

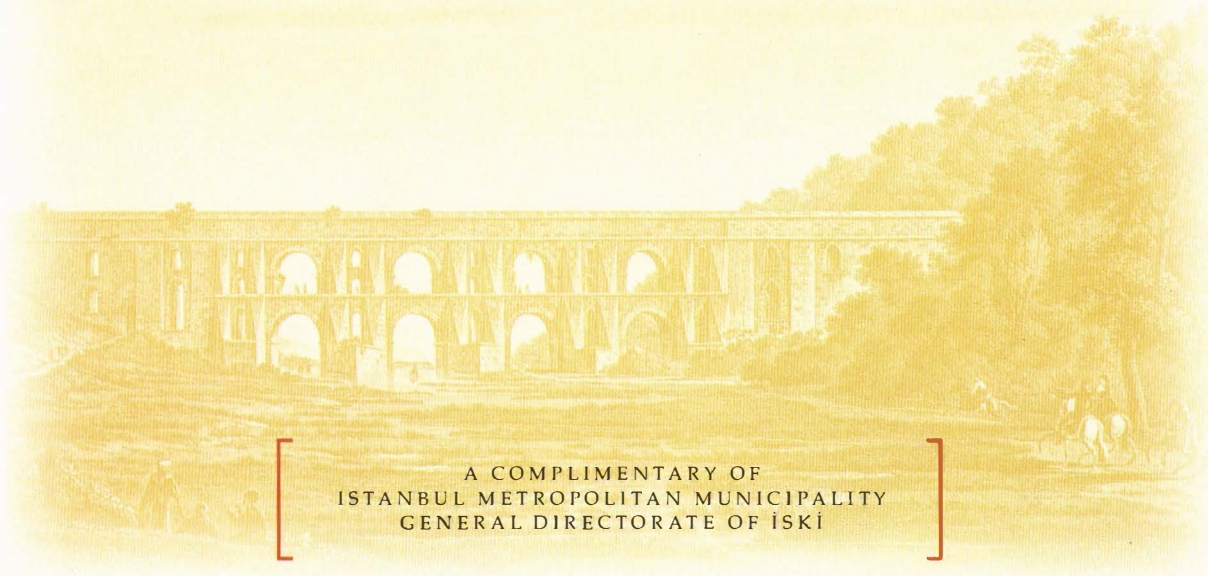
"TILL THE TIME COMES TO AN END, TILL THE EARTH STOPS WHIRLING..."

BEKCESME WATER SYSTEM



"TILL THE TIME COMES TO AN END, TILL THE EARTH STOPS WHIRLING..."

KIRKCESME WATER SYSTEM



A COMPLIMENTARY OF
ISTANBUL METROPOLITAN MUNICIPALITY
GENERAL DIRECTORATE OF İSKİ

ISTANBUL UNDISCOVERED

Dr. Architect Kadir TOPBAŞ

Mayor of Istanbul Metropolitan Municipality



Istanbul; since the conquest (feth), while embracing people coming from all around Anatolia, has been also awarding a new identity. Getting richer and greater while transmitted between generations, this new identity was called "Istanbulian". Ones coming from intellectually and behaviorally different geographies, has been gaining particular color, confusion, traditions, architecture,

Turkish of Istanbul the purest form of the Turkish language, lifestyle of Bosphorus and countless features of Istanbul, whose influence has been distinguished, from tradition to architecture, up to the farthest corner of the Empire, briefly have been becoming Istanbulian. Istanbul, today although is a crowded, great metropolis, the traces of the times when it was a 'wonderland' and when all its inhabitants were Istanbulians, still remain as an irremovable glaze. Now, this glaze is getting more obvious thanks to the services adorning and brightening the city. While providing Istanbul

with services that shall meet the needs of modern era, the protection and promotion of historical works of art have great importance. Aquatic monuments, as the yielding of solutions given to water problem by our ancestors, thousands of years ago, are just a part of undiscovered tourism riches. The Maglova Aqueduct of Mimar Sinan, who was known as "Pesendide-i Cihan Mimar-ı bi-akran" the master of architects, is a worldwide unique work of art with a construction system exceeding the limits of architecture and engineering. As the Istanbul Metropolitan Municipality, we are determined to invigorate those establishments without intervening in their peculiar tissue, as all the other historical monuments of Istanbul. We are working hard in order to revitalize historical fountains which are of the most important features of our cultural heritage. I believe by heart that this book, where you'll be introduced by the efforts of our ancestors, who have solved the water supply question, the common problem of the city's governors through history, with architecturally and technologically unique monuments, will be very beneficial in order to present inhabitants be aware and sensitive of Istanbul's riches.

ISTANBUL; THE CAPITAL of WATER CIVILIZATION

Dursun Ali ÇODUR
General Director of ISKI



*"Why they have cut my water
Who has stolen my brass "lüle"
When and how I was buried in land? "*

How Reşat Ekrem Koçu, a lover of Istanbul, has told of an annihilated fountain's scream... fountains on every corner which has enlivened Istanbul and Istanbulians for many years, by the domicile installation, have been alienated from view and hearts of people. Fountains have been offended of Istanbulians because of the negligence; as mentioned in the poem, some have hidden in the earth, some was leveled, some, being victim of rough hands, have got their "lüle" stolen. In spite of all these negativeness, as ISKI, we are working hard in order to revitalize our remaining fountains by vital water. Regarding that process, we are carrying out an extensive restoration program with

the coordination of universities and other organizations. As ISKI, we have prepared restoration and redesign projects of 23 fountains owned by General Directorate of Foundations (Vakıflar Genel Müdürlüğü) and municipality, and we have realized their repair. We are already aware of very precious and priceless monuments of Istanbul. One of these leading monuments is Kirkcesme Water System Facilities.

We are intended to protect and promote Uzun Aqueduct, Egri Aqueduct, Guzelce Aqueduct and Maglova Aqueduct with weirs connected to these, which were built by Mimar Sinan in order to meet Istanbul's water need by collecting water from Alibey and Kagithane Brooks, as additional tourism worth.

Today, we all know that, we don't only rescue, rebuilt or promote an elegant fountain or an aquatic structure watching over a narrow street of old Istanbul, but values peculiar to us, our culture, our physical and moral heritage.

"ONCE ON A DAYBREAK, THE SUN OF WORLD'S SULTANATE
AND THE SKY, THE MOST COURAGEOUS, THE MOST BRAVE
AND THE MOST HONORABLE OF SULTANS, WHOSE FORTUNE WAS SYMBOLIZED
BY RELIEF AND HAPPINESS, WHO HAS REACHED AT THE MERCY
AND FORGIVENESS OF ALLAH, SON OF SULTAN SELIM KHAN; SULTAN SULEYMAN KHAN.
ALLAH'S MERCY BE UPON HIM AND TAKE HIM TO HIS PARADISE.
ONE DAY, WHILE TAKING A WALK ON THE KAGITHANE PLACE,
HIS WAY HAS ENDED UP ON A MEADOW.
THERE, HE SAW WATER FLOWING LIKE A MIRAGE AND
DISAPPEARING IN TWINGS, A WATER LINE RUINED AND
ITS WATER DISSAPPEAR ON BLACK SOIL, LIKE FOUNTAIN OF LIFE.
BRINGING THIS WATER TO ISTANBUL SEEMS EASY TO SULTAN.
WITH INTENTION OF BRINGING THIS WATER AGAINST DROUGHT IN ISTANBUL,
SULTAN, GATHERS NOTABLES AND ASKS
HOW THIS WATER USED TO REACH AT CITY..."

TEZKİRET'ÜL BÜNYAN

16th century... When the borders of Ottoman Empire spread on three continents, East, West, Nord and South turn their faces to the throne, to Istanbul the symbol of power, majesty and wealth. At these days, while hunting around Kağıthane Brook, sultan, saw water flowing in an old water line. As he returns to the palace, he calls 'ser-mimar-I cihan ve mühendisan-I devran Sinan Aga' and asks him to investigate whether it is possible to bring water from there. Because, as from the conquest, the population of Istanbul had so increased that the water sources of that time wasn't able to meet water demand; Istanbulians of that time were suffering from drought. Selaniki, in his work of art about the problems of his era, had mentioned that a battle of water used to cost 15 akçe, namely very expensive; the poets of that age used to write poems about lack of water.

By Suleiman the Magnificent's order, Mimar Sinan, had investigated the water sources and brooks in Belgrat Forest, and has told sultan that bringing these water was quiet feasible. Mimar Sinan, in his work called Tezkire-tü'l Bünyan written by Caligraph (Hattat) Sai Mustafa Çelebi, tells about his observations and how he spoke to the Sultan; **"I, God's humble servant, while I was sub-**

mit in Faith, examining heigth and lowness of the valley by air aerial scale and following the old water ways and to behave in the direction of that exalted order I beg Allah that;

O! Allah, the most powerful on everything and who gives our daily bread! Help, this ant(Mimar Sinan) which is your servant not worthy then a tiny dust, in order to respect in his promise at the service of Suleiman of the Age. "

Afterwards, I saw water, being leaked and flowing into the low fields. As from the spring, having brought water flowing down the foot, to brooks by means of ditches; after building a weir, I have measured debit of water, according to the science of enginnering, by "lüles" that I had attached on the coffer. In the manner of comparison by considering the plants and trees on the other brooks, I told to His Majesty;

"Your Excellency! greenery on that black soil in these valleys prove the existence of vitalizing water just like 'Hızır'*. There is water in these valleys with half a day's road as well. Completion of these water lines awaits our Sultan's order."

Suleyman of the people and soul, after having consulted this weak ant, asked;

"By which road can these waters be conveyed?"

I said; "There are two ways, my Majesty. One is that you have an unlimited number of servants. They may die for your order. And the second is to assign a lot of money and to spend treasure skillfully.

(Briefly, we, your slaves, fulfill your orders; or you spend a lot of money).

Mimar Sinan, while telling sultan that such work would be so costly that the bags of gold should be lined up end to end. The Magnificent says;

"Grand Architect! If it is possible to bring water from there I am willing to line up the bags side by side as well." And he adds; "Payments will be done by my own property, and no one's feelings should be hurt."

Sinan, had started working immediately by sultan's orders. However, Vizier Rustem Pascha to lead, the other royal governors used to think that the population would increase and would rise difficulties in administration. While Master of Architects continue his works, with the gossips, it was argued that there were not enough water, Sinan would waste money. Sinan, in his biography, has mentioned it;

"They said; 'Flow of this water would inspire everyone and also would be auspicious. However, even there is

no water, how would it be possible to bring water by spending treasure just relying on the words of architect? Is that architect aware of the future that he had reported how many "lüles" of water exist?' Being ignorant of all these, while I was trying to accumulate water of the brooks in order to pour from "lüles", My Excellency Sultan has turned up from his usual hunting way. Sultan asked; "Where is the water, show me!"

Thereupon, Grand Sinan shows the "lüles" that he has just attached on the river and he persuades the Magnificent. Also he adds; "Dear Majesty, I have quiet enough proficiency on construction of water lines."

Kırkçeşme Water System

The construction of Kırkçeşme Facilities had been started in 1554 and completed before 1563. Aqueducts that had collapsed during flood in 1563, have been repaired in 1564. Kırkçeşme facilities, which are the most expensive works of Mimar Sinan, have costed 50 million 'akce's. The cost of Suleymaniye Center which was built by Sinan at the same era costed 35 million 'akce's. Conveying the water of Belgrad Forest to Istanbul by means of that 55 374 meters long, gigantic transmission line of 33 combined aqueducts like Uzunkemer, Maglova Aqueduct, Güzelcekemer and Pasakemeri, Mimar Sinan has put forward a unique work of architectural and engineering art by Kırkcesme Water System. Thanks to the additional weirs, the system with 33 arches, 4 weirs, 570 addings and 55 km. transmission line, has served 580 fountains, and countless Turkish baths and grand fountains. In



early years, 110 lüle – 5720 m³ per day, 334 lüle – 17413 m³ per day (without domiciles) according to registers, briefly 100 lt per day per person of water was delivered on August. By Halkalı Water System, this number has reached at 21372 m³ per day or 192 lt per day.

It is very notable to construct in such numbers of aqueducts in spite of the lack of stone in the neighborhood. Today, Istanbul is the only city to possess 450 years old potable water delivery system which is still in order. Related to Kırkçeşme Water System which was of the greatest investments of that era, Suleiman the Magnificent wrote down the history;

"My purpose is that this water reach at every district of the city, let fountains, as well as the wells be dig in improper areas, filled with water. Elderly and frail widows and little boy servants everywhere, fill their pitchers and cups and pray for the continuity of my sovereignty..."

"TILL THE TIME COMES TO AN END, TILL THE EARTH STOPS WHIRLING..."



Transmission line of Kırkçeşme / Miniature by Nakkaş Osman.
Tarih-i Sultan Süleyman • 1579-80 y. 226-2a
Chester Beatty Library, Dublin MS.413

KIRKCESME

In 1453, after having conquered Istanbul, Fatih Sultan Mehmed ordered the existing water supply lines to be repaired and new water lines to be constructed. Fatih, who had got the majority of gallery formed Roman transmission lines coming from Belgrat Forest thoroughly repaired with 21 additional aqueducts; had constructed fountains in lines at the lands under the Bozdogan Aqueduct upto Golden Horn as well. People have called these fountains 'Kirkcesme'. Enormous water facilities of the Magnificent beside fountains built by Fatih Sultan Mehmet, were also called as 'Kirkcesme'.



SINAN

Mimar Sinan, in his last years, tells about his life and works in a book of three volumes called as 'Tezkereler' which were dictated by poet and painter (nakkaş) Sai Mustafa Çelebi. In his book called Tezkiretü'l Ebniye, mentioned that his buildings will 'keep existing till the time comes to an end and the world stops whirling.' Sinan, telling about himself as 'I have a number of special ability and expertise', has universally important practices of civil engineering on aquatic structures. Sinan's water lines, with skills about practices of hydraulic principles used on transfer of water and about physical particularities of aqueducts, has been of the leading water transfer systems since Roman era till 20th century. By incredible mathematical calculations, balance systems and rates, Mimar Sinan, with the buildings of considerable dimensions and unusual beauty, and with Kırkçeşme Water Facilities delivering water to Istanbul, has put forward universally qualified works of art.

These works have inspired the whole Islamic geography from the Balkans to India.

"Poor myself, I am recruited into roses of Sultan Selim Khan's sultanate. Boys from Kayseri Province have firstly been recruited during his sovereignty, and I was the first one of those. Among the beginners, I was chosen owing to order of my creation, and I had great intention on carpentry..."



*Competence was a favor of Allah
I have intended on entire arts
Oh Lord, honor my poor spirit!
Who is on the summit of paradise.
Thanks to my master!
He made me competent on carpentry.
With my manner, art and wisdom
I started working hard since my childhood
Then, with my zeal among my equals
I have been brought up from Hacı Bektaş's society.*



MAGLOVA AQUEDUCT

"TILL THE TIME COMES TO AN END, TILL THE EARTH STOPS WHIRLING..."



*"Till the time comes to an end, till the earth stops whirling, when
my serious efforts are seen by friends, I hope them look by the view
of fair and commemorate me by prays of charity."
El Fakir Siyan, Ser-Mimaran-ı Hassâ*

MAGLOVA AQUEDUCT



MAGLOVA AQUEDUCT

MAGLOVA AQUEDUCT

Maglova Aqueduct on the Alibey Brook is the most beautiful structure of Kırkçeşme Water System. The pronunciation of that aqueduct in book Tezkiretü'l Ebniye is; Mağlova or Muğlova Aqueduct. However in Tezkiretü'l Bünyan, the name of the aqueduct is pronounced 'Muallakkemer'. Well-known western scholars, as usual, attributed that charming structure to Byzantines and called it Justinyen Aqueduct, yet it was later determined that the arch was completely an Ottoman work of art.

Spans of four principal arches above is 13.45 m. long, and these at the bottom is 16.75, are the longest spans on water arches ever built in the world. Mimar Sinan, in the construction of Mağlova Aqueduct, instead of building a structure that could resist water pressure during floods only by massive weight of corporal volume, has used a complicated geometric system. Mağlova Aqueduct, with its prismatic form to reduce water pressure on the wall by thinning piers to straight down, is a unique aqueduct. The aqueduct is also notable for demonstration of change of a simple and plain stone structure into a marvelo-

us work of art, in the hands of a genius. The resistance of such delicate structure against earthquake and wind is a result of great engineering work of art. In Roman and Hellenistic eras, the width of arches was constant from bottom to the top, therefore they had been easily collapsed. Today, according to the common opinion of scientists Mimar Sinan would be also such famous even if he had only built Maglova Aqueduct.

*"Emr-i şahiylekolub su yollarına ihtimam
Hızır olub ab-ı hayatı' aleme revan"*

(Sultan had took care of water lines
Came to the help of people like Hızır
and poured vital water.)



MAGLOVA AQUEDUCT

"TILL THE TIME COMES TO AN END, TILL THE EARTH STOPS WHIRLING..."



KIRIKKEMER AQUEDUCT

KIRIKKEMER AQUEDUCT

Three three-stroyed aqueduct with 207 m. length (length of front) and 35 m. height. 1st floor was supposed to built by Valens and Theodosius during Late Roman Era. In 16th century, Ottomans have built pointed arches in all aqueducts. Kırık Aqueduct possesses 14 pointed and 33 found arches; Mimar Sinan is supposed to build arches, except 1st floor, convenient with the former ones. The main evidence of that is the width equality of all Roman aqueducts from bottom to the top. However in this aqueduct, arches were built 7.00 m wide at the top and 3.30 m wide at bottom. On walking route, there are arches with 113 cm wide, 220 cm height and 55 cm. half-diameter. On front, spans between top orifices vary 3.88 m and 5.27 m. The gallery above has 55x175 cm of dimensions.



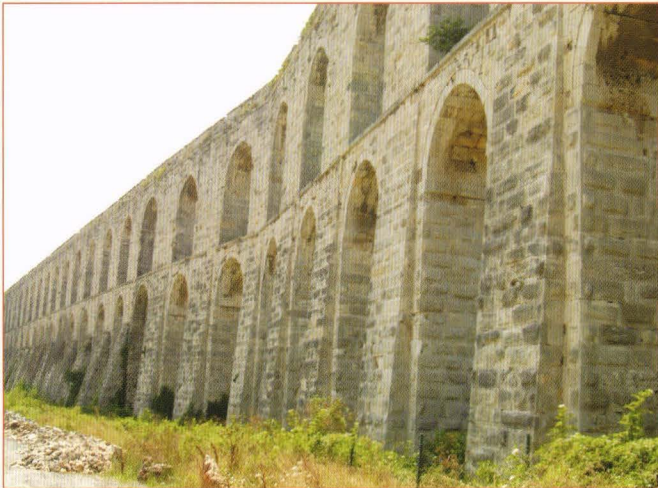
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— UZUNKEMER AQUEDUCT —

UZUNKEMER AQUEDUCT

It is two storeyed with 711 m. length and 25 m height. There are 50 arches on upper storey and 47 arches on lower storey. The upper gallery has 60x175 cm of dimensions. The spans on arches of upper storey are 4.50 m long while they are 5.33 m long on the lower storey. The lower storey arches are reinforced by some piers.



"TILL THE TIME COMES TO AN END, TILL THE EARTH STOPS WHIRLING..."



BASHAVUZ POOL

BAŞHAVUZ POOL

One of the leading structures of Mimar Sinan's Kırkçeşme Water System. It is the intersection point of Eastern branch (Büyükbent, Kirazlı Weir and Paşa Brook Adding) and Western branch (Ayvad Weir and other addings) and serves as a settling pool as well. The one pouring above is Eastern branch. Cylinder shaped structure has 2.00 m depth and 13.83 m, 9.80 m, 7.98 m of diameters as from above. The thicknesses of walls as from above are also 1.14 m, 3.09 m and 4.05 m. The total depth of the pool is 14 m.

The entrance and exit galleries are narrow and followingly high. Sinan, in Tezkiretü'l Bünyan, tells; "That pool is the collection of streams. Including basis, it is as tall as Galata Tower." as he points out the greatness and height of the pool. There is another expression;

*That pool shining like moon,
the circular beautiful
Is just like the pool of 'kevsir*' in heaven.*

*The stream supposed to be in heaven.



"TILL THE TIME COMES TO AN END, TILL THE EARTH STOPS WHIRLING..."



KARANLIK WEIR

WEIRS OF KIRKCESME WATER SYSTEM

There are 4 weirs in Kırkçeşme facilities. While construction, after water had been risen to the streams with a kind of connection and grids had been attached on front, water have been collected by means of a water collecting structure.

KARANLIK WEIR

(TOPUZ WEIR, KOMURCU WEIR, OTTOMAN II WEIR)

It is on the Topuzlu Brook the sum of Taşlıdere, Batakli, Ihmalur and Kızlarağası Brooks. It feeds Büyükbent Weir, by means of Belgrat Brook. It was built during Ottoman the Young era. (1618-1622)

Construction Year	:	1620
Length	:	64,50 m
Depth	:	7,60 m
Crate Width	:	5,20 m
Base Width	:	5,90-7,90 m
Drainage Area	:	4,56 km ²



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BUYUKBENT WEIR

BÜYÜKBENT WEIR

(BELGRAT WEIR)

Placed on the Belgrat Brook. Been constructed to increase water reserve of Istanbul. The weir supposed to be initially built during Late Roman Era, has been repaired in Fatih Sultan Selim, Kanuni Sultan Süleyman, Ahmet III, Mahmut I eras in order and a supplementary was added in 1900, Abdulhamid II era.

Construction Year	:	1724
Length	:	84.50 m
Depth	:	12.15 m
Crate Width	:	2.30 m
Pedestal Width	:	9.70 m
Drainage Area	:	6.93 km ²
Amount of Water Delivered	:	250 lüle



"TILL THE TIME COMES TO AN END, TILL THE EARTH STOPS WHIRLING..."



KIRAZLI WEIR

KIRAZLI WEIR

Situated on Kirazlidere Stream the sum of Buyuk Kavakli Brook and Kavakligol Brook, in Belgrat Forest. Constructed in Sultan Mahmoud II (1818-1839) era.

Construction Year	:	1818
Length	:	59,45 m
Depth	:	10,28 m
Crate Width	:	7,15 m
Base Width	:	9,00 m
Drainage Area	:	2,84 km ²
Amount of Water Delivered	:	56 lüle



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AYVAD WEIR

AYVAD WEIR

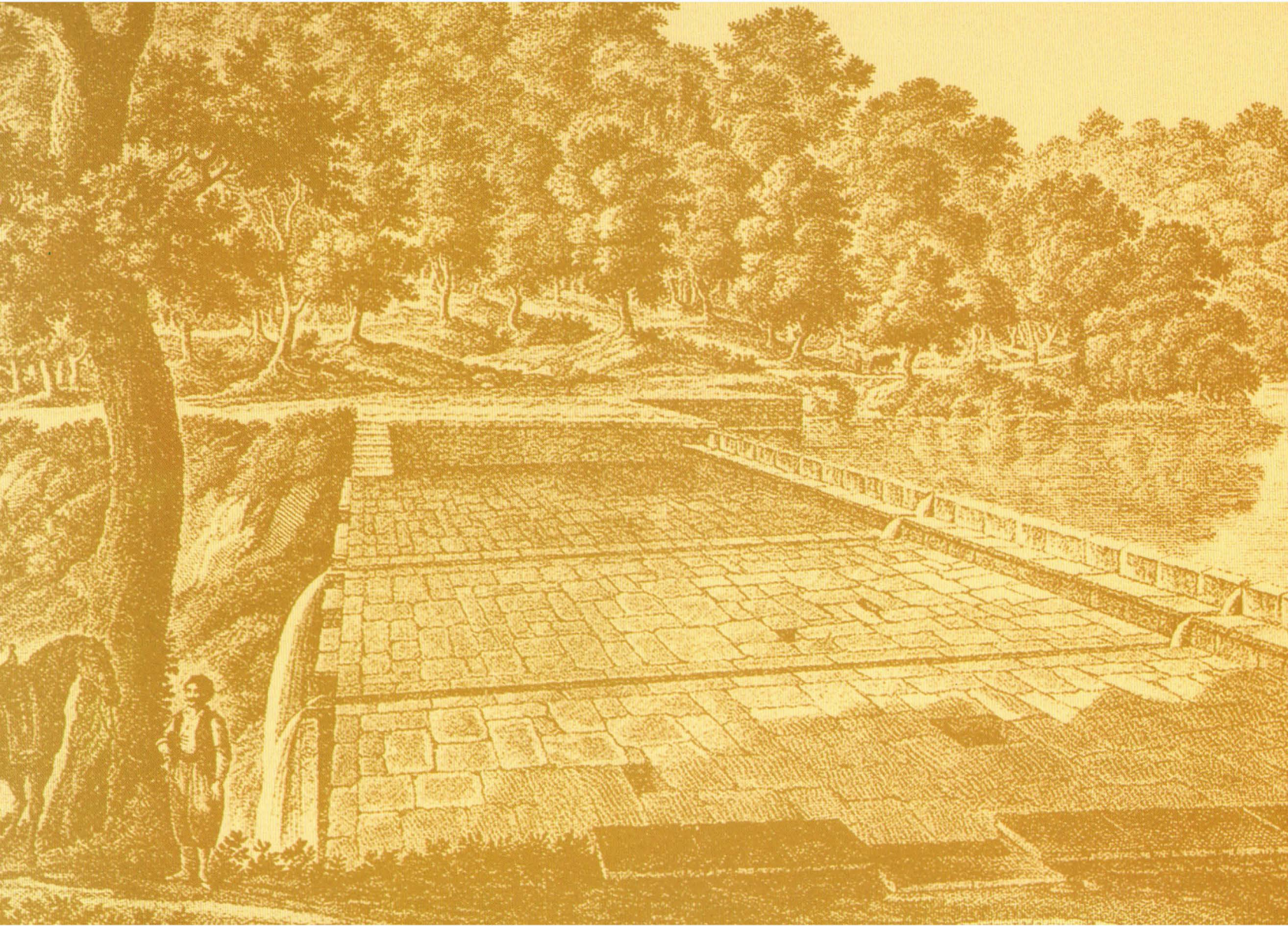
On the Ayvad Brook which is fed by Eşek Brook and Goller Brook. Constructed in Sultan Mustafa III (1757-1774) era.

Construction Year	:	1765
Length	:	65.80 m
Depth	:	12.30 m
Crate Width	:	5.30-6.90 m
Base Width	:	8.42 m
Drainage Area	:	2.00 km ²
Amount of Water Delivered	:	

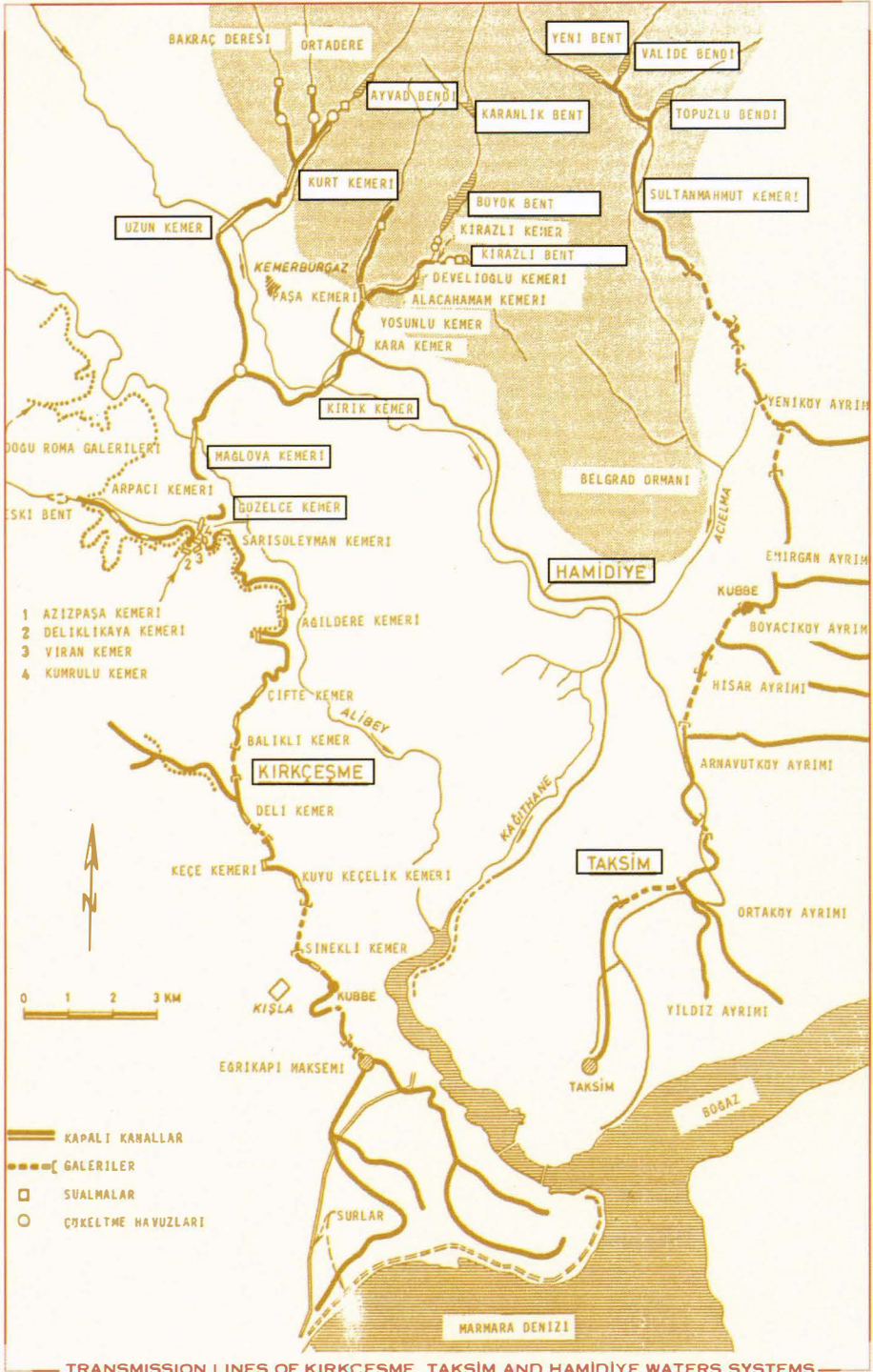
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TRANSMISSION LINES OF KIRKÇEŞME, TAKSİM AND HAMİDİYE WATERS SYSTEMS



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PRODUCT: ARTUS / 0212 347 02 20

ISBN: 975 - 6582 - 56 - 1