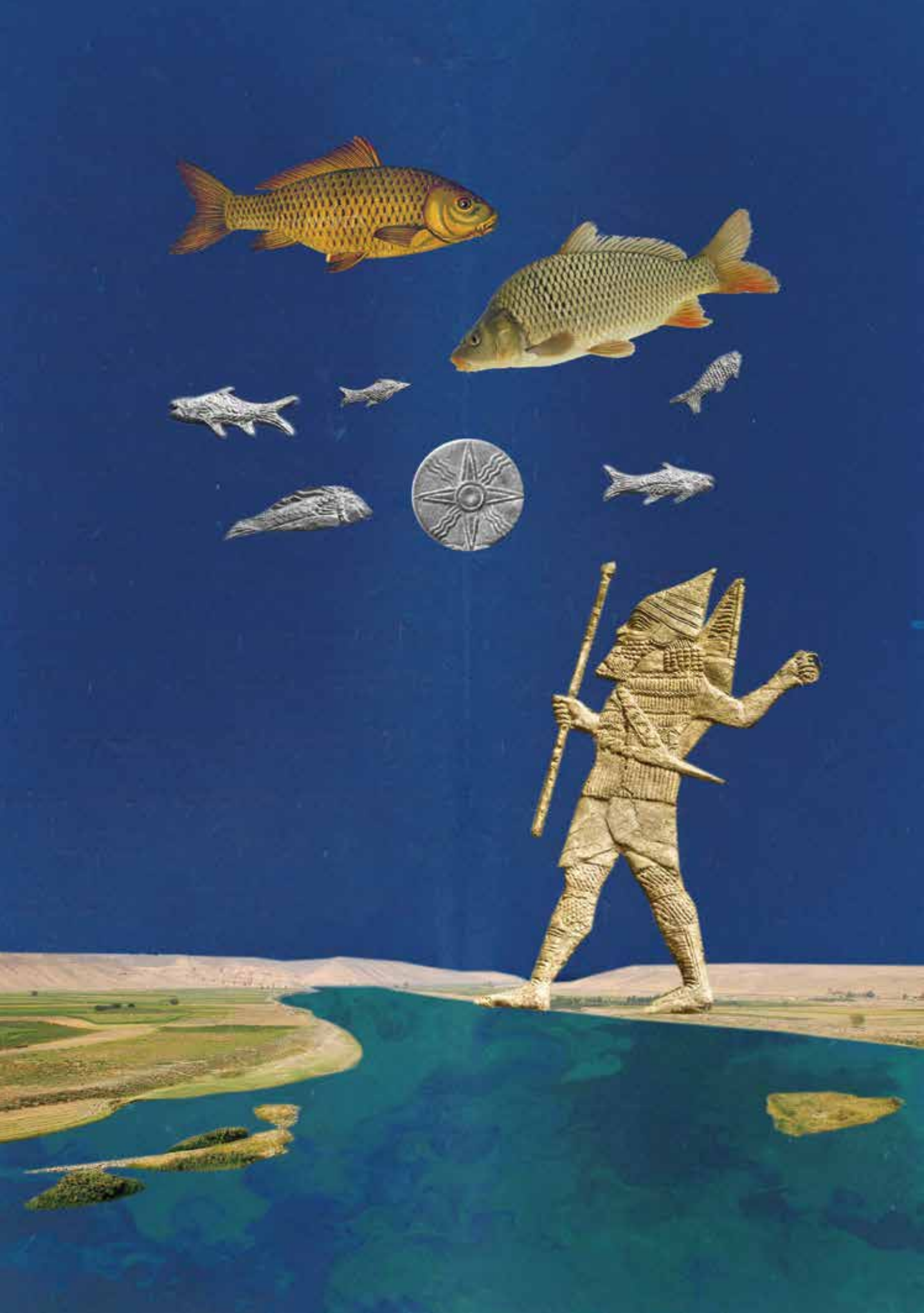

IV

# Rivers – The Essence of Civilization

## Water Management in Ancient Mesopotamia and Its Powerful Role Throughout Mythology and History

**Lanah Haddad**


**Lanah Haddad**

Lanah Haddad is an Iraqi-German Archaeologist specialized in the art and archaeology of ancient Mesopotamia. She studied in Germany and was a PhD Candidate at the interdisciplinary graduate program "Value and Equivalent" at the University of Frankfurt. She participated in several international archaeological excavation and heritage preservation projects in the MENA region, such as Syria, Jordan and Egypt. Most of her work focuses on Iraq and the Kurdistan Region of Iraq. She has published several articles and has contributed in two exhibitions. Passionate about ancient Mesopotamia, she created a strategy board game based on archeological and historical information in multiple languages in order to build a bridge between the diverse community in Iraq and their heritage.


# 1. Introduction

Ten thousand years ago, humans lived as hunter-gatherers. In small groups, they would constantly be on the move from one place to another in order to secure access to enough food for their nomadic communities. They also engaged in a long process of observing and understanding nature's ecosystem, which enabled humans to make a breakthrough in developing cultivation and eventually master farming over the following millennia. The development of agriculture was the most revolutionary progress in human history, creating the foundation of modern society. Some groups started becoming more sedentary settlers, and slowly their communities were able to grow in size. This was possible through the control and management of water resources, as well as greater understanding of seasonal weather conditions. This process took several millennia to establish early civilisations, a new and outstanding feature in human history.

These new formations of livelihood happened almost simultaneously in both ancient Egypt and Mesopotamia. Societies in both regions benefited not only from their climate, but also from their access to fresh water. In ancient Egypt, the Nile was the main source of fresh water, while Mesopotamia was covered by a network of streams feeding the two main rivers, the Euphrates and the Tigris. These rivers facilitated the establishment of the first civilisations, which progressed from farming communities to large, urbanised cities, with complex social structures and technologies. The success and prosperity in these regions resulted from both the advantageous climate which enabled agriculture, but also the clever regulation of the water resources. The Tigris and the Euphrates are perhaps the most prominent rivers in the history of human development in Eurasia. Their journey from their sources

in the high mountains of Anatolia, through the flat plains of Mesopotamia, to their confluence in the Shatt al-Arab before flowing into the Arab or the Persian Gulf, is connected to the rich history of civilisation; in many respects, few - if any - other rivers have such a rich history and important role for humankind. The two rivers are witnesses of many hugely influential social and technological innovations, as well as conflicts, and have been the life-givers of the region for thousands of years, enabling some of the most important developments in early human history.

Today, however, access to the waters of the Euphrates and Tigris rivers is threatened as never before, with the region's increasing population and water use not only for agriculture, but also for heavy industries and the production of electricity through hydroelectric dams. Continuous disputes, dialogues, and agreements over the waters have occurred between the modern states through which the rivers flow – Turkey, Syria and Iraq, as well as Iran, since the sources of three main tribute rivers to the Tigris are located inside its borders. It is important to look back at history to understand the value of these two rivers, in order to identify possible common ground for establishing regulations and policy to avoid violent conflicts over water in the near future, and to foster cooperation with a deeper understanding of the same responsibilities which our ancestors once bore. Over the following pages, we review diverse aspects of water usage in Mesopotamia, from ancient mythology to new innovations in water hydraulics, policy-making on water management, and recent conflicts over water resources. While the scope of these topics is wide, they all intersect in one way or another.

## 2. Mythologies As Transmitters of Knowledge

The value of water can be found in numerous literary texts on clay tablets from ancient Mesopotamia, which we can be categorised in our modern perspective as mythology. Before introducing the stories of water creation in such mythology, it is necessary to understand the reasons why these myths were generated. They are stories that have more to do with the lived reality of humans than many of us would initially think. They focus not on fantastical beings or supernatural abilities, but on seeking to articulate and explain the circle of life, understanding natural phenomena and coping with the hardships of existence. Storytelling is the most powerful tool for transmitting knowledge to others and from one generation to another. It is a vibrant and fluid medium, which retells the existence of a subject in many variations. Seasonal or periodic events in particular are often packed into stories which provide a figurative and vivid understanding of how and why things in everyday life occur. The subject is contextualised in the given reality of the people depending on the region and period in which they live.

On the one hand, mythologies provide an understanding of universal concepts and relief from everyday struggle, while on the other hand, they propagate moral codes and legitimate hierarchical social structures, as well as the duties and responsibilities of humans necessary to achieve prosperity and harmony. Mythology has been a central pillar with which rulers accredit their position and role in society, and justify the policies and regulations inside their realm.

Mesopotamia is a name familiar to many people around the world. The name has survived among us to this day from the ancient Greek term describing the land between the two rivers, the Euphrates and the Tigris. These names have long persisted, although they have been adjusted to the dominant languages in the region at each period. The modern Arabic names, al-Furat (Euphrates) and Dijla (Tigris) are rooted in the Akkadian Purattu and Idiglat respectively. The same origins account for the Old Persian names (H) ufratu and Tigra, from which the ancient Greek names Εὐφράτης (Euphrátēs) and Τίγρις (Tigris) were later derived, and have come to be preserved as the rivers' international names in our modern times. In many myths from the region, both rivers are mentioned together, and in some they are described explicitly as twin rivers. However, there are physical differences between the rivers: the Euphrates is longer and wider, and thus flows slower through the plains, while the Tigris rushes in a fast stream through a narrower riverbed and cuts through hilly land before it reaches flat land and eventually joins the Euphrates. This demonstrates that their identification as "twins" does not result from their being particularly alike, but rather their being considered siblings that were created together. Many myths have sought to explain the formation of the two rivers, with a wide variation of narratives arising, just as there is also no unified story between cultures concerning the creation of human beings. Despite this variety, it is important to note that the two rivers are often explicitly mentioned by their names as having been created by the gods, and thus stand out from the creation of rivers in general. In this conception, it is clear that no earthly power is entitled to claim the ownership of water resources! Rather, the responsibility of reasoned consumption and fair sharing of water is necessary.

The myths about the conception of the rivers also share a common thread of fertility. In the creation story "KAR 4", heaven becomes separated from earth, and the gods establish an irrigation system and define the streams of the Tigris and Euphrates, before creating humans and animals on earth to farm the land to serve and feed the gods. This narration presents the creation of the two rivers, and the construction of irrigation canals from them, as a divine operation, and serves a narrative of it being a royal duty to maintain and extend the canals - a management of powerful forces that cannot be carried out by small communities alone.

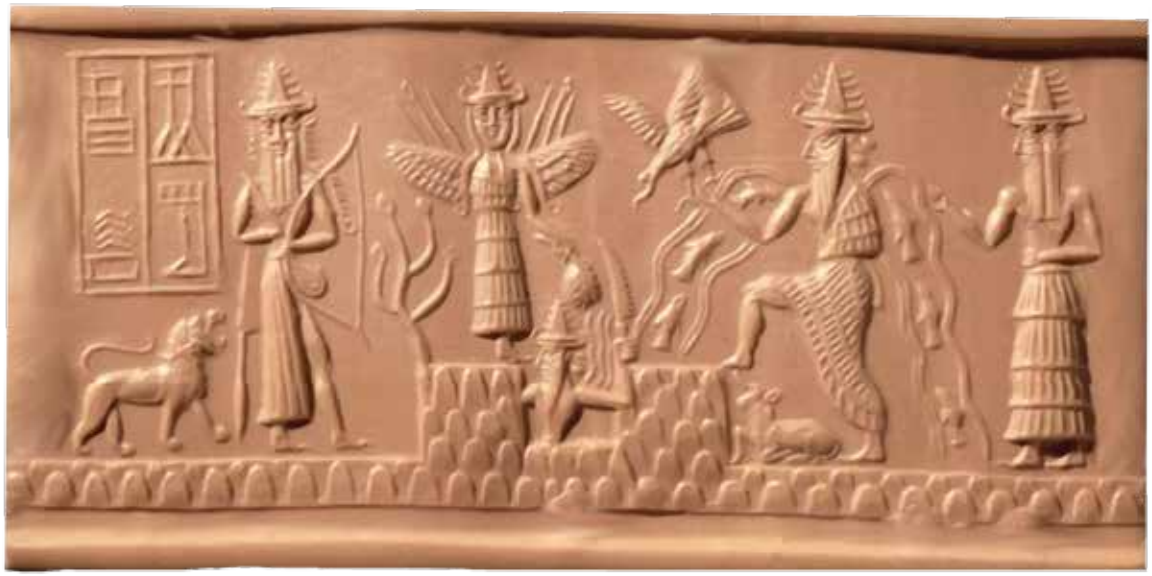

**Fig. 1: Seal impression of the so-called "Sealing of Adda".**

Mythology is part of daily life in Mesopotamia, resources being the motives for their artwork. From left to right: a hunting god with bow and arrow, Goddess Ishtar with wide spread wings, God Shamash holding a serrated blade and emerging between two mountains, and the God Ea (Ea is the Akkadian name, while Enki is Sumerian) standing with one foot on the mountain and water streams with fish emerging from his shoulders, and behind him the two-faced god Usimu.

*(Date 2300 BCE, originally from Sippar, today at the British Museum BM-89115)*

## 3. The Creation of Rivers by The Ancient Gods

In other myths, it is the Sumerian god Enki who is responsible for the creation of the two rivers. Enki, not only the god of water but also wisdom and creation, was one of the most prominent gods of the Mesopotamian pantheon (Fig. 1). His attributes reflect the importance of knowledge in managing the essential element for creating and sustaining life – water! "Enki and the world order" is a text with remarkable narration that reflects the development of urbanised civilisation with a well-regulated hierarchy. In this myth, Enki, also responsible for fertility and productivity, is instructed by his brother Enlil, the chief god of the Sumer civilisation, to make the land prosperous and secure. Enki "stimulates the penis and ejaculates. He filled the Tigris [sic!] with [ever] flowing water". Freshwater is clearly associated with insemination and the fertilisation of the land by the gods.

A mythological text, named by modern Assyriologists from its first line "Enuma Elish" ("when on high"), records a story about a time before earth and humans. It is the patron of Babylon, the god Marduk, who is the hero and the creator of the two rivers. The story begins with the three gods Mummu, Apsu, and Tiamat. Mummu is the advisor of Apsu, the male god characterised as sweet water, while Tiamat, the female goddess, symbolises salt water. Apsu copulates with Tiamat,

who bears two children from whom the subsequent generations of gods are born. Here, the god of fresh water is the begetter, symbolising the direction of rivers flowing into the ocean, Tiamat or salty water. However, the new born young gods make too much noise; Apsu and Mummu attack them, but Apsu is killed by the stronger younger gods, making the mother goddess angry. In her anger, she gives birth to monsters and attacks the young gods. In this chaotic fight between generations, it is Marduk who defeats Tiamat. Out of her dead body, Marduk first makes heaven and earth, then creates the Tigris from her right eye and the Euphrates from her left. The semantic beauty of this creation story is that the word for a source of a river in the Akkadian language is īnu, literally "eye", similarly to the Arabic word 'ain, which also means both eye and water spring. Another characteristic is in the orientation of the rivers, with the Tigris (which flows to the east of the Euphrates) on the right and the Euphrates on the left, and the Tigris always being named first. This demonstrates a perspective from southern Mesopotamia looking northwards and in the direction of the rivers' sources.

Besides Enki, many lower gods were associated with water, found not only in literature but also in the material culture of Mesopotamia, such as free-standing statues, on wall reliefs or paintings, and as a variety of other smaller objects. They may be female or male deities, and are easy to identify; they are depicted holding a small, round vessel in both their hands. From the vessel's mouth, multiple lines flow to the right and left in wave-like shapes, sometimes with fish swimming against the stream towards the vessel's opening. One of the most beautiful and creative depictions of such a deity was found at the site of a palace in the ancient city of Mari on the lower Euphrates in modern Syria. In the palace's courtyard stood a stone statue of a female deity, with a water vessel as described above. The statue functioned as a figural fountain, with water emerging out from the vessel. In the same palace, an impressive two-meter-high mural was found, incorporating both naturalistic elements and mythical beings and deities. The main scene of the image is the enthroning ceremony of king Zimri-Lim (1775-1761 BCE) by Ishtar, the goddess of war, love, and fertility. Beneath them are two deities with water-pouring vessels in their hands. The investiture scene is framed by a garden landscape, with palm trees on each side, the queen of southern Mesopotamian standing high, while men climb to collect the fruits. This harvest element is a potent symbol of prosperity. The composition demonstrates how religious ceremonies connected to kingship are related to responsible usage of the od-given water sources to ensure fertility in the land. As mentioned earlier, ancient Mesopotamians believed the gods created humans to farm the land to feed the gods; it is the duty of a ruler to ensure this covenant. In the ancient city of Uruk, the facade of the temple of Inanna (the name for the goddess Ishtar in the Akkadian language) was decorated with bricks

moulded in the shape of water deities in alternating niches. One of Inanna's attributes is fertility, and in Mesopotamia, fertility cannot exist without water.

## 4. Governing Authorities and Their Duty of Water-Management

The people in the region frequently related the rivers to the geographical dimensions of the known world, with many kings making the much-vaunted claim that they had travelled far on journeys of exploration and had reached the sources of the Tigris and Euphrates. One of the first kings claiming this achievement was Naram-Sin, the successor of Sargon of Akkad. While most ancient Mesopotamian empires, from the Akkadian to the Persian, were able to expand to the east and the west, they were more constrained to the north, in the area where the Euphrates and Tigris originate, and to the south, where they flow together into the Persian Gulf. After the emergence of governing authorities in the area, population and settlement growth continued with a wide territorial expansion, with the rivers being used as transportation. Thus, beside their role in irrigation, the rivers became the most important infrastructure for trade, migration and population resettlement. Much knowledge was transmitted and developed, including the cuneiform writing system.

The earliest civilisations of Mesopotamia recognised the importance of securing irrigation for the benefit of agriculture. It is important to view ancient Mesopotamian policies on water in connection, and the administration of economic issues, with the above described belief systems. While the blessing of water sources was literally in the hands of the gods, the development of sustainable irrigation systems as the lifelines of the land was the responsibility of humans. This included social codes attempting to create peaceful coexistence and solve the conflicts, great and small, which arose over water. As the region became occupied by different groups and their cities grew, the demands for fertile land and secure water resources increased, leading to the emergence of conflicts. Policies and regulations are key for keeping the peace between different interest groups using the same resources for daily life. Such regulations are not only dictated from above to tell the people how to use such resources, but also provide them protection and the assurance of access to resources essential for making a living. The maintenance of water supply remains to this day a complex task involving multiple layers.

In Mesopotamia, the securing of irrigation for settlements and agricultural fields was mostly a duty of the authorities, and included further tasks such as construction, the maintenance of water-distributing infrastructure, the organisation and payment of labour forces, the transport of materials and the water itself, and conflict resolution. The Assyrian Empire dominated northern

Mesopotamia in the second millennium BCE. Through the empire's territorial expansion, people were deported to the hinterland of Assyria and the population increased. This obliged the kings to ensure efficient irrigation systems to not only supply water to the growing cities but also improve agriculture in the surrounding lands to be able to provide enough food for the grown population number. Assyria, like most other regions, was an agrarian society, and its rapid growth placed additional urgency upon the issue of food supply for its people. The topography of the core land in Assyria (Mat Ashur) was hilly, with little flatland. Most of the terrain stood significantly above the plentiful large and small water streams. This geography made it difficult to apply the same irrigation system as in the south, where cuts in the sides of the rivers were made to irrigate the flatland for farming. The use of waterwheels to raise water, such as those which can still be seen in a few cities on the Euphrates such as Hit in Iraq or Hama in Syria is also difficult on the swift-flowing Tigris. Instead, Assyrian tapped water from upstream, and sent it along canals to the desired destination.

Canals thus became the irrigating arteries of the hilly land, starting with rulers such as Ashururbalit (1380 BCE) and continuing under his successors to Tiglath-Pileser (1116 BCE-1076 BCE), who established a new communal and labour-intensive method for creating waterways. The Neo-Assyrian period became one of the most innovative in antiquity, with major constructions of waterworks with a vast impact on the landscape. In the course of time, the Assyrian kings were impressed by the hydraulic engineering of neighbouring regions like Urartu in the north and Babylonia in the south, from which they not only imported new techniques, but also improved them on a larger scale and included new innovations. The most impressive project was the large aqueduct made of stone blocks, standing to this day at the former village of Jerwan, which must have been seen as a wonder at that time. The Assyrian kings boasted about their achievements not only to show their power, but also to document how much they had strengthened the Empire. They not only provided enough water for the pre-existing agricultural use, but also introduced new plants to their homeland, as Tiglath-Pileser claimed in his inscription:

> *I took cedar, box-tree, and Kanish oak from the lands over which I had gained dominion - such trees as none among previous kings, my forefathers, had never planted, and I planted [them] in the orchards of my land. I took rare orchard fruit, which is not found in my land and filled the orchards of Assyria. (Dalley 1933:1-13)*

Tiglath-Pileser reforested the land, since large trees were needed to construct the

roofs of not only normal housing, but also palaces, temples and other large public buildings. A century later, one of his successors, Ashurnasirpal II (883-859 BCE) wrote in more detail what kind of plants he imported, totally changing the availability of fruits and nuts:

> *I dug out a canal from the Upper Zab [a tributary of the Tigris], cutting through a mountain peak, and called it Abundance Canal. I watered the meadows of the Tigris and planted orchards with all kinds of fruit trees in the vicinity. I planted seeds and plants that I had found in the countries through which I had marched, and in the highlands which I had crossed: pines of different kinds, cypresses and junipers of different kinds, almonds, dates, ebony, rosewood, olive, oak, tamarisk, walnut, terebinth [Pistacia] and ash, fir, pomegranate, pear, quince, fig, grapevine […] The canal-water gushes from above into the gardens; fragrance pervades the walkways; streams of water as numerous as the stars of heaven flow in the pleasure garden […] Like a squirrel I pick fruit in the garden of delights. (Bagg 2017)*

Beside augmenting the farming capacity, Sarong II (722 BCE-705 BCE) imported new techniques after invading Urartu, a smaller empire stretching behind the high mountains of the modern city of Duhok in northern Iraq to the territory of today's Armenia, in 714 BCE. He observed an underground tunnel system for channelling water, a method that was then unknown in Mesopotamia. The use of these systems, known as kariz (Kurdish/Persian) or qanat (Arabic) in later periods, spread to China at the furthest east, and Morocco at the furthest west usage. Transporting water from hilly areas downwards to the plains, their advantage over open channels is that they can add ground water along the route to the main water source, and ensure less water loss. This technology proved to be practical for the Assyrian hinterland east of the Tigris, and was implemented efficiently.

## 5. King Sennacherib – The Mastermind Behind The Most Impressive Hydraulic Projects in Ancient Mesopotamia

Despite all the kings mentioned earlier, it is Sennacherib (705-681 BCE) who stands out as the most active in matters of irrigation, making the land around his capital Nineveh prosper on a previously unprecedented scale. The relief in his royal residence, the "Palace without Rival", not only shows his brutal ruthlessness in subduing rebellious cities, but also shows very prominently how he oversaw all his construction projects himself, as all orders were given by him personally. During his rule, Nineveh expanded from approximately 150 hectares to 750

hectares, and became a megacity of its time. Sennacherib understood his duty as a king was to invest in public buildings, and he improved engineering work to increase the water supply for his capital and the surrounding land. Like his father Sargon II, he drew inspiration from other regions during his military campaigns, and tried to transplant their knowledge back to his homeland. In 702 BCE and 700 BCE, Sennacherib marched with his troops to the marshes of southern Babylonia. Stimulated by the beautiful landscape of the wetland, he incorporated them into his works in Assyria. In his master plan, he built numerous channels with wires and dams to increase water supply from different sources, not only for Nineveh but also the land around it.

Near the modern village Khinis, he managed to use the topography of a canyon to tap water from the Gomel (also known as Atrush) River to carry part of its water in a canal in the direction of the Nineveh plain. To immortalise his name and his efforts, he carved large reliefs on the riff side of the gorge (Fig. 2), with a detailed inscription of the construction work:

> *At that time, I greatly enlarged the site of Nineveh. I had its [inner] wall and its outer wall, which had never been constructed before, built anew and I raised [them] as high as mountain[s]. Its fields, which had been turned into wastelands due to lack of water, were woven over with spider webs. Moreover, its people did not know artificial irrigation, but had their eyes turned for rain [and] showers from the sky. (Bagg 200)*

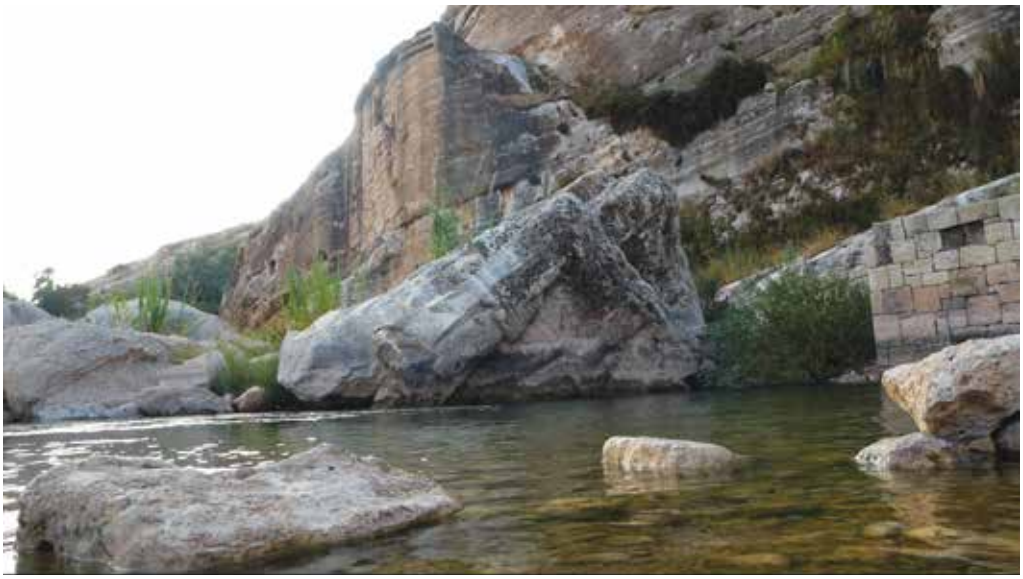

**Fig. 2: Sennacherib's impressive hydraulic project at Khinis.**
Large block stone carved with ancient gods, fallen into the Gomel river.
*(Photo by Al Baqer Jaafar)*

Sennacherib further mentioned eighteen cities in the mountain area from which he dug canals to direct their courses into the Khusur River. He continued describing how he had dug a canal to Nineveh itself. As a good King, he stated that his work was done in accordance with the wishes of the Assyrian chief god Ashur, "by the command of the god Aššur, the great lord". He boasted further about his achievements compared to the kings before him:

> *I d[u]g [that] canal with [only] seventy men and I named it Nār-Sennacherib. I added [its water] to the water from the wells and the canals that I had previously d[ug], and [then] I directed their courses to Nineveh, the exalted cult center, my royal residence, whose site [the king]s, my [ancestor]s, since time imme[morial] had not made large [enough], nor had they expertly carried out its artful execution. (Bagg 200)*

To underline the extent of his empire, he described how he filled the gardens around Nineveh with every type of fruit and spice from around his conquered territory. Proudly, he also addressed his successors, describing the incomparable work that he achieved with a small amount of manpower in a very short period:

> *[To] a later ruler, one of the kings, my descendants, who deliberates [the matter] in [his] heart but is not able to believe [it], [and] s[ays] "How did he have this canal dug out wi[th] (only) these few men?": [I swear] by the god Aššur, my great god, that I dug out this canal with [only] these [men]. Moreover, I completed the work on it within one year [and] three months; […] was completed [and] I finished digging its excavation." (Bagg 200)*

King Sennacherib continued over many more lines counting his numerous achievements, ending his inscription with a curse:

> *At any time [in the future], a future ruler, one of the kings, my descendants, who desecrates the work that I have done, dismantles the [canal] system that I have constructed, [or] div[e]rts the flow of the waters of these canals from the plain of Nineveh: May the great gods, as many as are named in this stele, by their holy decree, which cannot be al[tered], curse him with a harsh [curse] and overthrow his dynasty. (Bagg 200)*

Despite his threats, it was the ravages of time that rendered his great hydraulic innovation obsolete; the canal dried out within a few generations when Nineveh fell and his capital lost its glory.

## 6. Hydraulic Innovations as Inspiration for Modern Engineering to Solve Water Problems

The greatest innovation under Sennacherib's rule was the construction of an aqueduct (Fig. 3) to bring the water from his canal at Khinis gorge over a depression from a wadi (a riverbed that only carries water seasonally and is otherwise dry). It was an engineering masterpiece for ancient Mesopotamia, hundreds of years before the Romans built their first aqueduct. The aqueduct was over 280 metres long and 22 metres wide. On its highest side, it must have been almost nine metres high. The large stone blocks were carved with unfinished writing in cuneiforms; they were made for an administrative building, but the earlier project appears to have been cancelled, and instead the blocks were installed in random order at the aqueduct. Only a few blocks carry an original text from Sennacherib, in which he claims to be the constructor of this very first bridge for water:

> *[I am] Sennacherib, king of the world, king of Assyria. For a long distance, from the River Ḫaz[ur] [I had a canal dug to the meadows of Nineveh]. Over deep-cut wadis, I had an aqueduct of white stone blocks made, [and those waters I caused to pass over it]. (Bagg 200)*

**Fig. 3: The aqueduct of Sennacherib at Jerwan – an engineering masterpiece.**
*(Photo Al Baqer Jaafar)*

The topographic challenges of the landscape were taken into consideration in all hydraulic projects, to make them as efficient as possible. As Sennacherib described, he made many canals to direct water courses, but because of the height differences from the water source to its destination, the water was racing downstream and the flow needed to be slowed down to avoid damages by the water force. After seeing and being inspired by the marshes in south Babylonia, Sennacherib ordered the creation of an artificial wetland in 703 BCE:

> *To make the orchards luxurious, from the border of the town of Kisiri, to the plains of Nineveh, through mountain and low land, with iron pickaxes I cut and directed a canal. For a distance of [1 1/2 bëru] I caused the flow there [of] everlasting waters from the Tebitue. Inside those orchards, I made them run in irrigation ditches. (Bagg 200)*

Modern engineers still advise such methods for regions with water shortage, to create a low-cost solution for sustainable water supply. Such a wetland received the water and slowed down its flow, and attracted wild animals. In this wild reservoir, the king enjoyed the pastime of hunting.

Another hydraulic innovation was the kariz, introduced by his father Sargon II. Sennacherib improved by creating a tunnel from the river Bastora to the ancient city of Arbail (modern Erbil):

> *I, Sennacherib, king of the world, have dug three rivers in the Khani Mountains above the city of Arbail, and added the waters of springs from the right and left sides and made the canal run to the middle of Arbail, the seat of the great lady god [I]shtar, and made the course of it straight. (Bagg 200)*

The distinctiveness of this tunnel was not only in how it took its resources from groundwater, but also from the river. It was built against the direction of the water flow, to let the water run into the tunnel's opening more easily. The Bastora originates from the Safin Mountain and the Salah-i-Din area (Khani Mountains); while its banks are wide, today only a thin stream finds its way through the dry bed to the Higher Zab.

## 7. Gardens for Relaxation and Tree Shades for Resting – Authorities' Duty to Their People

Under the Assyrian kings, the hinterland of Nineveh developed into extensive farmland, including garden cultivation with diverse plants and herbs, but also into places for relaxation. The intensive planting program development in the Assyrian hinterland must have been the

origin for the synthesis of the "Hanging Gardens of Babylon". When the ancient Greek historian Herodotus visited the region, he was impressed by the fertile land. He describes agricultural production of wheat, barley, sesame, and millet, crops that to the present day are cultivated in the area.

In turning the dry landscape into a green and fruitful region under human control, the Assyrian kings continued a long tradition that had been recommended by the Sumerian king Shulgi, to plant trees in the fields for the wellbeing of their people: not only for food consumption but also in rural areas for places to rest during travels:

> *Because I am a powerful man who enjoys using his thighs, I, Shulgi, the mighty king, superior to all, strengthened [?] the roads, put in order the highways of the Land. I marked out the two-hour distances [and] built there lodging houses. I planted gardens by their side and established resting-places, and installed in those places experienced men. Whichever direction one comes from, one can refresh oneself at their cool sides; and the traveller who reaches nightfall on the road can seek haven there as in a well-built city. (Bagg 200)*

In a region with high summer temperatures, shade is needed to provide cooling and restful spaces. For this reason, water use for cultivation not only has an economic motivation, but is also an important addition to the landscape for ease and pleasure. This is a tradition that has had a major impact in the modern day, where, for example, urban planners provide parks in their communities and plant trees on the sidewalks.

## 8. Facing Challenges and Conflicts in Sustainable Water Mmanagement

The climate in Mesopotamia makes access to water resources essential. Settlements have been abandoned when water can no longer be secured due to the changes of river courses or mismanagement of canals. For this reason, the ruins of ancient cities such as Uruk, Ur, Kish, Lagash, Girsu, and many more, are found today in arid regions, while a few millennia earlier they were flourishing cities of the Euphrates and Tigris, with the sea much closer to them than the current location of the Persian Gulf. To this day, access to clean water is the main essence of our livelihood; however, it is in danger due to climate change and dam building that reduces water inflow. The unique and long-lasting lifestyle in the marshes was completely destroyed after Saddam Hussein solicited an order to dry out the wetland by stopping the water flow through dams. While the marshes were slowly rehabilitated after the fall of the regime, there exists another threat to water flow and access: efficient regulation on waste-management in Iraq is missing, resulting in pollution inflows

from urban areas and a degradation of the water quality downstream. The importance and the value of the waters is lacking the attention it deserves from a major part of society, as the past conflicts in the country dominate the topics of public conversation while water issues take a back seat.

## 9. Mediating Water Conflict to End Wars on Water

The ancient cities were independent city-states with loose alliances, creating the Sumerian civilisation of Mesopotamia in what became later Babylonian territory. The city-state of Kish was the strongest among them. The first legal agreement on water resources was drawn up by King Mesilim of Kish, around 2600 BCE. He acted as external mediator regarding the fertile valley on the border between the cities of Umma and Lagash, irrigated with a canal from the Tigris. Both cities claimed control of the canal; in a royal inscription, Urnanshe, king of Lagash, listed his accomplishments as ruler, constructing temples and palaces and digging nine canals for his city-state, including the canal in question. King Mesilim marked the boundaries with a stone stele, also known as the "Mesilim Treaty". One of the agreements in the treaty stipulates land lease for cultivation by Umma on Lagash territory, with an annual rental fee to cover the costs for the maintenance of the irrigation system. The authorities in Umma did not pay the rent they owed for several years, accumulating debts towards Lagash. A military conflict broke out from the dispute, becoming the first recorded war in history that was fought over water access. Several military campaigns were carried out by the king of Lagash Eanatum around 2470 BCE, and his nephew Enmetena around 2430 BCE, with the ultimate defeat of Umma. The conflict was resolved with Umma being forced to accept paying for the reconstruction of the canal, and changing the boundaries settled by Mesilim 200 years earlier.

The defeat of Umma was depicted on a stone stele today called the "Vulture Stele" (Fig. 4), recording Eanatum's victory. The broken fragments of the stele are reconstructed and are on display at the Louvre in Paris, after having been recovered from the ruins of Tello, the ancient city of Girsu. The stele depicts Eannatum leading a phalanx of soldiers into battle, trampling over their enemies; vultures fly above, carrying the heads of the dead soldiers. On the reverse of the stele is a mythological scene, with the mother goddess of Ninhursag holding the enemy's soldiers captured in a net and striking them with a mace. This artistic composition gives credit for the victory not only to the king and his soldiers, but to the support of Ninhursag, one of the seven great deities of the Sumerians. With the support of Ninhursag, goddess of the mountains and fertility, King Eannatum could not only settle the conflict, but also ensure his legitimacy as a ruler, personally and actively ensuring the

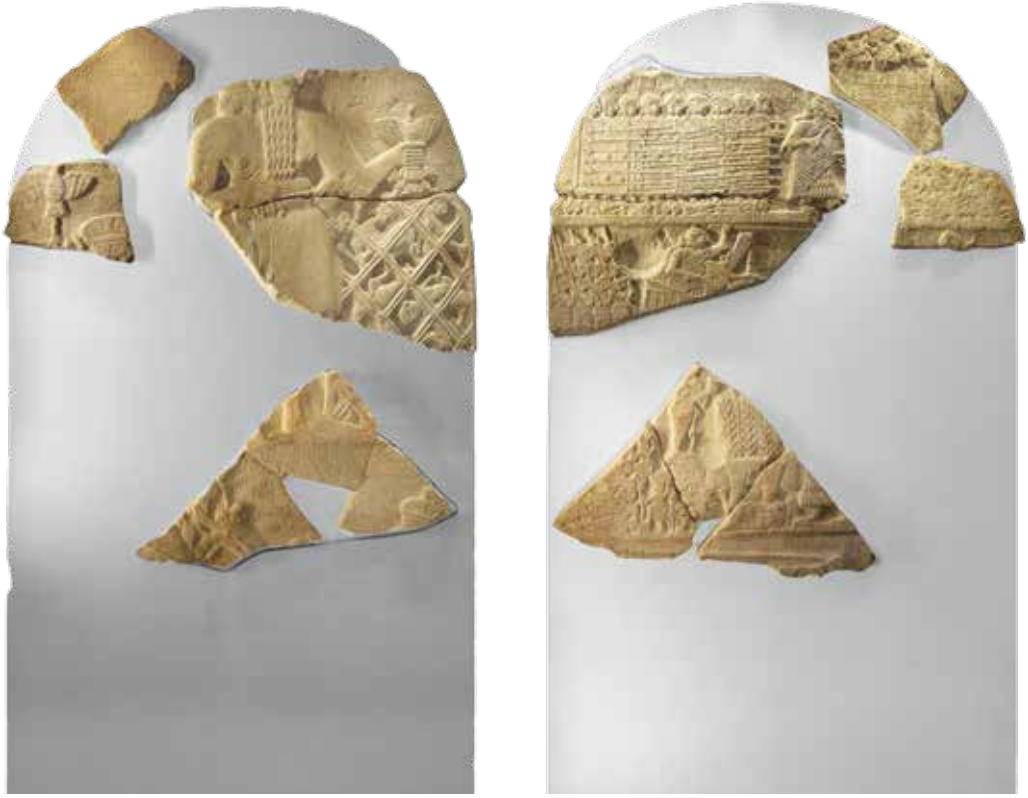

**Fig. 4: The so called "Vulture Stele"**

showing the defeat of the city state Umma under King Eanatum. Excavated at Tello and showcased at the Louvre in Paris.

keeping of the peace and securing water to ensure his land's fertility. However, the newly-established peace did not endure for long, and the conflict between Umma and Lagash repeatedly re-emerged, albeit on a smaller scale, for many generations. It was only finally settled by external political events, when the two city-states lost their independence and fell under the control of the Akkadian Empire.

Another territorial conflict over water access occurred at the end of the third millennia BCE during the third dynasty of Ur, again in southern Mesopotamia. The rulers of the city-state of Ur considered the Amorites, a nomadic pastoral group to the west, a threat to their own territory. King Shulgi ordered the building of a great wall between the Euphrates and Tigris, named Muriq-Tidnim, or "to repel the Tidnum Amorites", so that they could not water their flocks on the banks of the River Abgal, Tigris, and Euphrates. How exactly the conflict reached a stage of physical territorial separation and restriction of water access remains unclear, since the two societies had previously interacted peacefully. Between the nomadic Amorites and the urbanised Sumerians, there was a relationship based on mutual interest and exchange of animal products in

return for agricultural goods and crafted objects. Many Amorites had already integrated into the urbanised society of Mesopotamia, and some Amorite individuals held even high political positions in it. Nevertheless, the societies were rivals, and may have conflicted over local hegemony, as well as practical problems arising with a growing demand for water. However, Ur's restriction of the Amorites' access to water did not go unanswered. The commander tasked with building the wall, Puzur-Shulgi, struggled as the construction work came under Amorite attack, and wrote a letter to Shulgi to request more men to defend the site and to hasten the erection of the wall:

> *The enemy has replenished his strength for battle. However, my strength is limited. I cannot strengthen the fortress further or guard it […] against him. […] As for the sector […] of, the manager of the Sigsig watercourse […] lengths of […] on top of it are no longer fixed. […] As for the sector […] of Takil-Ilishu, the canal inspector […] of the Ab-Gal and Me-Enlila watercourses: 50 nindan lengths of the edge have been removed, and in the middle of it they collapsed. (Black et al. 1998-2006)*

Puzur-Shulgi not only complained about the raids during the construction work, but also reported on the occurrence of complications along different sections of the wall under the supervision of various officials and inspectors. This correspondence between the commander and his king shows how water management suffered under heated and violent circumstances.

In the early stages of Mesopotamian civilisation before urbanisation, seasonal rainfall in the north made rainfed agriculture very efficient, while in the south the use of water canals was essential for farming. Sustainable water use required different stages of water management and regulation, so that irrigation would not lead to flooding, desertification from removing too much water from the rivers, or unwanted salinisation from ruining fertile land. Water irrigation began with simple and most probably locally-organised systems, and evolved into complex state-managed schemes that involved large-scale hydraulic techniques, and building canals with governmental financial support and supervision, including frequent maintenance. As mentioned above, the concept of rulership in Mesopotamia centred on the provision and protection of secure cultivation as the economic foundation of the region. The role of state institutions in these matters thus included not only the construction and maintenance of irrigation infrastructure and the distribution of water, but also the management of labour duties, including payment, and of course the resolution of small- and large-scale conflicts, internally with local communities or regionally with rival groups.

## 10. Regulation and Policy Making on Water Control Reflected in Ancient Codes and Laws

In addition to irrigation technologies and skilled manpower, water management required some form of legal frame or code, to provide solidarity, responsibility, and accountability with consequences if legal agreements were broken. No detailed guidelines on the organisation of water control and the role of the authorities have survived, but the few available laws from different periods and regions emphasise a common sense of equitably and responsibly sharing water. It appears these are reactions to issues that arose frequently and needed suitable and just regulation. A sense of the socio-political complexity regarding water management can be obtained from the ancient text of cuneiform clay tablets, such as official letters or collection of laws and other inscribed materials.

Laws in ancient Mesopotamia covered a wide range of public and private affairs, including marriage, property rights, and minor and major crimes, as well as the resolution of conflicts between different parties. The oldest preserved law code written on cuneiform tablets comes from the reign of King Urnammu (2100–2050 BCE). It is not preserved completely, and nothing direct on water regulation is recorded. Nevertheless, two paragraphs mention the "river ordeal" to prove the innocence or guilt of a person accused of witchcraft or adultery:

> *If a man accused the wife of a man of adultery, and the river ordeal proved her innocent, then the man who had accused her must pay one-third of a mina of silver. (Civil 2011)*

This action was only taken when other attempts to solve the case had failed; the court sought a judgement from water, which was considered as a divinity itself, or at least a direct creation of the gods. The tradition of dunking suspects into bodies of water was in use during Christian medieval Europe until the 17th century. This juridical role of the river in such cases links water to its divine origin, enabling it to dispense justice within the Mesopotamian worldview.

## 11. Shamash and Hamurabi As The Most Prominent Law-Makers

Around 300 years later, we can read the first laws concerning water in the famous Codex of Hammurabi (Fig. 5), one of the oldest and completely preserved law-codes. The laws were not newly invented by King Hammurabi, but rather represented a continuity of a long tradition and adaptations of older laws. The Codex of Hammurabi takes the shape of an index finger over two metres high, made of black stone. Whilst older written laws are known to have existed, the black stone of Hammurabi is one of the most significant legal objects for two reasons. It was

excavated not in Babylon (Hammurabi's capital) itself, but in Susa, the capital of Elam. Hammurabi's Babylon gradually sunk under water with the rise of the groundwater level over time. The Elamite king Shutrul-Nahunte conquered the city in the 12th century BCE, and plundered its palace and temples. He and his army took valuable objects, including the Hammurabi stele, to their own capital, around 700 years after the stele's first erection in Babylon. This is significant: while Hammurabi's ruling dynasty had long vanished, the value of his code was such that it was preserved for hundreds of years by successive generations of Babylonians. The fact that the Elamite king did not destroy the stele, but rather transported it undamaged to his palace, also reflects the degree of respect and appreciation for the code of Hammurabi, even from the Babylonians' prolonged arch-enemy. Its value is also shown in the existence of ancient copies spread around different ancient Mesopotamian cities, but also in modern times: the original object, displayed at the Louvre Museum, has become one of the most reproduced objects of ancient Mesopotamia, with replicas standing in numerous museums, as well as at the Law School of Chicago, and in other universities.

The black stone stele of Hammurabi displays on its front, at the top, an image of the king facing the seated Shamash, the sun god who brings light over darkness and is the fulfiller of justice and equity. Underneath the scene, 282 laws dealing with diverse matters are listed. In the

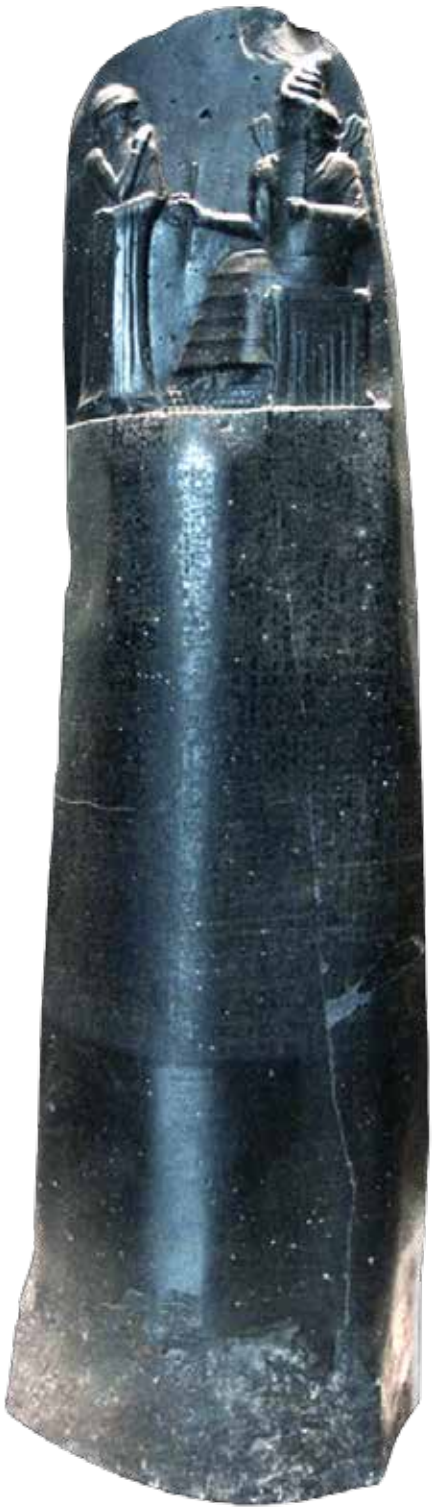

**Fig. 5: The Codex of Hammurabi with 282 laws. Excavated at Susa in Iran and exhibited at the Louvre in Paris.**

preamble, King Hammurabi claimed to have received these laws directly from Shamash; it was the king's role as ruler to fulfil and enforce the divine laws over his subjects. Four laws refer in detail to water policy, paragraphs 53 to 56:

*53) If anyone be too lazy to keep his dam in proper condition, and does not so keep it; if then the dam break and all the fields be flooded, then shall he in whose dam the break occurred be sold for money, and the money shall replace the corn which he has caused to be ruined.*

*54) If he be not able to replace the corn, then he and his possessions shall be divided among the farmers whose corn he has flooded.*

*55) If any one open his ditches to water his crop, but is careless, and the water floods the field of his neighbour, then he shall pay his neighbour corn for his loss.*

*56) If a man let in the water, and the water overflow the plantation of his neighbour, he shall pay ten gur of corn for every ten gan of land.*[1] *(King 1910)*

The cited laws reflect the mandatory responsibilities for the safe and secure use of water canals in the agricultural fields, preventing harm being done to other neighbouring farmers. Financial reparations were required from the accused to compensate the loss of neighbouring fields. The paragraphs cover active, but also passive, actions of a suspect: having access to water irrigation comes with the responsibility of maintaining the canals, to avoid damage resulting from negligence, and to ensure a controlled and deliberate use of water with properties kept in consideration.

(1) Gur and gan were Babylonian units of weight.

## 12. Conclusion

We have seen how important the rivers were in ancient Mesopotamia, and they continue to have an indispensable role for the modern state of Iraq. The review on the different challenges, innovations and role of water management both in the past and today are the pillars of peacebuilding. Looking into ancient resources provides us fruitful inspiration for our coming generation to create a better future. Learning from the past is the first step of improving the present.

# 13. References


- Adamo, Nasrat, and Nadhir Al-Ansari. «In Old Babylonia: Irrigation and Agriculture Flourished Under the Code of Hammurabi (2000-1600 BC): In Old Babylonia: Irrigation and Agriculture Flourished Under the Code of Hammurabi (2000-1600 BC).» Earth Sciences and Geotechnical Engineering 10, no. 3 (2020): 41-57.
- Adamo, Nasrat, and Nadhir Al-Ansari. «The Neo-Assyrians: Warriors and Canal Builders under Sennacherib (911-609BC): The Neo-Assyrians: Warriors and Canal Builders under Sennacherib (911-609BC).» Earth Sciences and Geotechnical Engineering 10, no. 3 (2020): 59-86.
- Altaweel, Mark. «Southern Mesopotamia: Water and the rise of urbanism.» Wiley Interdisciplinary Reviews: Water 6, no. 4 (2019): e1362.
- Bagg, Ariel M. «Irrigation in northern Mesopotamia: Water for the Assyrian capitals (12th–7th centuries BC).» Irrigation and Drainage Systems 14, no. 4 (2000): 301-324.
- Bagg, Ariel M. «Assyrian Technology.» A Companion to Assyria (2017): 511-521.
- Benito, Carlos Alfredo. «'Enki and Ninmah' and 'Enki and the World Order'.» (1969).
- Black, Jeremy, and Anthony Green. «Gods, Demons and Symbols.» Ancient Mesopotamia, London (2004).
- Black, Jeremy A., Graham Cunningham, Jarle Ebeling, Esther Flückiger-Hawker, Eleanor Robson, Jon Taylor, and Gábor Zólyomi. «The electronic text corpus of Sumerian literature.» Oxford (1998). Available at: http://etcsl.orinst.ox.ac.uk/ (Accessed 08.10.2020)
- Blaschke, Theresa. Euphrat und Tigris im Alten Orient. Harrassowitz Verlag, 2018.
- BOWE, PATRICK. «A DELIBERATION ON THE HANGING GARDENS OF MESOPOTAMIA.» Garden History (2015): 151-167.
- Cooper, Jerrold S. Reconstructing history from ancient inscriptions: the Lagash-Umma border conflict. Undena Publ., 1983.
- Dalley, Stephanie. «Ancient Mesopotamian gardens and the identification of the hanging gardens of Babylon resolved.» Garden History (1993): 1-13.
- Espak, Peeter. «The god Enki in Sumerian royal ideology and mythology.» PhD diss., 2010.
- Fales, Frederick Mario, and Roswitha Del Fabbro. «Back to Sennacherib's aqueduct at Jerwan: A reassessment of the textual evidence.» Iraq 76 (2014): 65-98.
- Irani, Kaikhosrow D., and Morris Silver, eds. Social justice in the ancient world. Vol. 354. Greenwood Publishing Group, 1995.
- King, L. W. «Translation of the Code of Hammurabi.» Internet Ancient History (1910).
- Retrieved September 16, 2020, from https://avalon.law.yale.edu/ancient/hamframe.asp
- Kornfeld, Itzchak E. «2. The Development of Water Law in Mesopotamia, The Evolution of the Law and Politics of Water (Joseph Dellapenna & Joyeeta Gupta eds. 2009).»
- Kornfeld, Itzchak E. «Mesopotamia: a

history of water and law.» The Evolution of the Law and Politics of Water, pp. 21-36. Springer, Dordrecht, 2009.

- Luciani, Marta. «More than just Landscapes of Pleasure. The Garden Frame in the 'Investiture' Wall Painting at Mari.» Wiener Zeitschrift für die Kunde des Morgenlandes (2010): 99-118.
- Luckenbill, Daniel D. «The Ashur Version of the Seven Tablets of Creation.» The American Journal of Semitic Languages and Literatures 38, no. 1 (1921): 12-35.
- Michalowski, Piotr. «Presence at the Creation.» In Lingering over Words: Studies in Ancient Near Eastern Literature in Honor of William L. Moran, pp. 381-396. Brill, 1990.
- Civil, Miguel. «The law collection of Ur-Namma.» Cuneiform royal inscriptions and related texts in the Schøyen collection (2011): 221-286.
- Pruitt, Madeline Lawson. «Cultural Identity, Archaeology, and the Amorites of the Early Second Millennium BCE: An Analytical Paradigmatic Approach.» PhD diss., UC Berkeley, 2019.
- Raaflaub, Kurt A., ed. War and peace in the ancient world. Malden: Blackwell, 2007.
- Reade, Julian. «Studies in Assyrian Geography: Part I: Sennacherib And The Waters Of Nineveh.» Revue d'Assyriologie et d'archéologie orientale 72, no. 1 (1978): 47-72.
- Rost, Stephanie. «Navigating the ancient Tigris–insights into water management in an early state.» Journal of Anthropological Archaeology 54 (2019): 31-47.
- Rost, Stephanie. «Water management in Mesopotamia from the sixth till the first millennium BC.» Wiley Interdisciplinary Reviews: Water 4, no. 5 (2017): e1230.
- Rost, Stephanie, Abdulamir Hamdani, and Steven George. «Traditional dam construction in modern Iraq: A possible analogy for ancient Mesopotamian irrigation practices.» Iraq 73 (2011): 201-220.
- Spar, Ira. «Mesopotamian Creation Myths.» Heilbrunn Timeline of Art History (2000).
- Vacin, Ludek. «Šulgi of Ur: Life, Deeds, Ideology and Legacy of a Mesopotamian Ruler as Reflected Primarily in Literary Texts.» Declaration for PhD Thesis, University of London (2011).
- Woods, Christopher. «On the Euphrates.» Zeitschrift für Assyriologie und vorderasiatische Archäologie 95, no. 1-2 (2005): 7-45.