Çamlıdere. The road on the 55<sup>th</sup> km. of the highway between Şanlıurfa and Mardin reaches to Mehemed Han after 3 kilometres. The Hayrat on the north side of the village which is estimated to belong to the Roman Age has length of 15 meters, and a width of 5 meters was carved into rock soils, and its surface is covered with big hewn stones and vault. It is one of the biggest examples of Hayrats in Şanlıurfa (Figure 4 and 5).

Rain water was accumulated in the depot of the Hayrat by lots of water channels that were carved into rock soils. Hayrat, which was photographed by Max von Oppenheim in 1899 was described as a "Big Water Depot" in the photo archive of Oppenheim.

*Kırlık Village Big Hayrat.* It is 2 kilometres away from the South of Akkese village after arrival at the Kırlık village on the 13<sup>th</sup> kilometres of the highway between Viranşehir and Şanlıurfa. It is estimated to belong to Roman era.

The Hayrat, which was built on a rocky area, can be entered via a stair on South carved into rock. After passing through an entrance tunnel which lies towards North, it goes on with a large square which is actually a cistern, where the water is preserved. A tunnel with a length of 20 meters was carved on the north side of this part. It is estimated that rain water was accumulated in this tunnel. But, as the tunnel is filled with clay delivered by the rain water throughout years by the rain water, it is unknown if or not it has more length.

It is estimated that the caves that have a length of 3-4 meters from the ground level, were carved by the cloistering monks, near the entrance and water gathering tunnels, during the first years of Christianity. Today, this water facility is not used (Figure 6 and 7)

*Kırlık Village Small Hayrat.* It is on the 13<sup>th</sup> kilometre of the highway between Viranşehir - Şanlıurfa and it is in Kırlık Village on the left side. The surface of the water gathering pool which has a length of 20 meters and a width of 4 meters of the Hayrat on the east side of the village is covered with vault. The entrances on the north and south sides of the Hayrat were covered with a wall for the purpose of security and now they are out of order. Two air shafts were opened on the vault with a distance to 6 meters to each. (Figure 7; Kürkçüoğlu, 2005). This Hayrat is also estimated to belong to Roman era like Kırlık Village Big Hayrat.

*Harapsor Hayrat.* It is on the 9<sup>th</sup> kilometre of the highroad of the highway that leads to the villages of İkizce, Bildim and Küçük Çaykuyu, on the 5<sup>th</sup> kilometre of the highway between Şanlıurfa and Akçakale. It is known that watch towers and castles were built between Halfeti and Şanlıurfa by the Roman emperor Septimus Severus who made Şanlıurfa a Roman province after a campaign against the "Parts" in 197. It is estimated that Harapsor was used as "headquarters". This structure, whose heritages were acquired, Hayrat, used by the soldiers, and rock graves should have been built during this period.

The Hayrat which is carved into the rocks and has a depth of 6 m. had a shape of a rectangle whose long sides were laying in the direction of North and South. The cover of the Hayrat which is estimated to be originally covered with vault doesn't exist now. On the walls of the Hayrat, which has a stair of 8 stairs on south, there is no sign or inscription. Hayrat is now partially filled with stone and earth and is not used.

*Monastery of Çardak and Big Cistern.* It is on the northwest in the mountainous area on southeast of Şanlıurfa with a 1 km. air distance to Monastery of Deir Yakup. In the 5<sup>th</sup> century Çardak Monaster was serving as a monk centre in Edessa (Şanlıurfa). Çardak Monastery consists of monastery heritage, caves where the monks resided, and cisterns (Kürkçüoğlu 2000).It is on a hill of the hill where monastery heritages and monks caves are. Later a door was built on the south part of the cistern and it was used a housing area (Figure 8). There is an edge on the cistern that has a shape of funnel and which was carved into rock. By the water ways around, carved into rock, rain water was accumulated on the edge of the cistern. Little rectangular and square retention ponds with a profundity of 20 centimetres were carved near the water way.

*Deir Jacob Monastery Big Cistern.* Deir Jacob, 4 km away from the tomb of Prophet Eyyub, is named as "Nemrud's Throne" or "Gin Mill" among the public. Here, on a hill of high mountain top, there are ruins of monumental tombs built for family members of Arryo, son of the Abgar Mano, in the 1<sup>st</sup> century B.C. In this structure named as "Monastery" by some sources, there are some cisterns carved into rock to meet the need of water of people. (Kürkçüoğlu, 2005).The largest cistern, of the Jacob Monastery is located in north eastern slope of the Monastery. There is a round edge carved into rock in the form of a funnel on the cistern. Retention ponds and waterways carved in the rock that deliver water to the cistern, are located around the edge. Just like the cistern of Çardak Monastery's, a door was built in the middle of the east side of this cistern and it has been used for the purpose of settlement.

### **Charities of Islamic (Ottoman) Period**

*Akabe Hayrat.* This Hayrat, located on Akabe area of the road between Şanlıurfa and Birecik, is estimated to be the work of late Ottoman periods. A properly opened hole, covered with vault, carved into rock with a length of 20 m, a width of 6 m, a depth of 3 m, is the water reservoir of this Hayrat. There is a stone stairs of four steps on the water reservoirs' north and south directions. Rain water is filled to the Hayrat by the channels carved into rocks around, from the edges of stairs and the holes properly opened on the walls on east and west (Figure 9).

*Hayrat of Firuz Paşa.* It is a Hayrat carved into rock soil, on the 12<sup>th</sup> kilometre of Şanlıurfa-Birecik highway. A properly opened hole, with a length of 15 m, a width of 5 m, a depth of 3 m, is the water reservoir of this Hayrat. With a hole, 4 m. diameter, 2 m. deep, on the northern part of the floor, the reservoir was also deepened. Throughout the long edges of the reservoir, lintels, made of properly cut stones, were thrown so that the top of the Hayrat was blocked. As they were not straight, stones on east were placed as one row, and the ones on west were placed as two rows (Figure 10).

*Hayrat of Şebeke.* This Hayrat, carved into rock, is located on the 20<sup>th</sup> km. of the highway between Şanlıurfa and Birecik, in area of Şebeke, has stairs carved into rock (Figure 11). Also there is a round edge on its surface, serving to gather water like the cisterns. Channels were opened into rock soil to accumulate rain water in the Hayrat.

*Hayrat of Sarı Mağara.* Hayrat, located on the 24<sup>th</sup> km of the highway between Şanlıurfa and Birecik, is estimated to be work of 18<sup>th</sup> century, and is estimated to be built by Ottomans. A rectangular hole, with a length of 15 m, a width of 5 m, a depth of 3 m, is the water reservoir

of this Hayrat. Surface of the reservoir is fully covered with barrel-vault and hewn stones (Figure 12). There is a stairs carved into rock, with a width of 1.40 m, on the reservoir of the Hayrat. Rain water is accumulated in the Hayrat by the channels craved into rocks around, from the edges of the stairs on the north and south.

#### *Hayrat of Edene Village Road*

This Hayrat, within the borders of the Osmanbey village, is rectangular and has a length of 15 meters, and a width of 5 meters. Reservoir of the Hayrat is 5 meters long and on this reservoir there is a barrel vault built of cut stones. The south western part of the vault is destroyed (Figure 13). Side walls of the Hayrat are plastered with a plaster with a mixture of ash and lime. It can be entered to Hayrat by the stairs carved into rock on southwest. Channels, delivering water to the Hayrat, were carved into the rock.

*Hayrat of İközce Village.* It is located on İközce area of Karaali Village of the central district of Şanlıurfa. It is estimated to belong to Ottoman era. Hayrat, which extends to north-south direction in a rectangular shape, has rock-carved stairs on the north. In Hayrat, carved into a slant and mountainous area, rain water is accumulated by natural fluxes, and specially opened thin channels.

*Hayrat of the Kapaklı Village.* It is located on the 46<sup>th</sup> km. of the highway between Şanlıurfa and Viranşehir, in Kapaklı area of the Açıkyazı (Silesor) Village of Çamlidere. It has been recorded by the German researcher Max von Oppenheim in 1899 (Figure 14; Oppenheim 2011). The side walls of the Hayrat, which was carved into rock on east-west direction, are expanding into the ground. Surface of the Hayrat is covered with hewn stones in the middle.

*Hayrat of Çar Melik.* This Hayrat, built underground by carving the rocks, is located on the east side of the Mosque of Çar Melik Village of Bozova district. It is rectangular on east-west direction. On the north of the Hayrat, an edge was built to pump water. And also there is laddered-long entrance on the east side (Figure 15).

*Hayrat of Tülmen Village.* This Hayrat, about which we don't have any photos, was located near Tülmen Village of the highway between Şanlıurfa-Bozova, but it was destroyed during the extension operation of the road.

### **Aqueducts**

Karakoyun (Justinian) Aqueduct located between Samsat and Millet Bridges on Karakoyun River was built to deliver the water of Kehriz, on the north, to the city. It is the unique example of aqueduct architecture in Şanlıurfa (Figure 16 and 17).

This aqueduct is estimated to be built with the channel of Justinian by the Byzantine Emperor Justinian. It is also estimated to be repaired by the "Qara Qoyunlus" (Black sheep Turkomans), during the extension of the channel.

### **Water Gauges**

Water gauges, that have a plain architecture, are the works of art of a basic physics system. They are built to deliver water to high areas. According to the information we have; there was a water gauge on the south of the Karakoyun aqueduct, delivering water to the makam in Kadioğlu Mosque. It is also understood from the old pictures that, there was a water gauge on Hizmalı Bridge, too (Figure 18). But these water gauges do not exist today.

## Water Maksems

Water, brought to the city via aqueducts and underground water conduits, was accumulated in a place (maksem) and was transferred to the city by "Lüles"(a lüle is a small pipe). Fountain of Kadioğlu mosque and its reservoir was built by a beneficent person with the epithet "Emencekzade" in 1723, and they were serving as a maksem (Kürkçüoğlu 1992.)

## Drinking Fountains

Drinking fountains are small zones from which the society can take water freely. These drinking fountains are made of marble or matters like this, with a tap on top and a hidden tank carved into the rocks. Water comes either from its source or is brought by inner tubes and kept in the tank. (Önge, 1983). Today, there are 15 known drinking fountains in Şanlıurfa.

## CONCLUSIONS

Because of the mankind's vital need of water, there are various types of water structures in every civilization. Since Şanlıurfa hosted lots of civilizations throughout the centuries, it had many water structures of various types.

Water structures in Şanlıurfa, can be divided into these 3 groups, according to their building dates: Before Christ, Pre-Islamic Period (Roman Period) and Post-Islamic Period. The oldest Hayrat in Şanlıurfa, Hayrat of Jacob, belongs to Before Christ Period. Hayrats of Kapaklı Village, Mehemed Han, and Big & Small Hayrats of Kırık Village are estimated to belong to Roman Period. Other Hayrats belong to Ottoman era. When examined in terms of engineering, although cultural structures don't have the same characteristics, it is noticed that water structures do. Also, in Şanlıurfa (like in other places) it is noticed that although, the settled communities have destroyed the cultural structures, they have protected and have developed water structure systems. This situation caused water structures to last to present.

There are Hayrats in various places of Anatolia with different names. But the main difference of the ones in Şanlıurfa is that they were carved into rock instead of being built by hewn stones on ground levels.

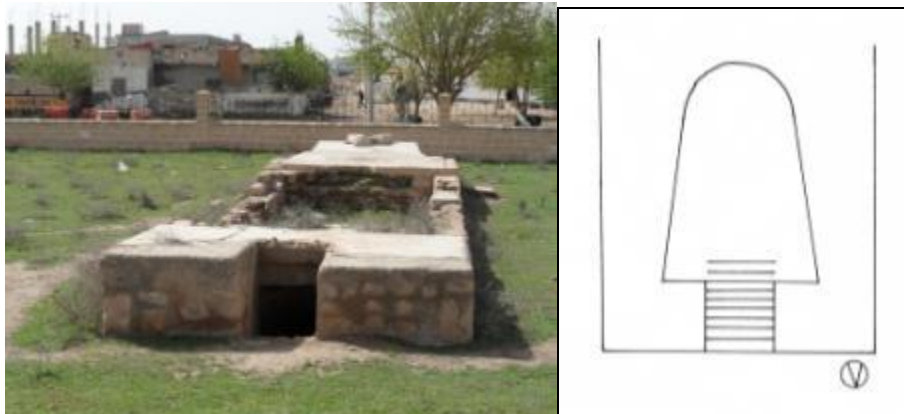
The difference of the Hayrats of the Post-Islamic period, from the ones in Anatolia is, they were built on way routes for passengers and animals, and their upper surface was also used as "*namazgah*" (a place to pray). However, only the *mihrap* (niche in a mosque wall indicating the direction of Mecca) of Hayrat of Akabe' have survived until today.

Most of the historical water structures in the area are still used. From engineering point of view, water systems of ancient times have the same characteristics with the ones of 21<sup>st</sup> century; even they were built with less technological capabilities, as expected. Also compared with the contemporary ones, it is noticed that they were designed to give minimum damage to the environment.

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**Figure 1.** Well and Hayrat of Jacob with its plan



**Figure 2.** Gravur of well and Hayrat of Jacob (Badger, 1850)



**Figure 3.** The villagers of Harran near the well and Hayrat of Jacob at the end of 19<sup>th</sup> century

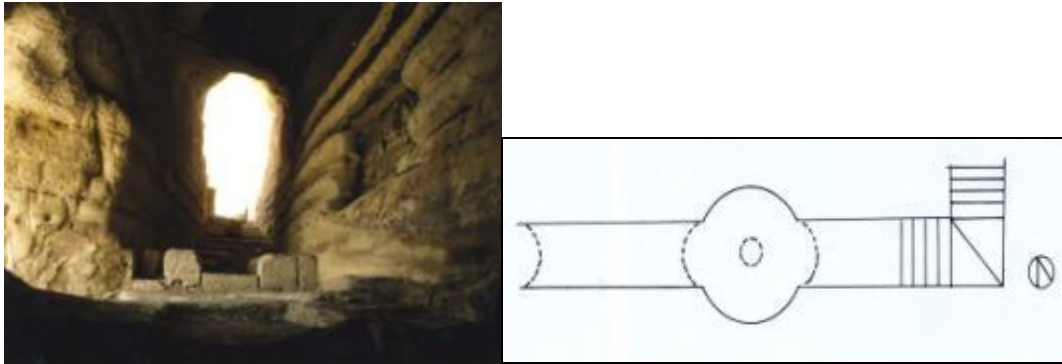


**Figure 4.** Mehemed Han Hayrat with its plan



**Figure 5.** Mehemed Han Hayrat from oppenheim archive

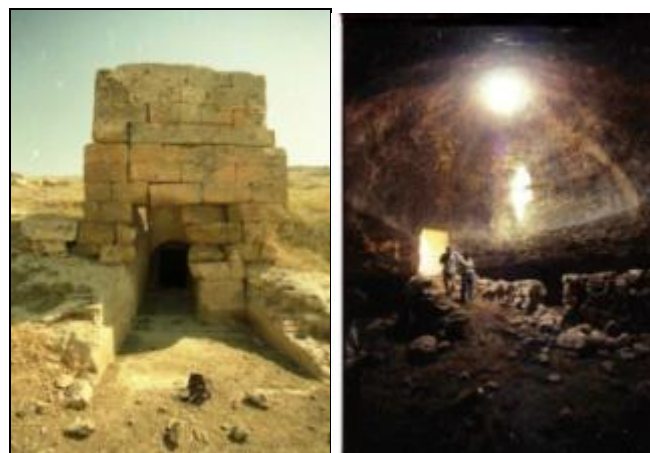




**Figure 6.** Kırılık village big hayrat with its plan



**Figure 7.** Kırılık village small hayrat



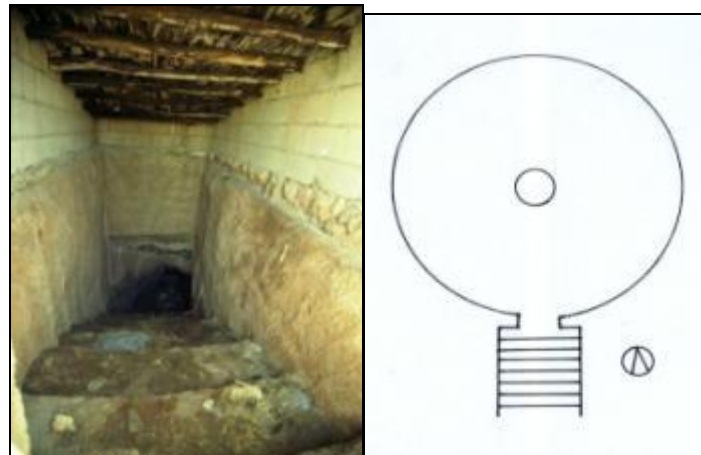
**Figure 8.** Interior and exterior view of monastery of Çardak and Big Cistern



**Figure 9.** Akabe Hayrat with its plan



**Figure 10.** Hayrat of Firuz Paşa



**Figure 11.** Şebeke Hayrat with its plan



**Figure 12.** Interior and exterior view of Sarı Magara hayrat



**Figure 13.** Edene village road hayrat

**Figure 14.** Hayrat of Çar Melik



Figure 15. Kapaklı village hayrat. exterior (from oppenheim) and interior view with its plan



Figure 16. Old views of Karakoyun (justinian) Aqueduct (C. Kürkçüoğlu archive)

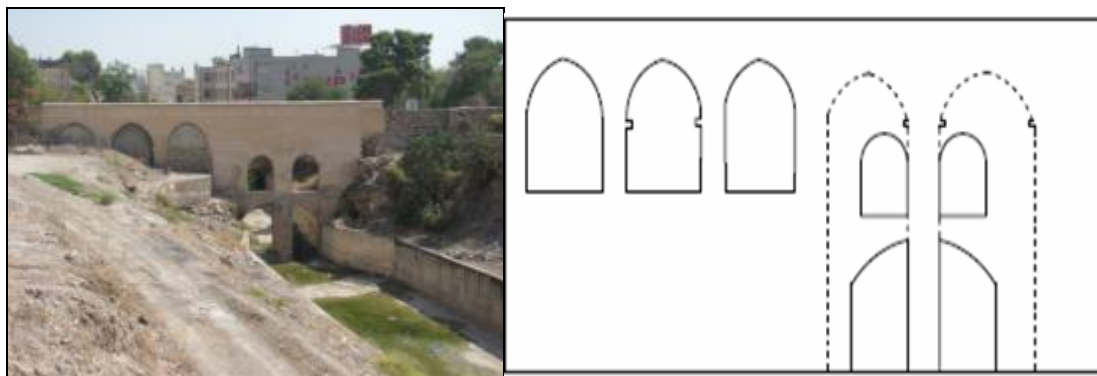


Figure 17. Front views of Karakoyun (justinian) Aqueduct with its plan (Gelener, 2011)

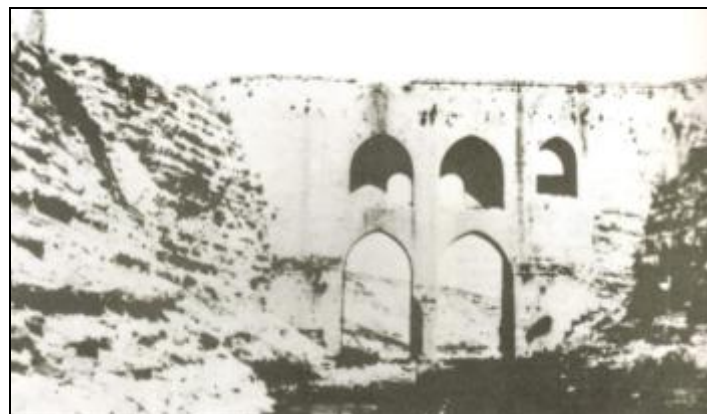


Figure 18. Old view of Hizmalı Bridge and its water gauges