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BEYOND THE PAINTED SURFACE ANALYZING OLD KINGDOM'S STEERING DEVICES BY DELVING INTO THE ICONOGRAPHY OF NOBLES' TOMBS Article 5

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BEYOND THE PAINTED SURFACE ANALYZING OLD KINGDOM'S STEERING DEVICES BY DELVING INTO THE ICONOGRAPHY OF NOBLES' TOMBS

ABSTRACT

[AR] ما وراء الجدران المصورة : دراسة تحليلية لأدوات توجيه قوارب الدولة القديمة من خلال مناظر مقابر النبلاء تقدم المقابر المصربة القديمة المزبنة بالنقوش والمناظر نافذة أسرة على المعتقدات والبراعة التكنولوجية لهذه الحضارة القديمة. نقشت هذه المناظر لتلبية احتياجات المتوفى في الحياة الآخرة، وخاصة الصور البحربةالتي تسلط الضوء على التراث البحري لمصر القديمة. تتناول هذه الورقة البحثية دراسة أجهزة التوجيه الموجودة على مراكب النقل الخشبية التي تظهر في مناظر مقابر النبلاء من عصر الدولة القديمة. فهى تفحص بدقة الترتيبات والمواضع والأعداد والتحسينات الفنية لأجهزة التوجيه. في عصر الدولة القديمة، كان للقوارب دورًا محوربًا في السياقات الدينية والجنائزبة والاقتصادية والاجتماعية، مما أدى إلى تطوير أنواع مختلفة من القوارب ذات هياكل ومعدات متميزة. تطورت أجهزة التوجيه بمرور الوقت، واعتمدت في البداية على مجاديف التوجيه اليدوبة المعلقة على الجانبين الخلفيين للقوارب. تم التعامل مع هذه المجاديف بالحبال أو الحلقات الجلدية المدعومة على محاور، عن طريق تدويرها على محورها أو رفعها على جانب القارب. ومع تقدم الدولة القديمة، شهدت مجاديف التوجيه تحسينات، بما في ذلك إضافة قطعة عرضية قصيرة لتحسين التحكم. حدث تحول ملحوظ في نهاية العصر، حيث تم تركيب مجاذيف التوجيه على أعمدة الدفة، مما أدى إلى تقديم محور ثابت لمزيد من التحكم في الملاحة. لا توضح هذه المناظر البحربة الجوانب الفنية لأجهزة التوجيه فحسب، بل تغذى أيضًا المناقشات العلمية حول تصويرها. يُظهر التنوع في أنواع القوارب وآليات التوجيه والانتقال من الحركة الجانبية إلى الدوران المحوري الفهم الدقيق للديناميكيات البحربة خلال عصر الدولة القديمة. في جوهرها، تعد المناظر البحرية الموجودة داخل مقابر نبلاء الدولة القديمة بمثابة سجل مرئى لتطور أجهزة التوجيه في القوارب المصربة القديمة. لا تسلط هذه الصور الضوء على التقدم التكنولوجي فحسب، بل تعرض أيضًا لمحة عن الاعتبارات الثقافية والعملية التي شكلت الإرث البحري لمصر القديمة.

[EN] Ancient Egyptian tombs adorned with reliefs and scenes provided a captivating window into the beliefs and technological prowess of this ancient civilization. Decorated to cater to the needs of the deceased in the afterlife, these scenes, especially nautical depictions, illuminated the maritime legacy of ancient Egypt. This paper delves into the study of steering devices on wooden transport boats, as portrayed in scenes on nobles' tombs during the Old Kingdom. It meticulously examines the arrangements, positions, numbers, and technical improvements of steering devices. In the Old Kingdom, boats played a pivotal role in religious, funerary, economic, and social contexts, leading to the development of various boat types with distinct hulls and equipment. Steering devices evolved, initially relying on hand-held steering oars suspended over the quarters. These oars, worked with rope or leather grommets or supported in pivots, were manipulated by turning them on their axis or levering them against the boat's side. As the Old Kingdom progressed, steering oars experienced enhancements, including the addition of short cross pieces for improved control. A notable shift occurred towards the end of the era, with steering oars mounted on rudder posts, introducing a fixed axis for more controlled navigation. The scenes not only illustrated the technical aspects of steering devices but also fueled scholarly debates on their portrayal. The diversity in boat types, steering mechanisms, and the transition from lateral movement to axial rotation showcased the nuanced understanding of maritime dynamics during the Old Kingdom. The scenes in the nobles' tombs served as a visual chronicle of the development of steering devices in ancient Egyptian boats. These depictions not only highlighted technological advancements but also offered a glimpse into the cultural and practical considerations that shaped the maritime legacy of ancient Egypt.

KEYWORDS: Grommets, iconography, Old Kingdom, rudder post, steering oar, transport boats, tiller.

I. INTRODUCTION

The reliefs and scenes found in ancient Egyptian tombs have been instrumental in providing extensive insights into the beliefs and technology of the time. Tombs were adorned with depictions of daily life activities, reflecting the belief that these scenes would fulfill the needs of the deceased in the afterlife. Nautical scenes, showcasing activities like boat construction, sailing, cargo handling, fishing, and funerary processions, hold particular significance, offering valuable glimpses into the ancient Egyptian maritime heritage.

This research paper aims to explore the steering devices used on transport boats depicted in numerous scenes found in the tombs of nobles during the Old Kingdom. By documenting the various types and forms of steering devices and tracing their evolution, the study seeks to unravel the intricate details of these maritime technologies. Wooden transport boats played a pivotal role in facilitating the movement of cargo and people across different directions – from east to west, south to north, and vice versa. The navigation activities served diverse purposes, including religious, funerary, economic, and social.

Examining the diversity in hulls and equipment provides a means to trace the overall development of the Old Kingdom's boats, shedding light on the evolution of their steering devices. Through a comprehensive analysis of these scenes, the paper aims to enrich a deeper understanding of the ancient Egyptian nautical legacy and its significance in various aspects of life during the Old Kingdom.

The rudder stands as the universal instrument that connects boats of the past and present, serving as an indispensable component. This singular device plays a pivotal role in enabling operational navigation and control, without which the very essence of steering a ship would be unattainable¹. Gilmer² suggests that it should be called a steering device because «rudder» is a recent appellation. The steering device of a ship or boat is typically manipulated from within the vessel to alter its angle or direction. This is achieved by using one or more steering oars, the number of which may vary based on the size and design of the craft. These steering oars allow the navigator or helmsman to exert control over the vessel's course, facilitating effective maneuvering on the water³.

In ancient Egypt, a common and widely adopted steering mechanism for boats was the use of steering oars. This practice became a standard feature on boats across various regions throughout antiquity. These steering oars were typically mounted on each quarter of the boat, allowing for effectively controlling the vessel's direction ⁴ [FIGURE 1].

¹ MOTT 1997: 3.

² GILMER 1999: 185.

³ CASSON 1995: 18.

⁴ ROBERT & EMEIL 1996: 39.



[FIGURE 1]: Old Kingdom's steering device, Giza tomb of *Kaemankh*, sixth dynasty. JUNKER 1940: PL.V.

II. STEERING DEVICES' ARRANGEMENTS

The steering devices employed on transport boats in the Old Kingdom were composed of various elements carefully crafted to ensure effective control and navigation of the vessel. The key elements of the steering devices used aboard transport boats include:

- **1.** A steering oar is an oar affixed to the planking or a crosspiece of a boat, allowing it to pivot against the hull. This type of oar is independent and can be leveraged to influence the boat's direction. It consists of:
- **A**. Loom or stock: The loom refers to the section of an oar situated inward from the pivot point. It might be constructed as a built-up structure rather than a single solid piece, and the stock could find support from a crosspiece⁵.
- **B**. Blades: The blades on steering oars were notably larger than those on rowing oars. They took three shapes: lancet, where the edges of the blade seamlessly integrated into the loom, lancet with squared shoulders, and globular [FIGURE 2]⁶.



[FIGURE 2]: A. Lancet blade with the edges of the blade merging into the loom. STEINDORFF 1913: PL.21; B. Lancet blade with squared shoulders. SIMPSON 1976: FIG.24; C. Globular blade. BOREUX 1925: 343.

⁵ DOYLE 1998: 85; MCGRAIL 2004: 468; STEPHENS 2012: 64.

⁶ FABRE 2005: 119; STEPHENS 2012: 64.

2. Grommets or Lanyards: Starting from the fourth dynasty, depictions of steering oars revealed the use of rope slings **[FIGURE 3]**, serving to provide support and function as relieving tackle (rudder pendants). These ropes played a dual role, preventing the steering oar from swinging excessively and serving as hoists to modify the blade depth in shallow waters. They were threaded through openings in the blade or looped around the stock⁷.



[FIGURE 3]: Steering device's grommets. A .Giza, Mastaba of *Sech-em-nefer*, fourth dynasty. BOREUX 1925: 386; B.Saqqara, Mastaba of *Ty*, fifth dynasty. MARK 2012: 85.

- **3.** Tiller: A short, straight pin inserted through the loom of the steering oar for ease of turning on its axis **[FIGURE 4]**; tillers took their appearance during the fifth dynasty⁸.
- **4.** Rudder post: A vertical post, often referred to as a stanchion **[FIGURE 5]** and termed by Edgerton as a "steering post"; its main purpose was to offer support to the upper section of the rudder loom. This feature allowed the use of rudders with longer looms, enhancing helm control. Additionally, it led to a more efficient steering process, requiring fewer helmsmen. During the sixth dynasty, it became a customary practice to secure the loom of the steering oar to a stanchion by lashing⁹.

⁷ DOYLE 1998: 85.

⁸ Casson 1995: 18; Doyle 1998: 103; Edgerton 1927: 257; Mcgrail 2004: 33.

⁹ Edgerton 1927: 260; Doyle 1998: 103; Gilmer 1999: 178; Stephens 2012: 66.



[FIGURE 4]: The Old Kingdom's tillers.Saqqara, Mastaba of *Ptahhotep*. fifth dynasty. WILSON 1944: PL.XIII



[FIGURE 5]: Rudder post. El Hawawish, Tomb of *Tti-ikhr*, sixth dynasty. STEPHENS 2012: 87.

III. STEERING DEVICES' POSITION

The placement of steering devices has been a subject of debate among scholars, who disagreed on whether draftsmen depicted all steering devices or only those on the visible side of the vessel. For instance, GRASER (1869), REISNER (1913), BOREUX (1925), EDGERTON (1927), LEHMANN (1978), and THURNEYSSEN (1980) argued that draftsmen illustrated only half of them, suggesting that an equal, unillustrated complement operated on the other side. However, ASSMANN (1913), DOYLE (1998), and STEPHENS (2012) found this viewpoint improbable.

Reisner proposed that the rudders were likely leveraged against the stern side. In this scenario, steersmen on one side would pull the shaft inward, causing the blade to extend outward, turning the boat in that direction. On the opposite side, steersmen would either allow their rudders to float or pull them up out of the water. The construction of the broad overhanging stern seemed to be specifically designed to enhance steering through this method¹⁰. Edgerton, possessing a thorough understanding of navigation, shared a similar viewpoint with Reisner on this matter. Although he appeared to suggest that only the steering oars depicted were present in each case, his overall stance aligned closely with Reisner's perspective¹¹. Assmann held a similar belief but speculated that the steering oar was rotated on its axis, resembling practices observed in later periods¹². Boreux proposed that the early form of dual steering involved the helmsman (or helmsmen) physically shifting from one side of the

¹⁰ Reisner 1913: VIII.

¹¹ Edgerton 1927: 256.

¹² ASSMANN 1913: 143.

vessel to the other¹³. Edgerton believed that the sizable passenger boats from the Old Kingdom likely had twice the number of steering oars depicted. He held the belief that the exact method of utilizing these early steering oars remained unclear, considering the possibility that both methods might be employed. Additionally, he affirmed that starting from the sixth dynasty, the steering oar could only be turned on its axis. Rouge observed that Egyptian steering devices were larger than typical ones and were managed at the stern by multiple helmsmen. He proposed that the differences in size could be attributed to artistic convention and theorized that they were positioned on both sides. Rouge speculated that, following the addition of the tiller and the rudder post, the steering oars functioned through the rotation of the blade on its axis, with the two points on which it rested preventing any lateral motion¹⁴. Lehmann theorized that the steering oar was secured in two locations, with the loom serving as the axis¹⁵.

Thurneyssen firmly asserted that there was a rudder on each side of the ship, and they were maneuvered laterally rather than axially. He also noted that the oars had symmetrical blades, requiring minimal effort to turn them on the axis. Thurneyssen cited the example of the Mastaba of *Akhethetep* from the fifth dynasty in the Louvre, which depicted a boat on the right with two or three helmsmen standing, each handling an oar without any visible pivots at the deck level. However, the low relief clearly illustrated a rope descending from the gunwale to the top of the blade. In this scenario, helmsmen could effortlessly maintain their oars' position and move them in various directions. The depiction showed the left hand holding the top of the blade¹⁶. Jones proposed that the steering oars were suspended over the quarters and could be maneuvered by rotating them on their axis or leveraging them against the boat's side. In the latter case, the boat would turn in the direction of the outward thrust of the blade¹⁷. Finally, Abd el-Maguid substantiated this perspective, drawing support from studies of the Khufu Boat and various illustrated evidence¹⁸.

Doyle proposed that, except for larger vessels, there was little necessity for steering oars to be installed on both sides. This conclusion was drawn from the observation that numerous Old Kingdom reliefs seldom depicted helmsmen with all steering oars positioned over the far side **[FIGURE 1]**. Moreover, some boats and rafts appeared too small to accommodate more than a single helmsman¹⁹ **[FIGURE 6]**.

¹³ BOREUX 1925: 387-403.

¹⁴ Rouge 1981: 58.

¹⁵ Lehmann 1978: 95.

¹⁶ THURNEYSSEN 1980: 3.

¹⁷ JONES 1990: 38.

¹⁸Abd el-Maguid 2009: 34.

¹⁹ Doyle 1998: 92.

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[FIGURE 6]: A small boat carries a single helmsman. Giza tomb of *Snb*, fourth dynasty. JUNKER 1941: FIG.14b.

Gilmer posited that the larger Egyptian vessels navigating the Nile necessitated more than a single helmsman. In this context, the helmsman naturally depended on the lateral movement of the steering oar blades. This was attributed to the boats having a relatively short waterline and long overhangs²⁰. Stephens proposed that helmsmen would reposition themselves on the side of the vessel based on the direction in which it was turning. When turning to port, they would align along the port stem quarter, and when turning to starboard, they would align along the starboard quarter. This arrangement, according to Stephens, allowed each helmsman to mimic the stance and actions of the person in front of him when all the rudders were placed on the same side of the craft. This disposition maximized the pressure exerted by the rudders, ensuring uniform bracing and angling of all the rudders. It also provided an additional advantage by utilizing the pressure of the water against the rudders to force the looms of the rudders against the side of the hull, enhancing the firmness of the steering²¹. Mark identified the steering devices of the Old Kingdom as quarter rudders, describing them in pairs. He proposed that these steering devices could function as primitive fulcrums, enabling a steersman to push a steering oar away from the hull as well as forward and aft. Additionally, Mark suggested that a loom line could serve as a fixed point or axis, allowing a steersman to turn these steering oars partially. This versatile steering device might facilitate the use of steering oars in all three directions²².

²⁰ GILMER 1999: 186.

²¹ Stephens 2012: 66.

²² Mark 2012: 90.

IV. STEERING DEVICES' DEVELOPMENT

The most basic approach to navigating a paddle or oar-propelled vessel involves directly using the paddle or oar. However, the evolution of steering mechanisms during the Old Kingdom highlighted the convenience and advancements achieved by incorporating a dedicated steering device at the stern of the craft²³.

In the Old Kingdom, boats were navigated using one or more hand-held steering oars suspended over the quarters. The oars' looms were manipulated through rope or leather grommets, or they were supported within semicircular grooves carved into the ends of a cross-beam inset into the deck just forward of them **[FIGURES 3, 6-7]**.



[FIGURE 7]: Steering device pivots; Saqqara, Mastaba of Ty, fifth dynasty. MARK 2012: 89.

These steering oars could be operated by either turning them on their axis or levering them against the boat's side, causing the boat to turn following the outward thrust of the blade. Toward the end of the Old Kingdom, short cross pieces were added near the butt-ends of the steering oars to enhance the steersman's control. Eventually, a notable development had the steering oar mounted on a vertical stanchion²⁴.

Technical enhancements in steering devices, introduced to enhance boat performance during the Old Kingdom, are elaborated in:

1. Steering oar

In the Old Kingdom, vessels propelled by oars or paddles primarily relied on the crew's adherence to the captain or pilot's instructions, with the rudder(s) playing a stabilizing role. This steering arrangement offered limited control, suggesting that the Egyptian sailors were not substantially aided by their rudimentary rudder²⁵. The use of steering oars persisted from the Predynastic period **[FIGURE 8]** through the Old Kingdom, representing a relatively primitive method of vessel control²⁶.

²³ Rouge 1981: 57.

²⁴ JONES 1990: 38-39.

²⁵ STEPHENS 2012: 69.

²⁶ Doyle 1998: 89.

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[FIGURE 8]: Boat depicted on a bowl; Naqada II. MCGRAIL 2004: 17.

The true steering oar with rotational capability is recognized as the oldest and most versatile form of steering. However, it is acknowledged as one of the most physically demanding for the helmsmen²⁷. In Old Kingdom boat scenes, depictions ranged from one to five steering oars, with two being the typical number on passenger boats. On cargo boats, the usual representation was one steering oar, though occasionally two were depicted ²⁸ [FIGURE 9].

As a natural progression, the subsequent developmental phase aimed to alleviate helmsmen from strenuous tasks and enhance the steering force by increasing the number of steering oars. While this evolution was not particularly inventive in terms of the steering mechanism itself, it effectively addressed the challenges posed by the demanding nature of steering tasks²⁹.



Two steering oars. Giza, Tomb of *Kaemankh* fifth dynasty. JUNKER 1940: PL.3



Four steering oars. Saqqara, Mastaba of *Ty*. fith dynasty. DOYLE 1998: 17.



Three steering oars. Giza, Tomb of *Kanenisu*t fifth dynasty. JUNKER 1940: 156



Five steering oars. Saqqara, Mastaba of *Ty*.fith dynasty. DOYLE 1998: 17.

²⁷ GILMER 1999: 185.

²⁸ Edgerton 1927: 255.

²⁹ Gilmer 1999: 185; Doyle 1998: 96.



[FIGURE 9]: Different Old Kingdom's steering devices.

During the fourth dynasty, some steersmen seemed to be steering with freely held steering oars³⁰ [FIGURES 2/C & 10], a practice that Mark found physically impossible³¹. Iconographic evidence provided little indication that the steering oars were firmly attached, if at all, to the vessel's hull, allowing for considerable freedom of movement. In numerous instances, helmsmen were depicted with their left arms wrapped around the upper length of the oar, suggesting a form of loose and flexible control³² [FIGURES 2/C & 10].



[FIGURE 10]: Helmsmen show their left arms wrapped around the loom. Giza tomb of *Nesutnefer*, fifth dynasty. KANAWATI 2002: PL.54.

Boreux expressed skepticism about how helmsmen, using steering oars, could influence the vessel's course solely through the "strength of the wrist" without any additional support. He believed that this seemingly inconvenient steering gear would limit the duration of voyages, implying potential inefficiency in prolonged navigation using such a mechanism³³.

In the fifth dynasty, the pivots for steering were depicted as horizontal half circles, with one per rudder, securely attached to the hull. These pivots could be situated at the junction between the deck line and the bulwark or at deck level. The steering oar preventer ropes extended from the connection point of the loom and blade, securing them to the grommet³⁴ [FIGURE 3/B & 7] on the quarter. The angle is relatively

³² GILMER 1999: 185,187.

³⁰ MCGRAIL 2001: 33.

³¹ MARK 2012: 89.

³³ BOREUX 1925: 388.

³⁴ STEPHENS 2012: 69.

steep by today's standards³⁵. Additionally, Stephens proposed that, apart from steering by adjusting the oar's angle to the fore and aft lines, this securement method had a dual benefit: it provided greater stability to the rudder, preventing its loss if the helmsman were to lose grip, and also facilitated the steering task by shifting the weight of the rudder from the helmsman's hands to the hull itself³⁶.

Certain scenes depicted the grommet and preventer rope arrangement used to secure the rudder, showcasing the rudders positioned against the forward edge of protruding beams. This configuration was illustrated on the Mastaba of *Akhethetep* from the fifth dynasty in the Louvre Museum and *Ty*'s tomb in Saqqara **[FIGURE 3/B]**. This suggests that such a form of steerage would impart increased firmness to the rudders. When positioned aft of the beam, the rudders would naturally tend to trail a little astern, with the amount of trail being regulated by the preventer rope. While in motion, the water pressure against the looms would push them against the beam, creating a more robust pivotal point for turning the rudder³⁷. McGrail proposed that the sailors might utilize a push stroke to maneuver the boat in this setup³⁸. Gilmer suggested that the oars in use were transitioned to axial rotation for steering, offering a significantly easier and more efficient method. The oar, in this evolution, essentially became a primitive rudder, turning about its axis. Gilmer added that for a sailing craft, this type of steering and helmsman was both the most natural and desirable approach³⁹.

2. Steering oars with tiller

The ancient Egyptians along the Nile evidently acknowledged the necessity for increased power in their steering systems, as they began incorporating a third and even a fourth or more helmsmen. Eventually, they recognized the significant advantage offered by the tiller⁴⁰, which substantially eased the helmsman's task⁴¹. The introduction of the tiller marked its appearance during the fifth dynasty. This device was relatively short and extended from the loom at nearly a right angle, projecting in either one or both directions. Among the earliest tombs depicting the tiller were those of *Ptahhotep and Akhethetep* in Saqqara [FIGURE 4] and the tomb of *Snefrou-ani-mertf* in Dahshur⁴² [FIGURE 11].

³⁵ McGrail 2001: 34.

³⁶ STEPHENS 2012: 69.

³⁷ STEPHENS 2012: 70.

³⁸ MCGRAIL 2004: 34.

³⁹ GILMER 1999: 187.

⁴⁰ GILMER 1999: 186.

⁴¹ CASSON 1995: 18.

⁴² Edgerton 1927: 257-259; Casson 1995: 18; Doyle 1998: 103; McGrail 2004: 33.



[FIGURE 11]: Old Kingdom tillers. Dahshur, the tomb of *Sneferu-ani-mertef*. fifth dynasty Helmsmen operating steering oars with tillers. EDGERTON 1927: 260.

The introduction of the tiller would provide enhanced control over the steering oar, reducing the physical effort required. With the lower hand serving as a fulcrum, the upper hand could manipulate the steering oar via the tiller **[FIGURES 4 & 12]**. Despite this advancement, Stephens argued that, since the helmsman still needed to force the blade into the water and support the weight of the steering oar, it may not represent a substantial improvement after all⁴³.



[FIGURE 12]: Old Kingdom tillers. Dahshur, the tomb of *Snefrou-ani-mertf*, fifth dynasty. DE MORGAN 1894-1895: PL.21.

With the introduction of the tiller, helmsmen might adopt a more seated position rather than standing, a departure from previous practices. A standing helmsman at the quarters would hold the tiller with the far hand and the loom of the steering oar with the near hand or both hands. In the case of a seated helmsman, the tiller would be held with one or both hands **[FIGURES 11-12]**. However, an occasional error by a draftsman resulted in the depiction of a helmsman grasping not the tiller but the mast crutch⁴⁴ **[FIGURE 13]**.



[FIGURE 13]: Rudder post. Saqqara, the Tomb of *Ptahhotep*. fifth dynasty. DOYLE 1998:185.

In the sixth dynasty, there was a trend for the tiller to become longer and to hang vertically from the loom⁴⁵. Despite its vertical appearance, the helmsman's use of both hands implies that it extended horizontally **[FIGURE 14]**, aligning athwart the ship and parallel to the deck. The manner in which it was held resembled the grip one might have on the handlebars of a bicycle⁴⁶.



[FIGURE 14]: Horizontal tiller. Deir El-Gebrawi, the tomb of Aba, sixth dynasty. DAVIES 1902: PL.X.

3. Axial rudders in the Old Kingdom

Towards the end of the Old Kingdom, a notable shift occurred, and the single steering oar with a tiller, pivoted on the stern and against a vertical stanchion, became increasingly prevalent. The introduction of the tiller brought forth another innovation: the stern-mounted steering oar **[FIGURE 15]**.

⁴⁴ DOYLE 1998: 103.

⁴⁵ Edgerton 1927: 262.

⁴⁶ DOYLE 1998: 103.



[FIGURE 15]: The stern-mounted steering oar; Meir, the Tomb of *Pepi-anch Heni-kem*, sixth dynasty. BLACKMAN 1914: PL.XLII.

Steering oars might be affixed to curved or straight timbers projecting up from each corner of the flat stern. The most well-known depictions of the axial rudder are found in the tombs of Deir El-Gebrawi from the sixth dynasty. From the sixth dynasty onward, the steering oar could only be turned on its axis⁴⁷ [FIGURE 16].



[FIGURE 16]: Steering device stanchions; Deir El Gebrawi, Tomb of Zau, sixth dynasty. DAVIES 1902: PL. VII.

Draftsmen illustrated various methods of fastening rudders to stanchions. In the scene from the tomb of *Pepi-anch Heni-kem* in Meir, lashings were depicted holding the loom to the stanchion. Alternatively, in scenes like the one at the tomb of *Ipy* in Saqqara, the loom seemed to pass through a loop of rope reefed through an eye in the stanchion. In this case, the loom did not appear to be secured by the stanchion but was merely supported by it **[FIGURE 17]**. Draftsmen might portray two stanchions, as seen in *Pepi-anch Heni-kem*'s tomb, or only one, as in *Ipy*'s tomb. If this was the case, it signified an intermediate step between the steering oar with a tiller and the development of the rudder. Like steering oars, rudders could be mounted either over the stern, as seen in *Ipy*'s tomb, or at the quarters, as depicted in the tomb of *Pepi-anch Heni-kem*. In certain instances, crosspieces were likely employed, although they might not be visible in two-dimensional representations **[FIGURE 15]**. Tillers were typically long and extended forward of the stanchion, in front of which the helmsman would sit⁴⁸; this arrangement allowed a helmsman to manage two rudders simultaneously or handle the tiller and braces concurrently **[FIGURE 17]**.

⁴⁷ Edgerton 1972: 262; Doyle 1998: 103; Belov 2014: 3.

⁴⁸ Doyle 1998: 103,110.



[FIGURE 17]: Different stanchions. A.Meir, the Tomb of *Pepi-anch Heni-kem*. sixth dynasty. BLACKMAN 1914: PL. XLIII; B. Saqqara, Tomb of *Ipy*. sixth dynasty, VANDIER 1969.2: PL.XXXIX, FIG.301.



[FIGURE 18]: The helmsman handles the tiller and braces. Saqqara, the Tomb of *Ipi*, sixth dynasty. DOYLE 2006: 16.

Draftsmen occasionally omitted the stanchion, even when portraying the same boat. For instance, in the tomb of *Pepi-anch Heni-kem* in Meir, stanchions were illustrated aboard the boat in one depiction and then neglected in another portrayal of the same boat [FIGURE 19].



[FIGURE 19] :The draftsmen neglect the stanchion on the same boat. Meir, the Tomb of *Pepi-anch Henikem.* sixth dynasty. WENZEL 2007: 359.

In some scenes, draftsmen neglected to connect the rudder with the stanchion; the loom might be angled to avoid any contact with the stanchion **[FIGURE 13]**. Alternatively, both rudders might appear on one side of the vessel, and a single tiller might be sufficient for two rudders, as observed in the tomb of *Zau* in Deir El-Gebrawi from the sixth dynasty **[FIGURE 20]**. It is essential to interpret these images not as factual representations but as early examples in the depictions of rudders.



[FIGURE 20]: A single tiller suffice for two rudders. Deir El-Gebrawi, the Tomb of Zau, sixth dynasty. DAVIES 1902I: PL.VII.

V.CONCLUSION

In conclusion, the steering devices employed in the Old Kingdom's boats could be categorized into two main types: the steering oar and the rudder. Both devices were utilized at either the quarters or the stern of the vessel. The steering oar, characterized by a larger blade than that of a rowing oar, was mounted solely to the planking or a crosspiece, allowing it to be freely levered against the hull. This technology persisted from the Predynastic period to the Old Kingdom. The rudder, featuring an oar with a tiller mounted to a stanchion, emerged by the late fifth dynasty.

The disappearance of grommets in scenes before this period does not necessarily indicate their absence in reality, as the strength of helmsmen's wrists alone would not have been sufficient for steering.

The tiller was invented during the fifth dynasty after the reign of *Sahure* and before *Djedkare*, suggesting a transition from lateral to axial steering. By the end of the fifth dynasty, the grommet was replaced by a stanchion (rudder post), potentially evolving from the stanchion used to support dismounted masts and yards. The researcher suggests that both axial and lateral steering methods were used consecutively, not simultaneously, with the lateral method preceding the axial. The evolution of steering devices aligns with Mott's notion that the replacement of one technology by another is a complex and multifaceted process⁴⁹. Furthermore, there might not be a need for double steering in smaller or lighter boats, but larger transport boats in the Old Kingdom often featured double the number of displayed steering oars.

Finally, the iconographic representations of the Old Kingdom's transport boats served as invaluable sources of information, offering insights into the technological advancements of Ancient Egyptian shipwrights. These depictions, showcasing the oldest presentations of planked boats known to date, provided rich documentation of a diverse fleet adapted to the unique challenges of the Nilotic environment. The fleet's gradual development over centuries reflected its ability to navigate and thrive in the specific conditions of the Nile, showcasing distinctive traditions of construction and navigation.

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