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RIVER TRANSPORT IN MESOPOTAMIA (5900–539 BC)

ABSTRACT

Water transport was the earliest mode of transport in ancient Mesopotamia. Thanks to the Tigris and Euphrates rivers, which run along the whole length of Mesopotamia, and a network of canals, river transport facilitated communication, exchange, as well as cultural and military contacts between towns. This paper focuses on the riverine transport in Mesopotamia and its development from the Ubaid (5900–4200 BC) to the Neo-Babylonian period (626–539 BC). The importance

of river transport in Mesopotamia is discussed, considering its role as a means of communication, exchange of goods and ideas, and a factor influencing the socio-political transformation in the region. Watercraft is discussed to the full extent, with particular emphasis on different types of ships and their functions. The chronological development of watercraft in Mesopotamia is also analysed based on boat models, cuneiform texts, and representations of boats in the art.

Keywords: boat, ship, Euphrates, Tigris, river, transport, Mesopotamia

Introduction

River transport was the main means of communication in Mesopotamia. This was a region dominated by the Tigris and Euphrates rivers and their tributaries, as well as by a large number of artificial canals in the southern part of the region. Rivers were crucial for living in Mesopotamia – they afforded not only a lifeline for human settlement but also provided an enormous transportation and exchange system. From the beginning of civilisation, the inhabitants of Mesopotamia were interested in navigating rivers as an easy and economical way to travel, communicate, and circulate goods.

The present paper discusses the development of river transport in Mesopotamia from the Ubaid period (5900–4200 BC), when the earliest evidence of watercraft is available, to the end of the Neo-Babylonian period (626–539 BC). The major objective is to make a synthesis of riverine transport in Mesopotamia with a special reference to ship typology and its development over time. Another purpose is to investigate the materials and techniques employed in shipbuilding and the function played by boats in the transport of goods and ideas.

River transport allowed Mesopotamian towns to import the necessary commodities in bulk from faraway resource areas across a vast network of waterways. This means of transport had many advantages: it was cheap and fast, as it would shorten journey times and transport costs. An important reason behind the popularity of water transport was also the fact that annual flooding regularly inundated immense areas of the country. In the flooding season, inhabitants of Mesopotamia focused on river transportation. One of the inscriptions mentions that “when the road was good they walked and when it was not good they sailed by boat”.¹

Water transport also played a role in the socio-political transformation of the region. As a common means of communication, it had an integrative and transformative effect on the societies of Mesopotamia, contributing to the spread of ideas and socio-political processes. Waterways were important factors in several of the major transformations of the region, including the Ubaid phenomenon or the urban revolution and state formation in the Uruk period.² Data on river transport in Mesopotamia includes boat models, representations of boats or boat transport in art, and cuneiform records.

¹ Oppenheim 1956, 94.

² Carter 2012.

Materials and techniques

The materials needed for boat-building mainly included reed, wood and bitumen. Perhaps the most abundant resource was reed from the marshes of southern Mesopotamia. It was a common material used not only for boat construction, but also for manufacturing baskets and mats, house construction, and as fuel or fodder.

Numerous Ur III texts specify the use of reeds for boat-building.³ In one of the texts, 4260 bundles of *šid*-reed and 12384 bundles of *izi*-reed are mentioned as material used for building a Magan boat.⁴ The bundled reed boats used by the Marsh Arabs of southern Iraq were coated on the exterior with bitumen.⁵ Cuneiform texts also refer to caulking ships with bitumen, especially the vessels of Magan and Dilmun.⁶ This coating is said to provide extra strength to the wood or reed and to have a waterproofing effect. At the Ubaid-related site of H3, located in modern-day Kuwait, a number of barnacle-incrusted bitumen pieces with reed impressions were uncovered which are interpreted as fragments of such waterproof coating of reed-bundled boats.⁷

Wooden plank-built boats were also used in Mesopotamia. Economic and religious texts reveal that some boats were built almost entirely of wood, while others were constructed of a combination of wood and reed. The most important type of wood was possibly the local pine or fir tree. Poplar, willow and palm trunks were also widely used for boat-building and accessories. Some of the trees, like cedar, cypress, mulberry and laurel were imported from the mountains of Lebanon, Dilmun, and Umluha.⁸

Enormous quantities of palm-fibre and palm-leaf ropes are mentioned in cuneiform records, suggesting that at least some of the watercraft was sewn or stitched. The Ur III texts list over eight tonnes of palm-fibre rope and one tonne of palm-leaf rope, together with six tonnes of fish oil probably used as an anti-fouling agent on the ropes.⁹ Another text affirms the use of 59290 wooden pegs for the boatyards of Umma during the Ur III period, indicating the use of wooden pegs in combination with stitching.¹⁰ Stitched plank vessels were traditionally made shell-first, with the frame inserted afterwards. Two techniques were employed in ancient wooden shipbuilding.¹¹ In the shell-based technique, the outer hull is construct-

ed first, after which floors, frames and other supports are inserted to provide extra strength. In the skeleton-based technique, a structure consisting of a keel, a stern and a stern post, and a number of frames is erected first. Next, hull plating is assembled around the pre-erected skeleton structure.

Leather also appears in texts dealing with ship and boat outfitting. One of the texts mentions the construction of a wooden frame covered with leather, in three various colours, which involved the use of eighty-five skins on the boat of Amar-Sin.

Textual evidence

In the archaic texts from Uruk, an ideogram for 'ship' is already attested. The oldest boat-shaped symbols show a boat with high ends (Fig. 1).¹² The Sumerian term for 'boat' was *má*, while the term *má-gur* was also frequently used to identify sacred and ceremonial boats of the gods and kings. In Akkadian, 'boat' is known as *eleppu*.

The cuneiform texts concerning watercraft mention different functional categories of vessels, indicating that each ship was specialised to carry a specific cargo.¹³ The type of transported goods was the main reason for the differences in the construction of ships.¹⁴ There were ca. forty types of vessels, as estimated based on cuneiform texts.¹⁵ These include sailing boats, rental boats, store boats, fishing boats, fodder boats, wine boats, boats for dry bitumen, harbour boats, and war boats.¹⁶ Other uses of boats are also mentioned in written records: vessels which carry grain from the fields, silver-transporting boats, grain-transporting boats, and boats transporting apples. A text from the Old Babylonian period indicates that certain changes had to be made to a boat which had been used to carry dried bricks before it could be used to transport a tree trunk.¹⁷ While these terms reveal little about construction, they speak much about the uses of Mesopotamian watercrafts. Certain kinds of boats were named after geographical locations, including the Magan boat, the Dilmun boat, or the Mari, Agade, and Assur boats.

Ships used to transport passengers were called *GIS.MA'*. *U5* in Sumerian and in Akkadian – *elep rakabu*. The structure of this type of vessel was unique in its

³ Waetzoldt 1992, 128.

⁴ Potts 1997, 107–117.

⁵ Ochsenschlager 1992, 67.

⁶ Potts 1995, 562.

⁷ Carter 2010.

⁸ Fadil 1989, 175–176.

⁹ Landsberger 1967, 7.

¹⁰ Potts 1997, 126–128.

¹¹ Mäkelä 2002, 26.

¹² Salonen 1939, 196.

¹³ al-Metwally 1994, 312.

¹⁴ Leemans 1960, 10.

¹⁵ Rashid 1981, 104.

¹⁶ Salonen 1939; Weszeli 2009, 161.

¹⁷ al-Hashemi 1981, 40; Oppenheim 1956, 93.

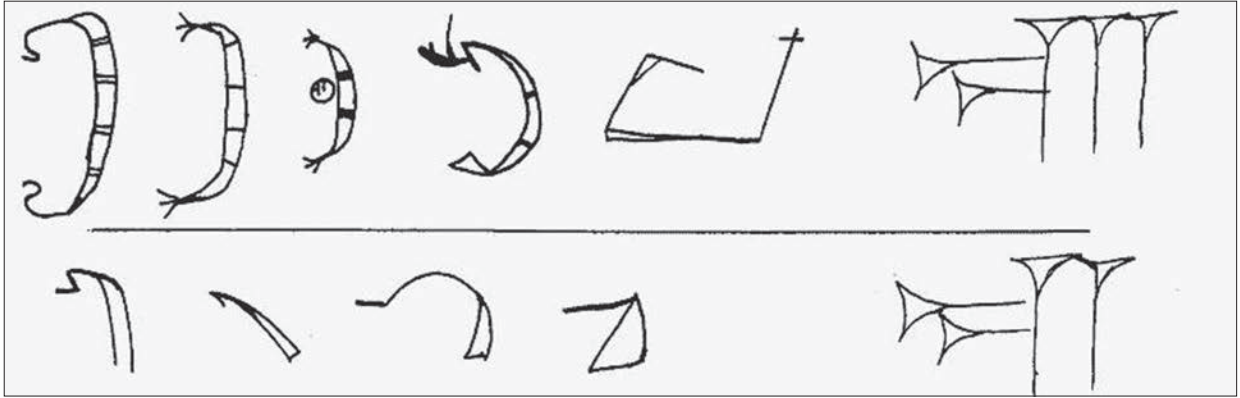


Fig. 1. Boat-shaped symbols in archaic script (after al-Hashemi 1981, 39, fig. 2).

Table 1. Types of ships.

	Ancient names	Translations
1	Malallu = gls MA-lal	Transport ship
2	Rukabu / rakubu / rakabu	Passenger transport ship
3	Eleppu muttabritu	Ship conveyor
4	Elep igri / Leppu Sa agurri	Dry brick ship
5	GIS MA2.SUM SAR (= eleppu sa sumi)	Ship transporting garlic
6	GIS MA2.IN.NU (= eleppu sa tibni)	Ship transporting hay
7	GIS MA2.GI (= eleppu sa qane)	Ship transported by the thorn
8	Elep Qarabi	War ship
9	Elep Tillate	Ship transporting soldiers
10	GIS MA2.SE (= eleppu sa se)	Barley ship
11	GIS MA2.SE.GIS.I3 (= eleppu sa samassammu)	Sesame ship
12	GIS MA2.ZI3 (D) (= eleppu sa qemi)	Flour ship
13	GIS MA2.ZU3.LUM (= eleppu sa sulupi)	Dates ship
14	GIS MA2.SAR (= eleppu sa sizabi)	Milk ship
15	GIS MA2.U2 (= eleppu sa sammi)	Herbal ship
16	GIS MA2.KU6 (= eleppu sa nuni)	Fishing vessel
17	GIS MA2.I3.GIS (= eleppu sa samni)	Margarine ship
18	GIS MA2. NINDA (= eleppu sa akali)	Bread ship
19	GIS MA2.SIR (= eleppu sa seri)	Meat ship
20	GIS MA2.SIG (= eleppu sa sapati)	Wool vessel

length. One of the texts mentions that the length of one of these boats was about 12.5 metres. The high intensity of river transportation prompted the creation of a new type of boat called the ‘rescue boat’, which would save people and their cargo during accidents on the Tigris or Euphrates rivers. Information available on warships indicates that the Sumerians and Babylonians did not know military ships (*elep qarabi*), and their watercrafts were only used to carry soldiers. The Assyrians used a variety of vessels to transport soldiers, horses, chariots and supplies across rivers, but they also produced ships specifically for military purposes. Assyrian naval warships were influenced by Phoenician watercraft.

Texts reveal little about boat construction, but they provide some information on their capacity. The watercraft ranged in size from 10 to 120 *gur*, some being as large as 360 *gur* (1 *gur* = 300 litres).¹⁸ Boats of 60 *gur* appear to be the most frequent, with 10-, 20-, and 120-*gur* boats also relatively common. During the Ur III period, texts from Ur (e.g. UET III 272) mention boats varying in size from 1 to 300 *gur*.¹⁹ Occasionally, a 60-*gur* boat at Lagash during the Ur III period could carry 150 talents of bitumen, while at Mari in the Old Babylonian period, a 6 tonne delivery of wine, consisting of three hundred jars of 10 *qa* (litres), each weighing 20 kilograms, was considered a normal load for a 20-*gur* vessel.²⁰ As for the size of the boats, texts mention the size of only two types: the first is a passenger boat, *rukubu*, with a length of about 12.5 metres, whereas the second, the *malallu* transport ship, was 6.0 metres in length, 4.0 metres wide and 3.0 metres deep. According to Salonen, the largest Babylonian vessel was 15.0 metres long.²¹ Very large ships made from timber in private shipyards were used for long sea journeys to countries such as Meluhha and Dilmun.²²

In addition, rental agreements for ships and several boat rental contracts are known from cuneiform texts. The charges for hiring watercrafts depended on the cargo being transported.²³ The daily cost of renting a sailing ship can be inferred from the ‘Laws of Hammurabi’: “If one hire a fast ship he shall pay two and one-half grains (ca. 20 g) per day” or “If a man hire a sixty-tonne boat, he shall give a sixth part of a shekel of silver (ca. 1.4 g) per diem for her hire”.

Accidents and infractions were a part of river traffic. There are several provisions in the ‘Laws of Hammurabi’ for compensation to owners for goods damaged or lost during transport. They often involve arresting the boat’s captain or its renter for damages to the boat or its cargo, as

well as arrests for damages due to accidents involving more than one vessel. When one boat going upstream collided with another coming downstream, “the captain of the upstream travelling ship rammed and sunk by a downstream travelling ship, the captain of the more manoeuvrable downstream travelling ship must replace the other ship as well as the lost goods.” However, if the renting captain raised the sunken vessel, he owed only half of its price to the owner. In fact, the same attitude towards ‘negligence’ is already found in the earlier Laws of Eshnunna, where a negligent captain is responsible for restoring not only the lost goods but also the ship to its owner.

The investigated textual evidence implies the existence of large dockyards and boat-building facilities in southern Mesopotamia with numerous personnel, sometimes under state control. Several grades of personnel associated with shipyards were identified, including shipwrights, unskilled dockyard workers, specialist builders, carpenters, bitumen workers, and cloth/sail workers.

Chronological review

Archaeological evidence shows that water transport was the earliest mode of transportation in Mesopotamia. Before the invention of the wheel, waterways were best for circulating heavy loads and boats were one of the earliest forms of transport. In Mesopotamia, the earliest attestations of water transportation are dated to the Ubaid period (6th millennium BC). Land transportation probably developed in Mesopotamia early in the 4th millennium BC, although the use of cattle as pulling power may have begun earlier.²⁴

The oldest methods used by humans to transport cargo through rivers possibly made use of tree trunks since these are buoyant and glide over water, even with added weight. Cylindrical shapes flow through water more efficiently than other floating materials.²⁵ Having used tree trunks to transport goods along rivers for some time, people refined them according to their needs. The first of these improvements was to create an opening in the centre of a trunk in order to create a place to protect the navigator of the vessel and his property. The second involved the front part of the vessel which was carved into a narrowed point as a means of steering the vessel more easily than in the case of the previous construction.²⁶

In the Ubaid period, clear evidence for water transport comes from the appearance of ceramic boat models

¹⁸ Widell 2009, 159.

¹⁹ Potts 1997, 129.

²⁰ Potts 1997, 129.

²¹ Salonen 1939, 155–156.

²² Altun 2015, 60.

²³ Potts 1997, 129.

²⁴ Carter 2018, 71.

²⁵ Rashid 1981, 100.

²⁶ Curtis, Tallis 2008, 26–29; Rashid 1981, 100.

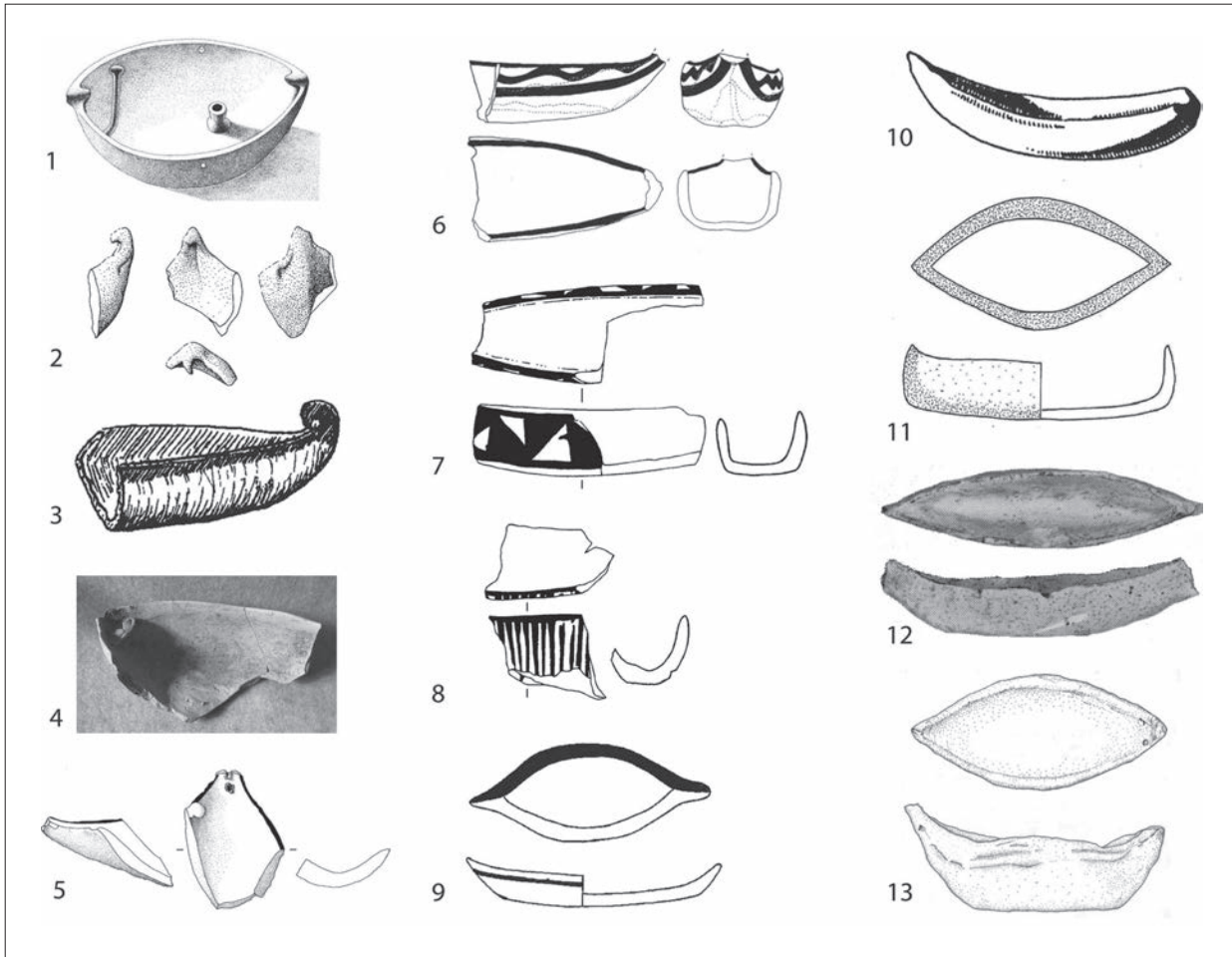


Fig. 2. Ubaid-period boat models (after Carter 2018, fig. 2.7).

(Fig. 2). The earliest of these indicate that several kinds of vessels were used for riverine transport. This variety implies an advanced watercraft tradition already in this early period. The majority of boat models in the Ubaid period have curved ends and slightly flattened bottoms, while others show more vertical or truncated ends. Some of the models have piercings along their edges which are usually interpreted as holes for rigging, suggesting the use of a mast and sail. A model from Eridu represents a sailing boat as evidenced by a central shaft for a mast (Fig. 2. 1).²⁷ Both ends of the model have holes, probably for rigging. The curled ends of several Ubaid models suggest a reed-bundle construction. The coating on one of the models from Eridu indicates that some were coated with bitumen, an early piece of evidence that boats were waterproofed. Most of the models from the Ubaid period may represent riverboats rather than sea-going ships.

Boat models in the Ubaid period are found at various sites covering the area from modern-day Kuwait to northern Mesopotamia. Southern Mesopotamia yielded the largest number of ceramic boat models, stressing the importance of riverine transport in this region. Finds of two boat models at Tell Mashnaqa (Fig. 2. 6), located in the Khabur triangle of north-eastern Syria, and Tell Zeidan (Fig. 2. 4), located on the Balikh River, clearly show that inhabitants of northern Mesopotamia and Syria also made use of boats for transport and fishing as early as in the Ubaid period.²⁸

In the 4th and 3rd millennium BC in southern Mesopotamia, flat-bottom boats with a characteristically upturned prow and stern raised high above the waterline were common, as can be seen on the cylinder seals from this period.²⁹ In some cases, boats of this type had leaf ornaments decorating the high horn-like stern and prow

²⁷ Safar *et al.* 1981, 231, fig. 111.

²⁸ Thuesen 2000, 73, fig. 5; Stein 2010, fig. 5.

²⁹ Potts 1997, 122–123.

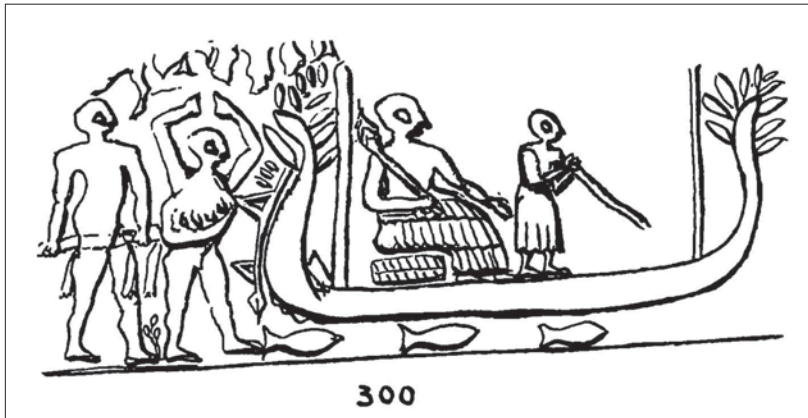


Fig. 3. Boat with high stern and prow decorated with leaf ornaments (after Legrain 1936, pl. 16, 300).



Fig. 4. The boat journey of the god Ea (cylinder seal impression, ca. 2300–2150 BC) (after Ward 1910, fig. 102).

(Fig. 3). The majority of boats were ceremonial in character, acting as journey vessels of the gods (Fig. 4). A mast or sail is never shown, possibly because these were river boats. Boat motion depended directly on the paddle. Nearly all depictions show a man punting at the front and another paddling or steering at the back which was high and curved (Fig. 5).³⁰ The early Dynastic and Akkadian glyptics shows some boats constructed of reed bundles, with reed and binding cords clearly depicted. A unique find is a silver model from the Royal Cemetery at Ur, with a flat floor and gently upward-curving ends and a possible canopy support in the middle. This silver model with seven thwarts and six pairs of paddles seems to correspond with the common fishing and hunting canoes of today's Marsh Arabs, especially the modern reed vessels.³¹

Cylinder seals often show cultic scenes where divinities are seated in boats with high up-curving ends. The *maqurru* is a barge used for ritual processions of the

gods by water. Kassite depictions show that boats with a curved hull and inward-curved ends were still in use in the late 2nd millennium BC.³² Assyrian reliefs also show a long, narrow reed boat of this type, employed usually in the marshes of southern Mesopotamia.

Ship types

A wide range of watercraft types and sizes was employed on the rivers and canals of Mesopotamia. The variety of boats probably reflects differences in construction, materials and functions. The native Mesopotamian typology of boats used geographical distinctions, such as 'Dilmun boat', 'Mari boat' or 'Assur boat', and the capacity of vessels rather than provenance or appearance.

The classification of southern Mesopotamian watercraft is usually based on distinguishing between the two most dominant materials used for boat construction

³⁰ Garrison 1989, 9–10.

³¹ Johnstone 1988, 10.

³² de Graeve 1981, 35–36, pls 30–31.



Fig. 5. Boat with Inanna symbol (cylinder seal impression, Uruk period) (after Foster 2009, fig. 1. 8).

– reed and wood.³³ As the evidence considering building materials is sometimes equivocal, in this paper boat types have been distinguished based on the general shape and construction as a major feature. Reed vessels may be identified on the basis of sets of parallel lines or striations, representing the bundles of reed which they were made of and seams, where the reed boats were sewn together.³⁴ However, not all reed boats have such unambiguous depictions. For example, boats on the early Dynastic glyptic generally lack the striations which enable reliable identification of reed constructions. Nevertheless, the curved nature of their ends and the general shape suggest that these were made of reeds as well.

Both sailing and non-sailing boats were used in Mesopotamia. With a sail, it was possible for a boat to move against the current of the river. Vessels with sails were available to southern Mesopotamian societies relatively early, as shown by a clay model boat dated to the late Ubaid, with a central shaft for a mast and sail from Eridu. The presence of a sail can also be suggested by the piercings at both ends of some models, which are usually interpreted as holes for rigging. Although riverine boats sometimes used sails, they were more usually propelled with oars or paddles or steered with steering poles, while the current provided the motive power. To return upstream, boats could be towed, sailed, or rowed against the current, although this was a laborious task.

A variety of watercrafts are attested on cylinder seals and wall reliefs – as models, and in written cuneiform sources: flat- and round-bottomed double-ended boats of reeds or wood, rafts on inflated skins, and basket-like water crafts covered with leather.

Flat- and round-bottomed double-ended boats made of reeds and wood

Iconography attests the existence of both flat- and round-bottomed ships. Flat-bottomed boats constitute the majority of riverine ships preserved from the Ubaid to Neo-Babylonian periods. There were differences in form or construction of boats which usually involve the shape of the prow and stern. Further variation is demonstrated by the difference in building material – vessels were made of reeds or wood. Based on the bottoms and the shape of their prows and sterns, ships can be divided into several types: crescent-shaped boats with rounded bottoms and simple outward ends, and flat-bottomed boats with straight vertical or out-turned ends, simple inward ends, inward-curved ends, and out-turned curved ends. The flat-bottomed boats with high, upturned prows and sterns are commonly shown in late Uruk and 3rd millennium glyptics. The shape and coiled ends of the vessels suggest a reed-bundle construction. Boats of this type were possibly coated with bitumen which increased their waterproof qualities. There are flat-bottomed boats with shorter ends, examples of which are depicted on Neo-Assyrian reliefs. They were commonly used in the marshes in the lower reaches of the Tigris and Euphrates. Assyrian reliefs show reed boats: some of the rafts are simple flat ones (marsh dwellers?), others have strongly up-turned ends (Fig. 6). It is clear that reed boats were well suited for local use on rivers and have had a long tradition – from the Ubaid period to the present day. In the Sumerian literary composition known as ‘Nanna-Suen’s Journey to Nippur’, the moon deity Nanna-Suen sends out men to collect materials necessary for the construction of his Magur-boat.³⁵ As a boat with a high, curving

³³ Potts 1997, 122.

³⁴ Casson 1971, 22–23.

³⁵ Ferrara 1973, 11, 37–58.



Fig. 6. Assyrian Relief from the Palace of Sennacherib in Niniveh (after Altun 2015, fig. 6).

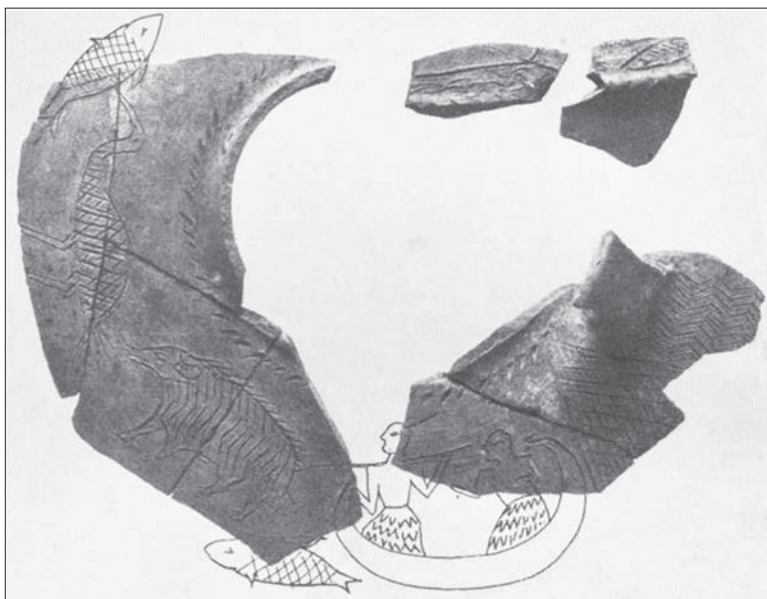


Fig. 7. Crescent-shaped boat on a vessel from Khafaja (after Frankfort 1934, 68, fig. 59).

proW and stern at either end, the Magur-boat was said to resemble the moon in its crescent phase when it lies on its convex side.

Archaeological evidence indicates that reed and/or wood plank crescent-shaped double-ended boats were widely used in the Tigris-Euphrates fluvial system very early, at least since the 6th millennium onward – first evidenced in Ubaid and still attested in the Neo-Assyrian period (Fig. 7). The use of such boats is amply attested in modern ethnographic records from southern Iraq. These vessels appear almost identical to *sasha* – an Arabian bundle boat still in use in the area. Ninety percent of the material necessary for building these boats is obtainable from the date palm tree.

***Kelek* rafts**

Kelek are skin-buoyed raft boats. The rafts were made of reeds or wood. Its buoyancy was increased by

attaching inflated goatskins below its surface. A number (sometimes hundreds) of inflated skins could be fitted to a wooden frame on which considerable loads could be carried. *Kelek* rafts were propelled by two oarsmen sitting at the forward end of the raft, each pulling an oar, with a third man on the float, swimming astern. Single separate inflated skins were also used on which a semi-immersed person could float or fish. Assyrian soldiers are commonly shown swimming with the help of an inflated goat skin when they are crossing a river (Fig. 8). It was the simplest form of river transport.

Today, rafts on inflated skins are known under the name *kelek* in Arabic. In Akkadian, it is known as *kalakku*, apparently from the Sumerian *ka-lá*.³⁶ Texts from the 2nd and 1st millennia mention rafts of timber and several terms for rafts made of inflated animal skins appear,³⁷ for example leather *kelek* (ELEP duse) or *kelek* of tree trunks.³⁸

The earliest depictions of *kelek* are seen in the Assyrian reliefs in Niniveh, dating back to the 7th cen-

³⁶ de Graeve 1981, 82.

³⁷ Wesszeli 2009, 161.

³⁸ Oppenheim 1956, 94.



Fig. 8. Shipping of building materials in coracles (*quffa*) (wall relief, Nineveh, South-West Palace, reign of Sennacherib, 704–681 BC) (after Layard 1853, pl. 12).

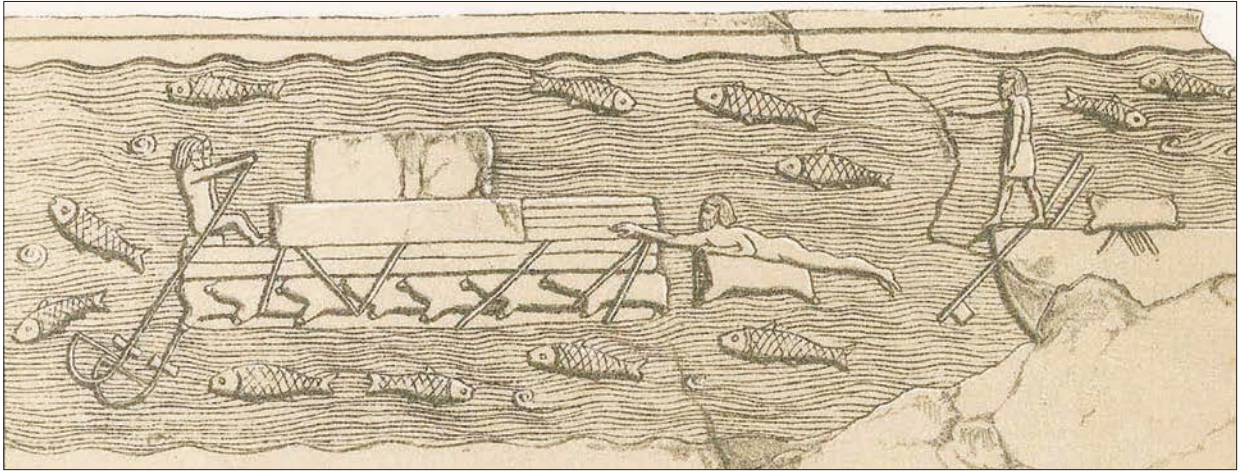


Fig. 9. Assyrian raft-boat (*kelek*) (wall relief, Nineveh, South-West Palace, reign of Sennacherib, 704–681 BC) (after Layard 1853, pl. 13).

tury BC. One of these examples, from the Sennacherib palace, shows Assyrians carrying stones on a raft made of inflated animal skins, while a third man, on a hide float, is guiding the raft from the stern (Fig. 9). *Kelek* were still in use in the 20th century in Iraq and Turkey for heavy loads. The loaded rafts floated down the river with the current. When the *kelek* reached its destination, the cargo was unloaded, the boat dismantled, the wood sold, and the goatskins deflated and loaded on donkeys to travel north and repeat the process.

Quffa coracles

Quffa is a small vessel of a round form similar to a coracle, made of hides stretched over a circular wooden framework. This resembles the *quffa* of the recent centuries made by coiling a long bundle of reeds or straw into a hemisphere, and coating it with skins and/or bitumen. *Quffa* could measure up to 5.5 metres in diameter and carry 16 tonnes.³⁹ It was driven by one or two men with short shovels, and it was suitable for different cargos.

Quffa is an Arabic word which originated from the Akkadian word *quppu* meaning basket.⁴⁰ These boats are basically in the form of a big basket. *Quffa* was a type of round basket, resembling that for moving soil and bricks. The basket was similar to the one which King Ur-Nanshe carries on his head, and that which King Ur-Nammu uses for manufacturing bricks. Neo-Babylonian texts refer to a variety of ‘basket-boats’.⁴¹

There is no confirmed evidence for their use prior to the 1st millennium BC. Boats from that time are known from Assyrian reliefs. Reliefs depicting *quffa* have been found on Assyrian depictions dating to the reigns of kings Ashurnasirpal II (883–859 BC), Sennacherib (705–681 BC) and Ashurbanipal (668–627 BC). Assyrian reliefs show the shipping of building materials in a coracle to the city of Niniveh for the construction of Sennacherib’s palace (Fig. 8). In the North-Western Palace at Kalhu, *quffas* are shown carrying a chariot, a bed and a jar. Boats and people are shown in their entirety, not half-submerged as was typical of Assyrian art.

³⁹ de Graeve 1981, 86.

⁴⁰ Weszeli 2009, 168.

⁴¹ Weszeli 2009, 161.

Quffas were used in trade and transportation to the south, along with the current. Due to its circular shape means it does not sail well against the current as it tends to spin. When the destination was reached, i.e. in the lower section of the river, the boat would be disassembled into parts and the wood would be sold, while the leather would be collected and carried up the river for reuse in the construction of new boats.

Conclusion

The environment was an important factor in the development of river transport in ancient Mesopotamia. The emergence of this type of communication was an answer to the vital needs of the inhabitants of Mesopotamia – one of these basic needs was to communicate and circulate goods and natural resources. The inhabitants of ancient Mesopotamia developed this type of transport from the early times of their history, as evidenced by boat models in the Ubaid period (5900–4200 BC).

Besides rivers and their tributaries, a number of artificial canals were employed for water transport in Mesopotamia. The Euphrates was better suited for transport compared to the fast-flowing Tigris. Moreover Euphrates-based canals were developed better.⁴² Besides their important role in irrigation, artificial canals, many of which were navigable, were crucial for communication and trade. In Mesopotamia, the prevailing winds and rivers moved more or less southwards.⁴³ Boats were, therefore, generally sailed downstream and towed upstream. Only when the wind occasionally shifted it was possible to sail upstream.⁴⁴ In this context, the canals were an attractive alternative in transport and communication. The investigated texts make it clear that boats would travel up

and down the canals. The size of vessels was probably one of the factors influencing the choice of the watercrafts used on the canals. During the Ur III period, ships of the 60-, 50-, 40-, 30-, 20- and 10-*gur* size categories were in use at Umma, and it is clear that some of the canals around this town were navigable only by small vessels.⁴⁵

Considering the vessels' major construction attributes, several types of boats or rafts have been distinguished based on cuneiform texts, boat models and representations in art: crescent-shaped boats with rounded bottoms and simple outward ends, flat-bottomed boats with straight vertical or out-turned ends, simple inward ends, inward-curved ends and out-turned curved ends, as well as rafts on inflated skins (*kelek*) and the *quffa* coracles. Although sailing ships were used, riverine transport was mainly based on non-sailing vessels whose motion depended directly on the paddle.

Until the Neo-Assyrian period, not many changes were applied to the basic design of riverine boats. This can be partly explained by the available building materials and by the fact that as soon as a basic form of vessel was obtained, there was no need for substantial improvements. It is not until the Neo-Assyrian period that any kind of Mesopotamian vessels appear other than the crescent-shaped double-ended boats made of wood or reed. With the Assyrian reliefs came the rafts on inflated skins and basket-like watercrafts covered with leather. Even the first rafts on inflated skins (*kelek*) and basket-like coracles (*quffa*) attested in the art of that period were derived from a much older tradition. The name *kelek* has Sumerian etymology which implies the considerable antiquity of this raft concept. Many types of riverine boats attested in Antiquity are still used by the people of Iraq, as shown by ethnographic evidence.

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⁴² de Graeve 1981, 18.

⁴³ Hausen 1979, 97; Johnstone 1988, 77.

⁴⁴ Johnstone 1988, 77.

⁴⁵ Sauren 1966, 37–39.

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