For the ancient Egyptians, the material world of everyday life encompassed three major bodies of water: the Nile, the Mediterranean, and the Red Sea. While the Nile provided pharaonic Egypt with its "superhighway," greatly facilitating the north- and southbound transportation of cargo and passengers, it also presented obstacles in the form of cataracts beyond the Nubian border. Furthermore, until the creation of a canal during the Late Period, it provided no east/west corridor to the Red Sea, which was the marine route not only to the nearby Sinai Peninsula (with its valuable turquoise, malachite, and copper ores) but also to the Arabian and east African coasts. What accident of geography omitted, the Egyptians themselves engineered to provide: where water could not be brought to boats, boats were brought overland to water. The terrestrial geography of Egypt had thus a profound effect on its nautical technology.

The archaeological record, including texts, iconography, artifacts, and site features, provides a variety of information on which to base interpretations of the general nature and importance of overland boat transportation during the pharaonic period. However, just as with the transportation of stone, Egyptian administrative records and monumental inscriptions omit most logistical details regarding the conveyance of watercraft over land.

**Eastern Desert Portage**

Although also reachable by the Nile and overland routes, the land of Punt (identified with the region now occupied by Eritrea, northern Ethiopia, and eastern Sudan, as well as southern Arabia) was the focus of the Red Sea trade, and from there came valuable exotic commodities, including frankincense and ebony. The Red Sea was, for the Egyptians, "land-locked" in pharaonic times, accessible from the Nile Valley only through the wadis of the Eastern Desert. Absence of sufficient resources to support an independent coastal boatbuilding industry made naval operations there dependent upon the importation of watercraft, either as timber, as boat parts, or as more or less constructed watercraft.

Although the Red Sea trade could date from as early as the Naqada II period, the earliest textual evidence suggesting the transport of boats or boat timbers through the Eastern Desert dates to the reign of Pepy II. Pepynakht called Heqaib records an expedition undertaken during this reign into the "country of the aAmw." Although the inscription does not specify the location of the expedition, the aAmw are generally taken to be the predecessors of Eastern Desert Bedouin. Pepy II charged Pepynakht with fetching back the corpse of an officer named Anankhet, whom the aAmw had slain. Anankhet and his soldiers, who were also killed in the attack, were in the region to construct (spr, literally "bind") a "Byblos" boat (kbnt) for a journey to Punt. Though it was formerly suggested that Byblos boats were necessarily built on the Syrian coast by Syrian shipwrights, it is now generally accepted that the term derives from the seagoing run on which such boats were first employed.

While it has been conjectured that fully constructed watercraft could have been transported through the desert, the evidence (linguistic and otherwise) better supports the more usual contention that expeditions brought timbers and that assembly...

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**Abstract**

Pharaonic Egyptian needs for waterborne transport surpassed the convenience of geography. Several obstacles—chiefly the lack of a water passage from the Nile Valley to the Red Sea and the unnavigable waters of the Second Cataract—had to be overcome. The Egyptians achieved this by techniques of hull construction, by architectural means, and by the employment of vehicles. Vehicles also functioned for the ceremonial transport of boats and boat-shaped shrines. This paper is a survey of the methods of overland boat transportation during the pharaonic period, with an emphasis on the archaeological and iconographic evidence.
took place on the shore. A general description of such an expedition, led by the “Keeper of the Door of the South,” Henu, dates to the reign of Mentuhotep III. In setting off on his journey to Punt, Henu “went forth from Koptos upon the road” (i.e., the Wadi Hammamat) with an army of three thousand men (this was perhaps an ideal, if not standard, complement; an inscription at Ayn Soukhna also mentions three thousand men). Donkeys accompanied them, but their only listed burdens are sandals. Once on the coast, Henu “made this ship” (iri h’ww pn). On the return through the wadi, after the naval expedition had secured the “gifts” and completed the round trip, Henu and his men picked up blocks of stone hewn from the hills.

The large number of men and the variety of their tasks (security, transportation, boatbuilding, sailing, well-digging, and quarrying) indicate the logistical complexity of the expedition. Unfortunately, as this is a commemorative inscription and not an administrative document, Henu omits details critical to understanding the organization and execution of the expedition. The text indicates specifics of neither boat transport nor boat construction, and there is no corresponding iconography from any period related to overland transport toward—or boat assembly on—the Red Sea coast.

However, two coastal sites, Mersa Gawasis/Wadi Gawasis and Ayn Soukhna, provide direct archaeological evidence. Scholars have known of the pharaonic site at Mersa Gawasis/Wadi Gawasis for at least fifty years but did not fully understand its significance until the last decade, when it became the focus of revived attention that remains ongoing. The site is located at the eastern end of the Wadi Gawasis, north of the Wadi Hammamat. At least seven chambers hewn from the limestone terrace served as warehouses. Evidence of occupation has been confirmed for the Old and Middle Kingdoms, when the site likely served as a seasonal harbor for expeditions, especially to Punt. Here too are found disarticulated ship timbers and a host of other ship-related components displaying the characteristics of the Nilotic boatbuilding tradition: unpegged mortise-and-tenon joinery, dovetails, and lashing channels.

The pharaonic site at Ayn Soukhna, which includes at least nine galleries dug into the base of a mountain overlooking the sea, presents similar evidence. No fewer than three galleries date to the Old Kingdom, and others are of tentative Middle Kingdom date. Numerous cedar ship planks (and at least two oak planks) with characteristically Nilotic unpegged mortise-and-tenons (Figure 1) yield carbon dates of approximately 2000 BCE.

The sites have not yet yielded the precise means by which timbers initially arrived. None of the inscriptions indicate any means of conveyance, although working scenes attest to timbers carried in hand (Figure 2) and slung from carrying poles (Figure 3). Definitive traces of construction on the shore are also lacking, and indeed, as Ward and Zazzaro point out, “it is hard to imagine what might indicate ship-assembly rather than disassembly” at a

Figure 1. Unpegged mortise-and-tenon joint.

Figure 2. Transportation of a colossal statue by means of a sledge; porters carry a timber in hand, after Newberry and Fraser, El Bersheh Part 1, The Tomb of Tehuti-hetep (1895), pl. xv.

Figure 3. Log or timber carried to a boatyard slung from a carrying pole, after Davies, Crum, and Boulenger, The Rock Tombs of Deir el Gebrâwi I (1902), pl. XXIV.
site such as Wadi Gawasis.\textsuperscript{19} At both this site and Ayn Soukhna, stored timbers represent the end (or at least intended middle) stage in the existence of the seagoing ships from which they came. At Wadi Gawasis, damaged timbers were marked before disassembly of the vessel, and workers removed barnacles and other marine incrustations before storing timbers in the caves—all indications of intent to reuse.\textsuperscript{13} Like the disassembled Khufu I boat interred at Giza, the Ayn Soukhna timbers were stacked in an organized manner, ready for future application.\textsuperscript{11}

Ship-breaking with the aim of preserving the utility of at least some timbers was made practical by the prevalent form of construction employed in the hulls; this was, to all evidence, a deliberate goal of pharaonic shipbuilders.\textsuperscript{15}

Evidence of lashings (cordage run from plank to plank in order to essentially “sew” the boat together) on the inboard faces of timbers can be found on the remains of most pharaonic vessels, beginning no later than the Early Dynastic, as represented by the boat burials at Abydos.\textsuperscript{18} Repurposed boat timbers were found in the First Dynasty cemetery at Tarkhan,\textsuperscript{14} while timbers “recycled” for the construction of a Twelfth Dynasty ramp appeared at Lisht.\textsuperscript{15} All of these—in addition to the timbers from Ayn Soukhna and Wadi Gawasis, the Fourth Dynasty Khufu I vessel at Giza,\textsuperscript{16} and possibly the boats from the pyramid complex of Senwosret III at Dahshur\textsuperscript{47}—likely demonstrate evidence of lashing. This would have made the boats easily disassembled (or, indeed, as evidenced by the modern reconstruction of Khufu I,\textsuperscript{13} easily reassembled) using a few specialized tools.\textsuperscript{19}

The second key element of hull joinery is characterized by what it lacks: pegged mortise-and-tenons. In absolute terms of hull integrity, pegged mortise-and-tenon joinery is more effective than unpegged; locking tenons and planks together by means of a peg prevents the planks from slipping laterally or longitudinally when subjected to stresses.\textsuperscript{48} In the construction of other objects, Egyptian carpenters did lock tenons in this manner and had since as early as the Naqada III period,\textsuperscript{47} and even used the technique for boat deckhouses (Khufu I) and rudders,\textsuperscript{44} but they seem to have entirely avoided it for hull construction.\textsuperscript{42} Nevertheless, beginning in about the fourteenth century BCE, pegged mortise-and-tenon joints proved so effective that they became the dominant shipbuilding technology in the Mediterranean for about the next two thousand years.\textsuperscript{44} Such joinery is meant to be permanent: disassembly of a pegged hull would have required breaking timbers, or at least drilling or hammering out hundreds of pegs per vessel, appears not to have suited the pharaonic Egyptian shipwrights’ purpose. Although it would have resulted in improved seaworthiness, pegging would have limited the reuse of timbers and would have made the regular disassembly of hulls an excruciating and impractical task. The concession seems clear: more time invested in construction (and perhaps maintenance) of lashed and unpegged hulls was exchanged for savings when the vessels were in use. The returns on the initial construction investment would have compounded each time a vessel was disassembled and reassembled.

Ease of disassembly should also be considered in the context of large Nilotic vessels, particularly obelisk barges. The volume of timber required to transport such architectural elements downstream from the quarries would have been astounding, and towing a vessel of such large proportions upstream to the quarries (either from the shipyard where it was constructed or back from its last port of call) might not have been practical. The river current, which could reach 4 knots,\textsuperscript{45} could have proved impassable when the barge was headed southward. Disassembly of a barge, for subsequent transport of the timbers on smaller, more streamlined vessels, might have been a better option.\textsuperscript{45}

**Slipways and Vehicles**

The wooden runners of sledges, with their characteristic blunt and usually upturned forward ends, often appear in paintings and reliefs showing the transport of large or heavy objects. Items transported by this method included stone blocks and finished architectural features such as colossal statuary, columns, and obelisks,\textsuperscript{49} as well as considerably less massive but no less unwieldy statuary.\textsuperscript{49} Boats composed another significant class of objects transported in this manner.

Most of the iconographic evidence for such boat transport comes from the context of ceremony\textsuperscript{49} rather than depictions of working watercraft in scenes of daily life. A shrine aboard a ceremonial craft, which might be a large model rather than a working vessel, houses an image of the deity or the mummy of the deceased, which is taken either along a ritual circuit (in the case of a god) or from the embalming station to the tomb (in the case of a mummy; see Figure 4). Model barques are borne aloft on the
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Figure 5. Portable sacred barque of Amun. O. BAM 21 446, Deir el-Medina, after Emma Brunner-Traut and Hellmut Brunner, Osiris, Kreuz und Halbmond: die drei Religionen Ägyptens (Mainz am Rhein: von Zabern, 1984), 52 fig. 36.

In the iconography, funerary vessels large enough to accommodate the mummy and its coffin are the ceremonial craft far more likely to be shown being dragged on sledges.53 Although frequently referred to as boats, many of the objects represented in the iconography have a nature that transcends the nautical: they are, rather, a type of wooden funerary shrine. “Boatless” versions of these shrines appear mounted on sledges or wagons (Figure 6).54 In some cases, the shrine encases the hull; that is, only stem and sternpost appear (such as in Figures 7 and 8). These instances may represent shrines fitted with finials to give the appearance of a boat. Although excavation has revealed no examples of these boat-shaped shrines, two such finials—a matching set of stem and stern of New Kingdom date—are known.55 A scene of carpenters at work (Figure 7) shows that shrine, boat, and sledge were constructed as elements of a single object. This is further underscored by an instance in which a tow-rope is tied not to the sledge or other vehicle but to the bow of the “boat” being transported (Figure 9). In some cases, the sledge runners might never have been intended to facilitate transport of the object; it has been noted, for example, that neither the little golden shrine of Tutankhamen56 nor a small sledge from Lisht (probably intended for a canopic chest57) has been dragged. In rare instances, wagon-mounted sledges (discussed further below) have transverse beams beneath the runners (Figures 8 and 9), which would, of course, render a sledge impractical for dragging. While these could be taken for elements of the wheeled vehicle that carries the sledge (also discussed below), in one case particularly (Figure 9), it is evident that the beams (or blocks?), being outside the wheels, are associated with the sledge runner and not the wagon body, which seldom appears in the iconography. These wooden members were probably added to facilitate lifting the shrine from the ground.58


Figure 7. Construction of a funerary shrine (TT51), after Davies, Two Ramesside Tombes at Thebes (1927), pl. XXXVI.

Figure 8. Wagon-mounted funerary shrine, after Orazio Marucchi, Guide du Musée Égyptien du Vatican (Rome: Imprimerie Polyglotte Vaticane, 1927), 40 fig. 11.

Figure 9. Wagon-mounted funerary shrine, after John H. Taylor, Death and the Afterlife in Ancient Egypt (London: British Museum Press, 2001), 188 no. 131.
While such observations warrant caution in drawing interpretations about functional nautical details from these objects, they do not negate the use of wagons or sledges to move bulky objects such as boats; these shrines will thus be treated as evidence without prejudice.

The usual convention is to show a single runner, but on rare occasions, both runners appear—as, for example, in the tomb of Intef-iker (Figure 10). This has the advantage of showing both tow-ropes clearly tied not to a beam between the runners but to the runners themselves. Typically, no means of attachment is shown, and the line of the rope simply terminates at the sledge, though in some images a ring (presumably metal) affixed to the runner serves as a purchase to tie rope(s) (Figure 11). In other cases, ropes (which in the iconography can appear as one or two in number) are tied directly around the runners (Figure 10).

Few working sledges (Figure 12) are known. One was found—along with as many as five boats—buried beyond an outer enclosure wall southwest of Senwosret III’s pyramid at Dahshur; presumably, it carried at least one, if not all, of the boats to the site for burial. Each runner, which has the same upturned end that appears in paintings and reliefs, measures 4.21 m in length and has an L-shaped mortise running between the upper and outer side face immediately behind the upturn (presumably for fastening a tow-rope). The overall width of the sledge is approximately 80 cm. Four crossbeams span the space between the runners. The extant sledges, or records thereof, seem to indicate that 4 m by slightly less than 1 m could be considered common dimensions.

In funerary scenes, such boat-bearing sledges are pulled by a team of men, or cattle, or both (men following cattle, or men and cattle on different ropes). Liquid (perhaps milk?) was poured in advance to purify the way, but pouring sufficient quantities of water would also have the effect of slicking the roadway for readier passage of the sledge runners. Nile silt makes a highly effective lubricant: once moistened, “it becomes as slippery as ice.” Iconography attests to the fact that the Egyptians took advantage of this property for the overland transportation of heavy objects. Indeed, it has been observed that the underside of at least one of the extant sledges did not have scratches, which indicates that, if it was dragged it all, it was not pulled over (or at least not damaged by) rough surfaces.

In nautical terminology, “slipway” refers to a sloping section of shore on which ships and boats can more easily be moved to and from the water. The term has been more widely applied to any path across which an object may be dragged, pushed, or towed. Kemp defines the term more narrowly as a mud-lubricated roadway, which may or may not be reinforced with stone, timber, or mudbrick. Slipways without some kind of reinforcement are likely to have been overlooked, reclaimed by the Nile or desert, or otherwise obscured from the archaeological record. Most were probably convenient paths reinforced as necessary for the task at hand and later disassembled to reuse the materials, thus leaving little, if any, evidence. Occasionally, more permanent facilities were devised, such as the launching slipway at the quay at Karnak and the portage slipway at Mirgissa.
Aptly conceived as a “boat road,” the Mirgissa slipway, the only known example of its type, was constructed to avoid the least navigable portion of the Second Cataract (Figure 13); in the vicinity of the rock of Abu Sir, south of Wadi Halfa, the Nile became “scarcely navigable for a considerable distance.” This was the customary end-and-return point for nineteenth- and early twentieth-century European tourists venturing up the Nile. During the inundation, the rocks and islands of the cataract might be submerged, turning this portion of the river into a stretch of rapids; when low, from roughly December to July, the river ran very shallow.

Because neither trade, exploration, nor war wait for high waters, slipways to ensure safe portage were prudent investments of potentially great strategic advantage. That labor and resources were invested to construct such an elaborate portage suggests the significance, in quality or quantity, of the traffic. It is certainly by intent that the southern end of the slipway was in close proximity to the fort of Mirgissa (for monitoring and protection), with the northern end perhaps at Matuga or Abu Sir. It ran straight for no less than 1.5 and perhaps as much as 4 km. Used at least as late as the reign of Amenemhat III and possibly into the New Kingdom, the slipway was not a simple ditch or rut, but had a support structure of mud bricks, packed mud, and lateral wooden ties “rather like [a] railroad” (Figure 14). The slipway itself is approximately 3 m wide, more than enough to accommodate the maximum beam (width) of the Twelfth Dynasty Dahshur boats (2.15–2.43 m) and would provide ample clearance for the width of a sledge such as...
that found at Dahshur (approximately 0.8 m).85 Sledge tracks were, in fact, evident on the slipway, the last travels baked into the watered silt road;86 incised a few centimeters into the silt by the weight of the sledge and its load,87 these are easily distinguished as parallel impressions approximately one meter apart, a figure corresponding tolerably well to the width of the sledge found at Dahshur. Hoof- and footprints were also found in the boat track. In this case, people (watering the silt? drovers?) walked in front of cattle88 that dragged a sledge while one or more persons followed behind. This provides an archaeological parallel to the iconographic examples of sledge-towing in funerary scenes discussed above.

Photographs of the Mirgissa slipway (Figure 15) appear to indicate that an additional mode of portage was employed along the slipway: dragging a boat directly on the silt. Vercoutter noted: “The silt still shows long track where either the sledge or the boat itself rubbed on the [wet] silt” [emphasis added];89 however, it seems that both events occurred.

A certain set of raised striations is easily overlooked, but nonetheless presents convincing evidence for direct contact of a boat hull on the silt. These striations are much thinner than the sledge tracks and likely resulted from the seams of a boat coming into contact with the wet silt. They are remarkably consistent and spaced approximately 15–20 cm apart from the next90—spacing that recalls the dimensions of hull timbers on the Dahshur boats.91 Between the marks of the boat’s seams, it may also be possible to see the even smaller striations left by the grain of the dragged timbers themselves.92 If a sledge had been employed, a boat should not have come into contact with silt and left such marks.

In exceptional cases in the iconography, there is no sledge beneath the funerary boat in processional scenes.93 Sledges are also missing from a couple of two-dimensional depictions of working boats being actively moved across land: one from the tomb of Meryneith at Saqqara,94 the other from TT40, the tomb of Huy (Figure 16).95 There is no doubt that the former image, associated with workshop scenes, represents the festive launch of a royal traveling boat. Two gangs of men pull at ropes; what seems to be a makeshift truss, with the mast serving as a truss stanchion, prevents the ends of the hull from bending downward, or hogging. The rudder is not present. The Theban scene, associated with the collection of tribute from Nubia, is more ambiguous. Here each cargo boat (also rudderless) is fitted with a more conventional form of hogging truss. These trusses are also associated with depictions of (the same?) boats elsewhere on this wall, with crewmen aboard and rudders mounted. One of the rudderless boats is being simultaneously pushed and pulled. The ground before (but not behind) the hull is depicted as an irregular surface above the painted baseline, suggesting, as Davies says, “the mud-flats near the river.” Although it is impossible to discount the possibility that this is, like Meryneith’s scene, a launch, it is tempting to view this as the slipway, either at Mirgissa or elsewhere.96

A water-slicked mud surface was not the only means the Egyptians used to lessen friction for the transportation of heavy loads: wooden rollers facilitated the passage of sledges bearing stone blocks or statuary,97 some of which may have surpassed one thousand tons in weight.98 Such mass is a serious obstacle when employing rollers,99 but even the largest boats were not nearly so heavy; the largest extant pharaonic vessel, the approximately 43.5 m long Khufu I,100 consists of approximately 38 tons of Lebanese cedar.101 While rollers are a hypothetical possibility for the portage of boats, the available evidence is disputable.
A purported example from the New Kingdom can be found in a vignette from the funerary papyrus of Maiherpri (Figure 17). A similar scene from a New Kingdom linen at Dartmouth College Museum (no. 39-64-6623), in which a team of cattle drag a “boatless” funerary sledge with three circles beneath it, has been similarly interpreted (Figure 6).

The use of the wheel in Egypt has been dismissed as impractical on account of the nature of the ground in both floodplain and desert. However, additional evidence reveals that this scene almost certainly represents wheels rather than rollers; although spoked wheels were well known by the New Kingdom, disk wheels made their first identified appearance in the record in Egypt at the bottom of a siege ladder in a painting of late Fifth or early Sixth Dynasty date.

Another parallel roughly contemporary with the Maiherpri vignette appears on an Eighteenth Dynasty stele in the collection of the University of Liverpool (no. E.50). Here it is not a boat being transported but a sledge bearing what appears to be a compartmentalized crate for a variety of agricultural produce. Pulled by a team of at least two oxen tended by a drover, the vehicle rides low to the ground. There is no sign of a separate wagon frame beneath the sledge—only a pair of circles. Kitchen cedes that these could represent wheels, but strongly prefers to interpret them as rollers. Whether the arrangement of captive rollers (i.e., affixed to the sledge) would in Egypt be any more effective than wheels seems dubious. It also bears noting, regarding the utility of wheels in Egypt, that chariots sometimes appear in agricultural and garden scenes.

Furthermore, among the Karnak talatat, fatted cattle appear on what are indisputably wheeled wagons. Unlike chariots of the period, these wagons have disk wheels; the axle and linchpin securing each wheel are clearly portrayed in relief, distinguishing them from rollers. Each vehicle is equipped with three pairs of wheels to convey the enormous weight of the livestock. Similarly, barque-shrines with nominal stem and stern (associated with the burial of the Buchis bull in the Ptolemaic period) have what appear to be four pairs of disk wheels.

Other examples of solid wheels exist in association with boats. Earliest of these is the wall painting in the Seventeenth Dynasty tomb of Sobeknakht (II) at el Kab (Figure 18), in which a shrine containing the mummy sits aboard a small boat of typically funerary form. The vessel sits on a sledge that in turn is provided with solid wheels through which the axle terminals protrude. As with the wheeled vehicle in the Liverpool stele, there is no evidence for a wagon body. Whether the sledge itself has been fitted with wheels—or rests upon a wagon undepicted except for its wheels—is impossible to say. As with scenes of sledge-dragging (and also paralleling evidence from the
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Mirgissa slipway), cattle pull Sobekhnakht’s vehicle, before which walk men, one of whom purifies the way. Tylor’s interpretation of the scene as a representation of a wagon drawn over rollers (on account of the artist’s unfamiliarity with the function of wheels) was discounted at an early date. 116 Wheels of this sort appear with a boat model found in a tomb at Gurob (Figure 19). 117 Unlike most other boat models, this one is generally considered to be a child’s toy; 118 the hull form differs from other boat models and does not match well with Egyptian ritual watercraft. Aside from a pierced rectangular piece of wood that served to attach the boat to its conveyance, of the supporting vehicle only the four wheels remain. If this was made as an amusement, something with which a child could play, the arrangement of the supporting vehicle need not reference any other representations or working arrangement: the wheels might exist only to allow the boat model to be moved across the ground or floor and nothing more. However, the polychrome decoration of each wheel is vaguely reminiscent of some post–New Kingdom representations of disk wheels (see, e.g., Figure 9) that appear in scenes of funerary processions with wagons towed by men or by men and cattle. While in some cases it is ambiguous whether the wheels depicted are rather impressionistically rendered spoked wheels, one example with concentric circles overlain by petal shapes on its wheels seems more likely to represent decorated solid wheels. 119 With the interpretation of the object from Gurob in dispute (toy or representation of wheeled ritual craft?), it is difficult to infer much information from it regarding the portage of working watercraft.

A low wagon with four small solid wheels and thus a very low profile—dubbed by some a “trolley” 120—is known from the Ptolemaic Period (Figure 20). 121 Found at Medinet Madi, the wooden frame of the wagon measured 2.09 m in length and 1.23 m in breadth (excluding the two axles, each of which measures 1.70 m from end to end). The solid disc wheels, affixed to the axle with a linchpin and each 31 cm in diameter, are probably not strong enough to support large stone loads. However, less weighty loads, including small vessels of perhaps 15 m or less (about the size of the Dahshur boats), would not be unreasonable. It has been suggested that a sledge or other structure would have been secured atop the wagon. 122 Although there is no evidence that this vehicle carried a boat, it is entirely possible that just such a trolley was what the artists of the examples mentioned above intended to represent. 123

More sophisticated spoked wheels also appear with funerary boat transport. Most of these are post-pharaonic, but the earliest example comes from the tomb of Ahhotep (I). A model wagon, made of copper alloy and wood, was found in association with two exceptional model boats, one of gold and one of silver. 124 The wagon (Figure 21) has two pairs of four-spoked
wheels\textsuperscript{135} on fixed axles that run under the extreme ends of the wagon frame. Atop the frame sits a block of wood to which one or the other of the hulls was fastened; both block and hulls have protruding, horizontal metal eyes, two on each side, with the block having an additional eye on one short side. 

There is debate as to which model boat belongs mounted on the wagon. As currently displayed, the gold model is placed there.\textsuperscript{136} It has the characteristics of a funerary barque with papyriform finials turned inboard, but bears no chapel, has a single quarter rudder (extremely unusual for the period\textsuperscript{137}), and includes a complement of oarsmen. Unlike two-dimensional representations of vehicle-borne boats or any other boat models, both metal hulls are provided with rings by which each could be fastened to corresponding rings on the (or a) wagon. Furthermore, the presence of the crews with their oars or paddles\textsuperscript{138} calls into question the purpose of setting either boat onto a wagon. Possibly they are toys, a function that relieves them of any need to accurately represent a working, real-world arrangement; in no known representations of ceremonial overland boat transport from the period is rowing or paddling portrayed, although this would not, of course, be impossible.

Representations of wagons at least nominally bearing a boat or boat-shaped shrine became more common during the Third Intermediate Period and thereafter.\textsuperscript{139} Some are processions associated with gods and temples, which are (along with the festival of Opet) probably ancestral to the festival of the local saint, Abu el-Haggag, celebrated annually even today at Luxor with a wagon-borne boat.\textsuperscript{140} However, most of the post-pharaonic, pre-Islamic examples occur in association with funeral processions.

The wagons themselves are not well defined in two dimensions, and seldom provide any interpretively useful information. They appear most commonly as sledges perched atop wheels, with little clear evidence of any structural connection between the two elements. As discussed previously, it is possible that what appear to be beams parallel to the axes in two examples (Figures 8 and 9) might belong to the shrine being carried rather than to the wheeled vehicle: note that such beams do not appear on the models or the Medinet Madi wagon. Another possibility is that the cart body itself is deliberately archaized as a sledge.\textsuperscript{141} On the funerary wagon in the tomb of Petosiris at Tuna el-Gebel (Figure 2\textsuperscript{12}), a bar appears running between the two wheels; it passes “behind” the felloe of the rear wheel but runs “over” the felloe and spokes to the hub of the forward wheel, almost as if it were intended to represent (in some kind of perspective) the axle. But it seems highly doubtful that this is a two-wheeled cart rather than a four-wheeled wagon. The zigzag lines between this bar and the bottom of the poles that support the boat (whether decorative or intended to indicate some structural element) are likewise difficult to interpret.\textsuperscript{133}

Even if most of these wheeled processionals wagons never carried working boats, a notable account of the transport of working (as opposed to ceremonial) watercraft by wheeled conveyance does exist. The Gebel Barkal Stele of Thutmose III describes the event as part of that king’s eighth Asian campaign, in his thirty-third year, when the Egyptian army had to cross the Euphrates.\textsuperscript{144} The king ordered boats (ḫḥw) to be made or hewn (mḏḥ) in the hills near “the Mistress of Byblos.” The term ḫḥw is a common term used to refer to Nile boats used for purposes as diverse as fishing and war.\textsuperscript{145}

These vessels were transported to the river by ox-drawn carts (wrrywt). Faulkner’s claim that this is the “first recorded use by the Egyptians of wheeled transport as distinct from the light two-wheeled chariot”\textsuperscript{146} is incorrect, as the previously discussed iconographic evidence of wheeled vehicles (some predating Thutmose III) attests. The term wrrywt is, in fact, usually translated as “chariot.” Chariots occasionally appear in agricultural scenes, apparently to transport officials into the fields,\textsuperscript{147} but sometimes also to haul loads. Ox-drawn chariots are known too,\textsuperscript{148} but in this context, “cart” (meaning a two-wheeled vehicle other than a chariot) is probably intended.\textsuperscript{149} They might have generally resembled those that appear later in the Battle of Kadesh reliefs (Figure 2\textsuperscript{3}) or, more nearly contemporary with the inscription, the two-wheeled ox-drawn cart with railed sides known from a fragmentary relief of an agricultural scene.\textsuperscript{150}
Faulkner suggests that, given the distance and roughness of the terrain that Thutmose III’s army would have encountered, its boats must have been transported in sections. For most watercraft, timbers approaching 4 m in length would probably have been rare. For example, of the 99 structural timbers used in the construction of the Cairo Dahshur boats, only one exceeds 4 m in length, with only eight exceeding 3 m. The majority, 51, are less than 2 m, and an additional 39 timbers are 2–3 m; all such lengths could easily be transported on two-wheeled carts. Over rougher terrain unsuitable for wheeled vehicles, a single fit porter would find a 2 m timber manageable, and certainly donkeys or teams of porters could transport longer timbers (Figures 2 and 3); few timbers would have required special overland travel arrangements. This account strongly suggests that whoever “hewed” the boats at Byblos did so using Nilotic building techniques.

Conclusions

While there is insufficient evidence to indicate that the need for overland transportation—especially as disarticulated timbers—inhibited the development of boat and ship construction and technologies, it was at least a consideration for the pharaonic shipbuilder. This consideration (or necessity) may have had further ramifications on Egypt’s prowess as a seafaring power, especially from the New Kingdom onwards, as other Mediterranean cultures adapted more efficient construction technologies such as pegged mortise-and-tenons.

For working watercraft of relatively modest size, portage without disassembly was certainly possible by several means, but the available evidence suggests this practice was probably confined to exceptional regions (such as the Second Cataract) and/or circumstances (e.g., ritual contexts). In the latter case, portage preserved the Egyptian ideal of water transport, even if the boat carrying the deceased to the tomb was more semblant than authentic.

Notes

1. The ease of Nile navigation is often overstated by scholars, though seldom by travelers, whose accounts are often filled with frustrations occasioned by storm, lack of wind, and other delays and hazards. For a review of the challenges, see Angus Graham, “Plying the Nile: Not Plain Sailing,” in Kathryn Piquette and Serena Love (eds.), Current Research in Egyptology 2003: Proceedings from the Fourth Annual Symposium (Oxford: Oxbow, 2005), 41–56.

2. Carol A. Redmount, “The Wadi Tumilat and the ‘Canal of the Pharaohs,’” Journal of Near Eastern Studies 54 (1995): 127–135. Belief in such a canal prompted, for example, Carl Söderberg (“Egyptian Shipping of about 1500 B.C.,” The Mariner’s Mirror 11 [1936]: 430–469) to suggest that it “would have been much easier to build ships on the Nile and send them by its eastern arm to the Red Sea than to transport materials for shipbuilding from the Nile by land to the coast of the Red Sea” (454). Torgny Säve-Söderbergh (The Navy of the Eighteenth Egyptian Dynasty [Uppsala: Lundequistska Bokhandeln, 1946], 11) also believed that Hatshepsut’s Punt expedition traveled from the Red Sea to the Nile by some water passage, because “no desert traveling is depicted” in the scenes of the event at Deir el-Bahri.

3. Evidence of a maritime corridor between the Nile and the Oases and the Fayum to the west is scant. A notable exception could be the Lahun-Hawara gap connecting the river and Lake Moeris, especially during the annual floods; see James Harrell and Thomas Bown, “An Old Kingdom Basalt Quarry at Widan el-Faras and the Quarry Road to Lake Moeris,” Journal of the American Research Center in Egypt 32 (1995): 71–91.


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10. Säve-Söderbergh (1946, 11) suggested Suez as the location, but the two sites discussed below, Mersa/Wadi Gawasis and Ayn Soukhnah, are distinct possibilities.


21. See, for example, Bard and Fattovich 2007 and Ward and Zazzaro 2010.


27. For example, the plank carried in association with the transport of the colossal depicted in the tomb of Djehutyhootep (Percy E. Newberry and George Willoughby Fraser, *El Bersheb Part 1, the Tomb of Tehuti-hetep* [London, Egypt Exploration Fund, 1895], 20, pl. xv). Compare, too, the transport of a mummy case cradled in the arms of four men who carry it to the tomb (TT177, Amenemnet; Jeanne Marie Vandier d’Abbadie, *Deux tombs ramesiades à Gournet-Mourra* [Cairo: Imprimerie de l’Institut Français d’Archéologie Orientale, 1954]), pl. XIV, XV.2, XVI.1–2).

See Creasman, forthcoming, and Ward and Zazzaro 2010, fig. 10, for an illustration of rudder blades with pegged mortise-and-tenons.


For further discussion, see Vinson 1994, 37–41.


For example, Vandier d'Abbadie 1954, pl. X, XI.


On occasion, funerary boats are elevated, such as depicted on the Nineteenth Dynasty Memphite relief of Merymery (see P. A. A. Boeser, Die Denkmäler des neuen Reiches: Gräber [Milano: Cisalpino, 1911], pl. XV; Hans D. Schneider and Maarten J. Raven, De egyptische oudheid [s-Gravenhage: Staatsuitgeverij, 1981], 98, no. 84b). Not only is the sledge-mounted model funerary boat carried on poles by men, but a rope is held in hand by three additional men and is fastened to a team of two cattle. Merymery thus enjoys all possible advantages of every form of conveyance.

The watercraft in this scene—which supports a funerary lion-headed bier, the coffin, and, presumably, the mummy—could be either a papyrus raft or a wooden papyrusiform vessel. Remains of papyrus watercraft, which surely existed as everyday working craft, are not known from the archaeological record.

For example, Vandier d’Abbadie 1954, pl. VIII, X; George Foucart, *Le tombeau d’Amonmos* (tombeau no. 19) (Cairo: L’Institut français d’archéologie orientale, 1912), 57, fig. 5; pl. IV, 9.

Occasionally, the rope is omitted entirely; see Earl of Carnarvon and Howard Carter, *Five Years’ Exploration at Thebes* (London: H. Frowde, 1912), pl. LXIII (TT37: man driving two cattle with a brace between their horns for the rope, pulling a sledge-borne barque with two steering oars).

In addition to the sledge from Dahshur (George Andrew Reisner, *Catalogue général des antiquités égyptiennes du musée du Caire*, 68, No. 4798–4975 et 5034–5200: Models of Ships and Boats [Cairo: L’Institut français d’Archéologie orientale, 1913], 88–89; Jacques de Morgan, *Fouilles à Dâchour: Mars–Juin 1894* [Vienna: Adolph Holzhausen, 1895], 81–83), a small sledge, approximately 1.70 cm in length, from Senosret III’s pyramid complex at Lish is known (Dieter Arnold, *Pyramid Complex of Senwosret I at Lish* [New York: Metropolitan Museum of Art, 1992], 59; William Hayes, *The Scepter of Egypt: A Background for the Study of the Egyptian Antiquities in the Metropolitan Museum of Art I* [Cambridge: Harvard University Press, 1951], 193). Arnold (1992, 26) hypothesizes that at least one other large sledge, approximately 4.2 m, was also present at that site, but the wood was too degraded to confirm the suspicion. It is possible that another full-sized sledge exists. On display at the Cairo Museum is a sledge labeled “5460,” presumably corresponding to the Catalogue General. However, “GC 5460” is an amulet (G. A. Reisner, *Amulets*, *Catalogue General 5218–6000 et 12001–12527* [Cairo: L’Institut français d’Archéologie orientale, 1907], 35). The sledge on display is often (correctly) identified as the sledge from Senwosret III’s pyramid complex at Dahshur (“GC 4928” in Reisner 1913, 88–89). For example, Partridge (1996, 131–133) explicitly reconciles the visual differences between Reisner’s recordings of the Dahshur sledge and the one on display, but no one has clarified the conflicting labels. Comparison of Reisner’s drawing (1913, 89, fig. 126) of the Dahshur sledge with the one labeled GC 5460 produces a near-identical match. Records associated with a sledge “5460” report that it came from the New Kingdom and has similar dimensions to the Dahshur sledge (Waheed Edwar, personal communication, June 4, 2004). A photograph of the sledge, with Arabic label legible, can be found in Pearce Paul Creasman, “The Cairo Dahshur Boats” (master’s thesis, Texas A&M University, 2005), https://www.hallmarksmuseum.org/research-center/associates.imrd.org/pcreasman-MA2005.pdf (accessed December 12, 2009), 123, fig. 57. To the best of our knowledge, the records of the Cairo Museum sledge (JE?) “5460” are otherwise unpublished.


For example, Vandier d’Abbadie 1954, pl. X (TT277); Naville 1971, Taf. III P.e.

For example, Marcelle Baud and Étienne Drioton, *Le tombeau de Roy* (tombeau no. 255) (Cairo: L’Institut français d’Archéologie orientale, 1928), fig. 7; Naville 1971, Taf. III P.j., l.e.

For example, TT78 (Annelies Brack and Arthur Brack, *Das Grab des Haremheb: Dieben nr. 78* [Mainz am Rhein: P. von Zabern, 1986], Taf. 16, 55b); TT16 (Marcelle Baud and Étienne Drioton, “Le tombeau de Panchesy,” in Georges Foucart, M. Baud, and E. Drioton [eds.], *Tombes thébaines: Nécropole de Diral d’Abu’Naga: Le tombeau de Roy* [tombeau no. 255]; *Le tombeau de Panchesy* [tombeau no. 18]; *Le tombeau d’Amon-amen-ait* [tombeau no. 277]) (Cairo: L’Institut français d’archéologie orientale, 1935), pt. 2, 11, fig. 3).
65. Foucart 1932, 37, fig. 5, pl. IV (TT19).
69. Kemp 2000, 93.
70. How likely an explanation this is for the lack of scratches mentioned by Arnold (1992, 59) is unknown. The undersides of other extant sledge(s) have not, to our knowledge, been similarly examined.
72. Kemp 2000, 93.
73. Jean-Claude Golvin, “Temple of Amen-Re at Karnak,” in Bard, Encyclopedia of the Archaeology of Ancient Egypt, 400–404, fig. 53; Partridge 1996, 8, fig. 5.
75. That is, a road intended for boats and distinct from roads made of boat timbers, like those previously mentioned at Lahun and Lisht. A 70 m segment of the nearly 10 km quarry road between Widan el-Faras and Lake Moeris was constructed of silicified wood (Harrell and Bown 1995, 80, fig. 15), but it is not clear if the wood was silicified prior to use in the road. Regardless, there are no indications the wood was from a repurposed boat(s), nor is there a clear interpretation of when this road was constructed.
76. Vercoutter 1964, 37–38; Vercoutter 1965, 62–73; Vila 1970, 204–214. Ironically, the slipway is now submerged and likely lost due to the creation of Lake Nasser/Nubia.
77. Cook’s Tourists’ Handbook for Egypt, the Nile and the Desert (London: Thomas Cook and Son, 1892), 243.
78. H. E. Hurst, The Nile: A General Account of the River and the Utilization of Its Waters (London: Constable, 1952), 73. Before the Nile was dammed, the floods typically began in June, reaching their apex in September. The waters would quickly recede, ultimately reaching their lowest levels in May (John Ball, Contributions to the Geography of Egypt [Cairo: Survey and Mines Department, Ministry of Finance, 1939], 204; Harrell and Bown 1995, 83).
80. The total length of the slipway is unknown. The French concession only included the southernmost 1.5 km (Vila 1970, 203, fig. 1; Vercoutter 1970, 12–13, fig. 4), and the remaining portion was not surveyed prior to the flooding of the region.
82. Vercoutter 1965, 69; Vercoutter 1964, 37.
83. Vercoutter 1965, 68.
84. Creasman, forthcoming, table 1; Ward 2000, 84, table 8.
85. Reinsier 1913, 88.
86. Vila 1970, 209, figs. 13, 15, 16.
87. See Vila 1970, 207, fig. 13 (“Les traces de patins de traineau sont indiquées par les flèches blanches”); 209, fig. 16 (“empreintes des patins”); 215, fig. 22, at bottom.
88. Note that the carcasses of draft cattle were found in the builders’ debris from the Eleventh Dynasty complex of Mentuhotep at Deir el-Bahri (Lehner 1997, 203; Arnold 1991, 64).
89. Vercoutter 1965, 68.
90. See, especially, Vila 1970, figs. 13, 22.
91. For hull plank dimensions, see Creasman 2005, 37 (table 1), 49 (table 2), 85 (table 7), 92 (table 8).
92. See, especially, Vila 1970, fig. 13.
93. On the side of a rishi coffin in the Metropolitan Museum of Art (William Hayes, The Scepter of Egypt: A Background for the Study of the Egyptian Antiquities in the Metropolitan Museum of Art II [Cambridge: Harvard University Press, 1959], 31, fig. 14), two cattle, driven by a man with a stick, drag a funerary boat directly on the ground. It should be noted that Hayes described the style of painting on this coffin as “somewhat crude”; the absence of the sledge could be merely an artistic oversight, or even the result of concern for fitting the entire scene into the narrow register.
Huy’s is not a depiction of a slipway, it could instead be a visual manifestation of a boat encountered, for example, in autobiographies in which the tomb-owner specifies that he has built watercraft for a particular task appointed to him by the king—see, e.g., the inscription at Qubbet el-Hawa in the tomb of Sabni, which states: “The majesty of my lord sent me to construct two great barges in Wawat so as to ship two great obelisks north to Heliopolis” (Strudwick 2005, 339; also Roccati 1982, 214–215; Lichtheim 1988, 17).


99. Arnold 1991, 275. Note that even the colossus being transported in a scene from the tomb of Djehutyhotep (Figure 2), estimated to have weighed about sixty tons (Clarke and Engelbach 1930, 85), was moved on a sledge without rollers.


105. Partridge 1996, 76; similarly, the use of wheeled vehicles at Deir el-Medina is said to “rarely have occurred, if ever” (Jacques J. Janssen, Donkeys at Deir el-Medina [Leiden: Instituut voor het Nabije Oosten, 2005], 74).

106. Davies pointed out the wheels in el Kab scene in 1926, 112.


110. M. A. Littauer and J. H. Crouwel, Wheeled Vehicles and Ridden Animals in the Ancient Near East (Leiden: E. J. Brill, 1979), 8 and also 35, where the authors propose that wagons developed from sledges on rollers.


116. Tylor 1896, 4; Davies 1926.


119. For a discussion of these representations, see René van Walsum, The Coffin of Djedmohutisankh in the National Museum of Antiquities at Leiden (Leiden: Nederlands Instituut voor het Nabije Oosten, 1997), 216–231; see also Wachsmann, forthcoming.

120. Littauer and Crouwel 1979, 112.


122. Dittmann 1941, 62–64, abb. 2.

123. For further discussion, see Dittmann 1941, 65.


128. Whether these crewmen are rowing or paddling (among other details of the silver model) is subject to debate; for a summary, see Wachsmann, forthcoming.

129. A list of examples, with discussion, can be found in van Walsum 1997, 225–239; see also Wachsmann, forthcoming.


131. Archaizing might also account for the proliferation of disk (rather than spoked) wheels on many funerary vehicles. The Egyptians employed deliberate archaic forms in watercraft, most notably giving wooden hulls the pretense of being rafts by means of papyri-form finials, but also, more elaborately, in rigging: see Noreen Doyle, “The Persistence of the Bipod Mast and the Transience of the Tripod” (paper presented at the Fifty-Seventh Annual Meeting of the American Research Center in Egypt, 2006).


133. The depiction is vaguely visually reminiscent of a funerary cart appearing in a vignette drawn on linen (BM 10265), in which the cart body appears as a cross-hatched area between the wheels (Kristensen 1919, 272, fig. 6; Göttlicher 1992, 69, Abb. 40).


137. Faulkner 1946, 40.

138. One example is TT17 (Nebamun); see Richard B. Parkinson, The Painted Tomb-Chapel of Nebamun (London: British Museum Press, 2008); Yadin 1963, 210. A second example is faience fragment (chariot in vineyard); see Yadin 1963, 188.

139. Davies, Gardiner, and Davies 1926, 24, pl. XXIII, XXVII, XXVIII (Nubian).

140. See A. Erman and W. Grapow, Wörterbuch der ägyptische Sprache (Berlin: Akademie-Verlag, 1926) 1:334; compare use of the word in O. Cairo 25 543, which makes reference to a “she-ass of the wagon” (Janssen 2005, 74).


143. Faulkner 1946, 40. Vinson (1994, 44) suggests that the army brought “prefabricated boats” with them for the river crossing.

144. Yadin 1963, 434.