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The Earliest Sailboats in Egypt and Their Influence on the Development of Trade, Seafaring in the Red Sea, and State Development

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Abstract

Based on iconography and trade patterns, Egyptians first outfitted their vessels with sails during the beginning of the Naqada IIc Period. As a result, the Nile became such an important trade network that settlements moved from the desert fringes to the Nile floodplain. Sailboats may also have been the primary catalyst for the spread of Naqada culture into Lower Egypt and an intensification of relations with Lower Nubia. Eventually, ships sailing to Punt on the Red Sea probably led to the extinction of the Late A-Group culture.

The Nile is often seen as a "perfect waterway" because vessels can float downstream for *c.* 1200 km while consistent north winds allow them to sail upstream (Figure 1).[1] In the context of Egypt's long history, this idea is of course an exaggeration because navigability on the Nile can be influenced by a number of factors, including time of year, location on the Nile, changes in climate, and technological innovations. Even so, the idea of a constant stream of boats sailing up and floating down the Nile throughout Egypt's history is so ingrained in the field of Egyptology that it is difficult to imagine a time when boats did not sail on it. However, before Egyptians outfitted their vessels with sails traveling upstream was difficult and time consuming. Not only could sailboats carry larger and heavier cargos up and down the Nile but also armies, supplies, and reinforcements. Thus, the appearance of the sail in Egypt greatly influences not only our interpretations on the development of trade along the Nile and on the Mediterranean and Red Seas but also our interpretations on the development of the Egyptian state. A review of iconography and trade goods and their distribution from the Neolithic through the Naqada IIc Period suggests sailboats were first used to carry heavy cargos during the latter period. The term "sailboat" can have different meanings, depending on period and context. In this paper, the term "sailboat" is used in its most basic meaning as any vessel outfitted with a sail.

Earliest Evidence of Sailboats

Two different opinions have been proposed as to when the sail first appeared in Egypt. The traditional view is that it was either invented or borrowed at roughly the same time as the first depictions of sailboats. The most firmly dated example of a sailboat is painted on a pot that the British Museum broadly dates to the Naqada II Period (*c.* 3500–3200 BCE) (Figure 2),[2] but other sources date it later to the second half of this period (Naqada IIc/d Period).[3] Two other possible depictions of boats outfitted with sails on pots are also dated to the Naqada IIc/d Period,[4] while a graffito depicting a sickle-shaped sailboat has also been recorded (Figure 3).[5] This type of craft appears to have been used only during the Naqada II Period, and this hull shape may indicate a change from papyrus to wood in Egyptian boat construction.[6] Since no evidence exists for a sail prior to the Naqada II Period, these data suggest sailboats first appeared sometime in the Naqada II Period and were definitely sailing on the Nile during the Naqada IIc/d Period. A vessel under sail is depicted on the Qustul incense burner, but since the tomb from which it came (L 24) dates no earlier than the Naqada III Period and probably to the First Dynasty,[7] a span of time when sailboats were common, this depiction has no relevance to the discussion.

A second theory is that Egyptians outfitted their vessels with sails considerably earlier. Kenneth Kitchen believes they sailed on the Red Sea as early as the fifth millennium BCE.[8] Based on his interpretation, Cheryl Ward proposed that it was probable that Egyptians were carrying disassembled ships to the Red Sea by *c.* 3500 BCE.[9] Both theories have been recently challenged.[10] The evidence for Egyptian ships making such long voyages so early is based on indirect evidence. Kitchen proposed that the discovery of sorghum (*Sorghum bicolor*) in Oman at the fifth or early fourth millennium BCE is evidence of long-distance trade because sorghum is believed to be indigenous to Africa,

suggesting seafarers carried it to Oman. Furthermore, he stated that "[i]n turn, one may extend this principle to earliest explorations along the west coast of the Red Sea."[11] This interpretation is no longer supported by the evidence because these plants are now believed to have been *Setaria* sp., a common grass found throughout Oman.[12]

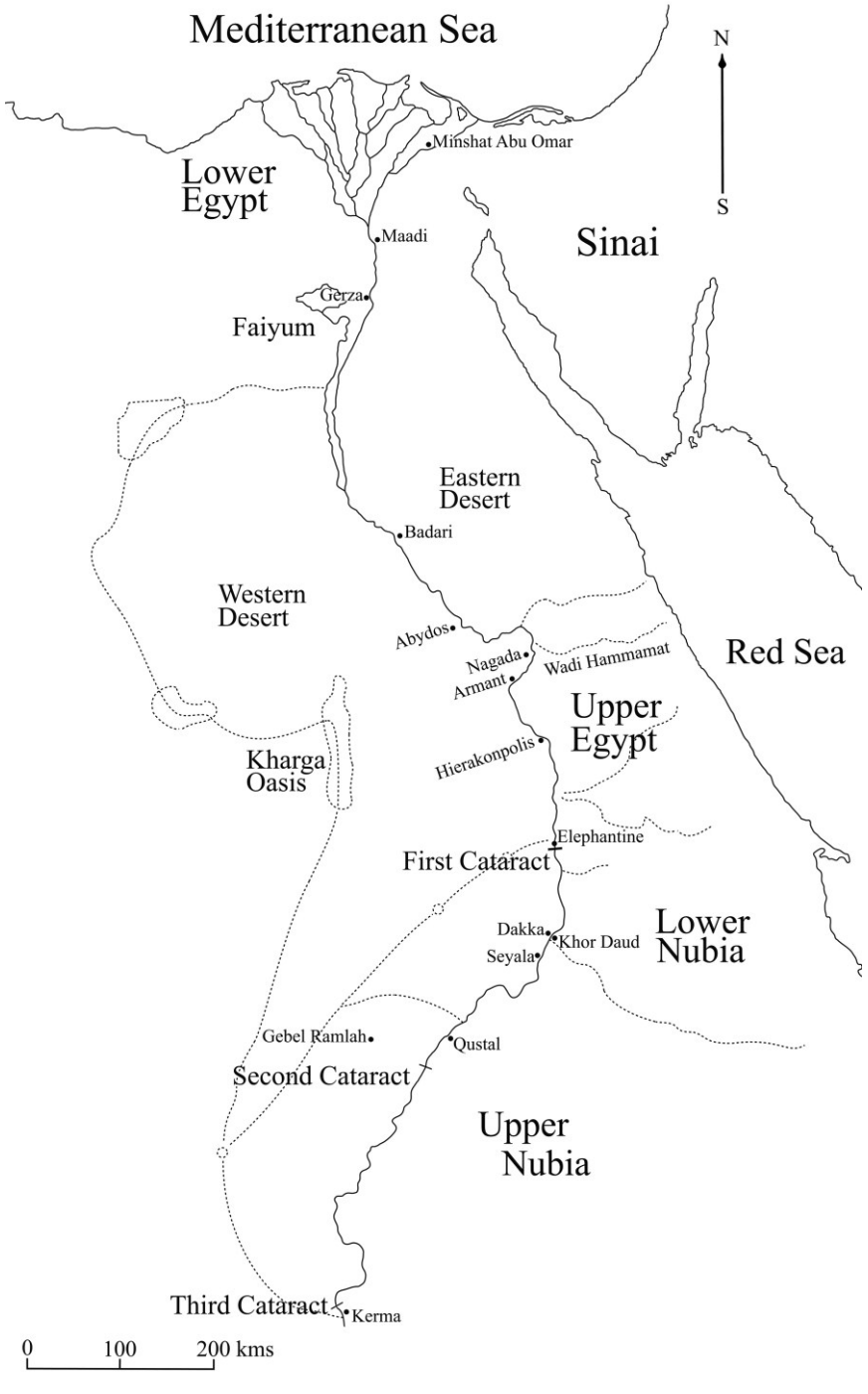

Figure 1: Map of Egyptian and Nubian Sites, after Wilkinson, *The Rise and Fall of Ancient Egypt* (New York: Random House, 2010), xxxv.

Ward, however, argued that the appearance of obsidian at Upper Egyptian sites *c.* 4000 BCE from sources in Ethiopia or southwest Arabia[13] and Red Sea shells, which have been found on many Neolithic and Predynastic sites, supports an early date for seafaring.[14] In regards to obsidian, the evidence indicates that it probably came from Ethiopian sources because inhabitants of contemporary sites along the west coast of Yemen imported it from Ethiopia.[15] It is therefore probable that obsidian in Upper Egypt came from the same Ethiopian sources and was traded along the Nile.

Yet, if Ethiopian vessels were transporting obsidian to sites in Yemen, they may also have been sailing up the Red Sea, bringing obsidian directly to Egypt. According to Kitchen, a possible parallel for an early Red Sea sailboat is depicted on an Eighteenth Dynasty tomb relief, portraying what appears to be a sailed leather raft from the land of Punt (Figure 4). The construction of such a vessel would be technically feasible during the Neolithic Period,[16] raising the possibility that Puntites introduced the sail to Egypt. Two flaws exist with this line of reasoning. First, there is a tendency among scholars to assume that when evidence of sea travel exists, especially when based solely on evidence of long-distance trade, seagoing vessels were outfitted with sails, as in this case.[17] A review of more recent data suggests that this is not necessarily so. Sea trials with papyrus rafts in the Aegean show that they could travel from Athens to the island of Melos, *c.* 159 km, without sails. It is proposed that similar craft were used during Mesolithic and Neolithic Periods (before *c.* 3800 BCE) to acquire obsidian.[18] Considering the distance between Ethiopia and Yemen is *c.* 30 km, their obsidian trade did not require sailed vessels, and even Kitchen agrees that indirect trade via land routes also existed between Egypt and Punt at this time.[19] As such, the evidence suggests trade between these two lands was indirect and took place along the Nile River.[20]

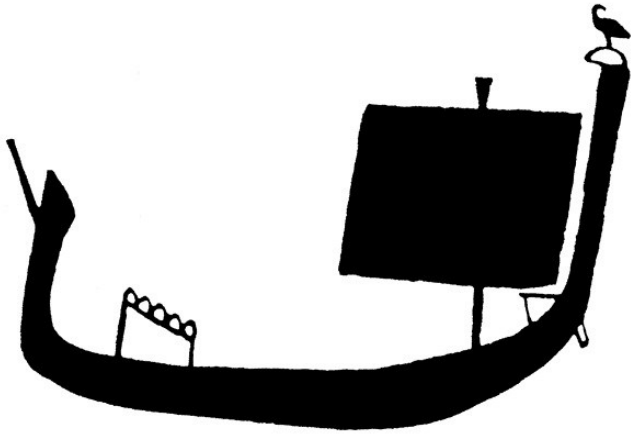

Figure 2: An Egyptian sailboat painted on a pot, probably Naqada IIc Period, after William Flinders Petrie, *Prehistoric Egypt* (London: British School of Archaeology in Egypt, 1920), pl. XXIII.3.

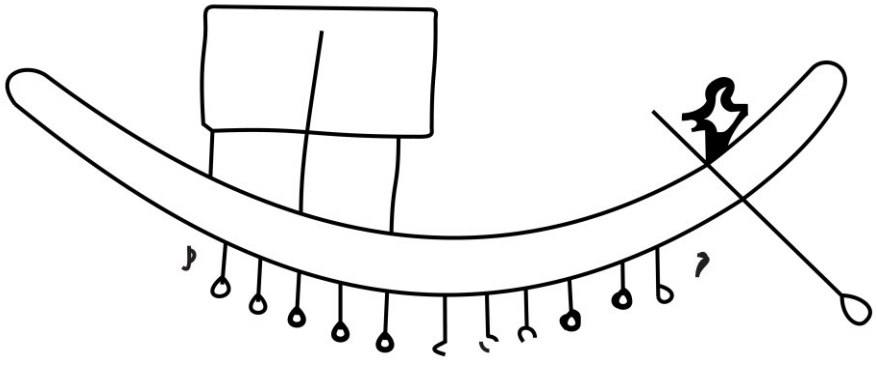

Figure 3: Graffito of sickle-shaped sailboat, after Červíček, fig. 156.

Neolithic Trade

A review of trade goods found in Egypt during the Neolithic Period, including Red Sea shells and obsidian, is consistent with a long-distance indirect-trade network that was not dependent on any sailed vessels, either riverine or seagoing. For example, Late Neolithic sites (*c.* 5100–4700 BCE) in the Western Desert have produced a large number of trade items. At Gebel Ramlah, Red Sea shells, beakers with complex designs, sheets of mica, knives of beige flint, rectangular and oval hard-stone palettes, beads and lip plugs of carnelian and turquoise were found. These items and others "indicated far-reaching contacts with the Eastern Desert, and the Red Sea," while other grave goods, such as "mortars and pestles of hard stone, pottery with rocker stamp decoration, crescent-shaped lithics and mica slabs point to connections with the far south."[21] Items from the Red Sea must have come via long-distance trade because Gebel Ramlah is *c.* 500 km from the Red Sea (Figure 1), and "it is likely that the people themselves

remained in the desert all year round."[22] Similar items were found in a Tasian grave in the Eastern Desert, dating to *c.* 4940–4455 BCE.[23] These include Red Sea shells, malachite, red ochre, fragments of mica slabs, and beige flint.[24]

At Badarian sites (*c.* 4500–4000 BCE) a similar pattern exists. It has been proposed that turquoise, steatite, and copper were imported possibly from the Sinai or farther east. Moreover, Badarians traded for the same goods from the Eastern Desert as previously cited, especially Red Sea shells, but on a larger scale. Ivory and porphyry may also have come from Nubia while a possible loop-handled Palestinian jar was found at Badari,[25] and small amounts of cedar (*Cedrus* sp.) have been reported.[26]

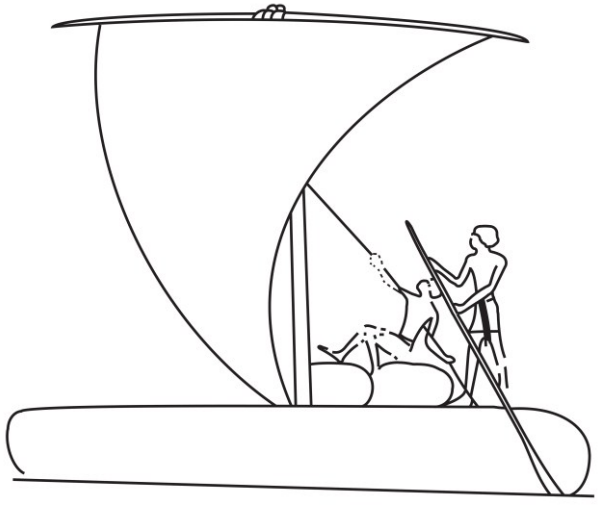

Figure 4: Punt sailboat, after Shelley Wachsmann, *Seagoing Ships & Seamanship in the Bronze Age Levant* (College Station, Texas: Texas A&M University Press, 1998), fig. 2.44.

In Lower Egypt evidence of a trade network also exists. For example, at the Neolithic Faiyum or Faiyum A (late sixth and early fifth millennium BCE) seashells from both the Mediterranean and Red Seas and a shark's tooth were found, while cosmetic palettes of Nubian diorite came from the south and beads of green feldspar possibly came from the Eastern Desert. One turquoise pebble was recovered, which probably came from the Sinai.[27] Some features exhibited in the local lithic industry are reminiscent of that at the Kharga Oasis (Figure 1).[28] The previously described items from all these sites are small and easily transportable, and they are consistent with a well-developed indirect-trade network throughout Egypt that did not require sailed vessels to transport goods. These goods could in fact have easily been traded via land routes. The only required transport over water was across the Nile for goods traded along routes between the Red Sea and Western Desert. Finally, as no evidence exists for pack animals, a number of middlemen must have existed in this network.

Predynastic Trade before the Naqada IIc Period – Lower and Upper Egypt

Even though Predynastic societies dating before the Naqada IIc Period are wealthier and more complex than earlier cultures, the earlier trade pattern does not appear to have radically changed. The primary difference is a greater volume of goods being traded. Lower Egyptian trade is best illustrated at the site of Maadi. From the southern Levant, the Maadians imported basalt vessels and rings, copper, large flint nodules, "Canaanite blades," large circular scrapers, pigments, resins, oils, cedar, and asphalt.[29] Of all trade goods, copper appears to be the main import, coinciding with an expansion of copper working in Upper Egypt. Near Eastern traders may have been living at Maadi because four subterranean structures similar to those at Beersheba were found along with wavy-handled pottery,[30] but it is not clear whether these pots are imports or were made on site. In return, exports to the southern Levant appear to include a few pieces of Lower Egyptian black ware, along with flint, Nile catfish pectoral fin spikes, and Nile shells.[31] Furthermore, possible Upper Egyptian goods found at sites in the southern Levant include stone mace heads and gold.[32] These goods are believed to have been transported using donkeys via a land route through the Sinai.[33] Caravans would allow merchants to carry a greater volume of small high-value goods over longer distances. In regards to Maadian trade with Upper Egypt, Maadians imported rhombic palettes and mace heads carved from hard stones, fish-tailed flint knives, and ivory combs, as well as raw materials such as ivory and hard stones, and a few fine black-topped vessels. Imperfect local copies of black-topped vessels were relatively common, suggesting a high demand, and Maadians also borrowed Upper Egyptian motifs to decorate their pottery. In return, they exported basalt vessels, ceramic styles, and copper.[34] Considering the popularity of Upper Egyptian pottery, if boats were used to move goods down the Nile, large quantities of pottery could have been relatively easy to transport, and if so, larger quantities of pottery would have been found at Maadi. Instead, the increase in trade of small, easily transported items suggests that trade goods were transported primarily by donkey. This observation finds support with Béatrix Midant-Reynes, who points out that what is most surprising is that "contacts between Upper and Lower Egypt were not more intense (considering the incomparable nature of the Nile as a communication route) and that they were expressed mainly in imitations rather than actual imports and exports."[35] The only proposed explanation is that some unknown cultural group inhabited the *c.* 250 km between them and acted as a buffer, even though no evidence for such a population has been found.[36]

Nubian Trade with Upper Egypt

Trade between Upper Egypt and Nubia is more difficult to

discern. The Nubian A-Group culture is divided into three phases: Early, Middle [Classical], and Late [Terminal]. Early sites may have extended south from the First Cataract to Dakka-Sayala (Figure 1). Two other interpretations, however, have been proposed. First, A-Group sites closest to the First Cataract are a regional variation of the Naqada culture and "true" A-Group sites are located farther south.[37] The second is that Naqada settlements were established south of the First Cataract while some Nubian sites were north of it. Thus, a definite border did not exist.[38] The date of this culture's appearance is also in doubt. It may have first appeared at roughly the beginning of the Naqada I Period (*c.* 3500–3200 BCE),[39] coinciding with the appearance of Ethiopian obsidian in Upper Egypt. The earliest evidence for Egyptian influence among the Early A-Group culture, however, dates later, to the Naqada Ic Period.[40]

What we know of the Early A-Group comes primarily from burials. Artifacts from them include "red-polished, black topped pottery, fine bifacial flint tools, stone bowls, diamond-shaped schist palettes and conical mace heads."[41] These goods may indicate trade with Egypt, but "some features on pottery may have derived from local culture as well as being influenced from Egypt."[42] Since it is difficult to differentiate Early A-Group sites from Naqada sites in this region, however, it is difficult to differentiate whether Naqada artifacts found in Nubia were locally made or imports.

Regardless, as the Naqada culture becomes wealthier so too does the A-Group culture. Some goods were probably produced by the A-Group people, but they also appear to have been middlemen, trading finished goods from the Naqada people to the north for raw materials and exotic goods, such as ivory, incense, vegetable oils, skins of wild cats, ebony or African blackwood (*Dalbergia melanoxylon*),[43] and obsidian from the south. Transporting goods from Egypt to Nubia did not require sailboats. Considering the types and volumes of goods being traded from the southern Levant to Nubia, all could have been transported by caravans of donkeys. No evidence exists to suggest goods were shipped on the Nile, neither during the Neolithic Period nor the Predynastic Period prior to the Naqada IIc Period.

The Naqada IIc Period

Major changes are evident throughout Egypt during the Naqada IIc Period. Maadi disappears, and sites with Naqada cultural traits appear in the Faiyum region, such as Gerzeh. Farther north in the Delta sites such as Minshat Abu Omar begin to exhibit these traits later in the Naqada IId1 Period. This cultural change is so significant that it is commonly referred to as a Naqada expansion.

In Upper Egypt the location of settlements begins to shift from the low desert to the Nile floodplain, which is completed by the Naqada IId. Abydos is the only exception probably because it was a sacred site.[44] Diana Patch proposes that increased dryness may have caused this shift, whereas Midant-Reynes suggests trade may have been an influence because the Nile was "the favored axis for trade."[45]

Evidence of foreign trade and influence also increases. Wavy-handled pottery is imported probably as transport containers for wine and possibly vegetable oils, and the wavy handles were copied on Upper Egyptian pottery.[46] Moreover, Upper Egyptians appear to have imported Mesopotamian containers and copied some features. These containers may include tubular-spouted, triangular-lugged, loop-handled, and footed containers.[47] In regards to raw materials, lapis lazuli from Afghanistan becomes common at some sites[48] and probably came via Mesopotamian colonies in northern Syria.[49] Silver and lead may have been imported from this same region.[50] Obsidian found at Lower Egyptian sites is consistent with deposits from Anatolia, while obsidian from Upper Egypt still comes from Ethiopia.[51] Finally, Mesopotamian or Mesopotamian-style cylinder seals first appear, and a number of Mesopotamian motifs are adopted.[52]

During the Naqada IIc Period, trade between Naqada sites and Early A-Group sites intensifies. According to Stan Hendrickx, A-Group cemeteries show a strong Egyptian influence,[53] while Izumi Takamiya proposes that bulk cargos of beer, wine, oil, cheese, cereals, and honey were imported in pottery containers to sites such as Khor Daud, a trade center in Lower Nubia (Figure 1). Differentiating imported and locally made pottery is still difficult, with one exception. Some containers were made with marl clay, and the closest deposits of this clay are *c.* 40 km north of the First Cataract.[54] We therefore have the earliest definitive evidence of imported pottery containers, as well as the earliest indicators of pottery containers being used as transport containers for bulk cargos. If these same goods were imported using donkeys, leather bags would perform the same function and greatly reduce weight, allowing more cargo to be transported per donkey. In contrast, pottery containers are better suited as a transport container on boats, as they are easier to stow and stack than leather bags, especially when transporting liquids, while keeping other goods, like grains, dry. Finally, this intensification is further suggested by the establishment of a Naqada settlement on Elephantine.[55]

It seems unlikely that it is a coincidence that this Naqada expansion coincides with the relocation of Naqada settlements closer to the Nile, the appearance of an unprecedented number of foreign imports and influences in Upper Egypt, and an intensification of trade with A-Group sites, especially the transport of bulk cargos in pottery containers. These shipments of bulk goods to Nubia appear to coincide with bulk imports into Upper Egypt of wine and possibly oils in wavy-handled containers from Lower Egypt. All roughly coincide with the appearance of sailed vessels in Egyptian iconography. As previously mentioned, it has been proposed that an unknown cultural group acted as a buffer between Upper and Lower Egypt before the Naqada IIc Period, but instead of a cultural buffer, for which no evidence has been found, there may have been a technological barrier. Sailed craft could carry larger cargoes over longer distances, allowing for direct trade between Upper and Lower Egypt as well as between Upper Egypt and Lower Nubia.

If so, it is at this time that the Nile becomes "the favored axis for trade."

The Development of the Egyptian State

The first sailed vessels would also have influenced the development of the Egyptian state. In general, two competing theories have been proposed to explain the Naqada expansion. Both agree that no evidence exists to suggest there was an excess population in Upper Egypt influencing this expansion, and instead, a desire to control trade was the primary influence. A cooperation theory proposes that by the Naqada IIc Period three proto-states existed in Upper Egypt and were ruled by Abydos, Naqada, and Hierakonpolis (Figure 5). These proto-states formed either alliances or a confederation, then invaded and conquered the north.[56]

Barry Kemp has proposed a second model based on game theory wherein a polity takes chances on trade, technology, or even warfare to gain an advantage over other polities. Sometimes a change produces a gain and sometimes a loss. Bad decisions or unexpected consequences can affect the game, which can continue for generations until one polity gains an insurmountable advantage over all others, leaving only one. Instead of alliances or confederations, the three Upper Egyptian proto-states or statelets or paramount chiefdoms were in competition with each other while a similar situation was taking place in Lower Egypt. Eventually only one polity in each region existed, leading to a war between them, and eventually the southern polity conquered the northern polity.[57] Bard, however, points out that there is no evidence for such a unified polity in Lower Egypt.[58]

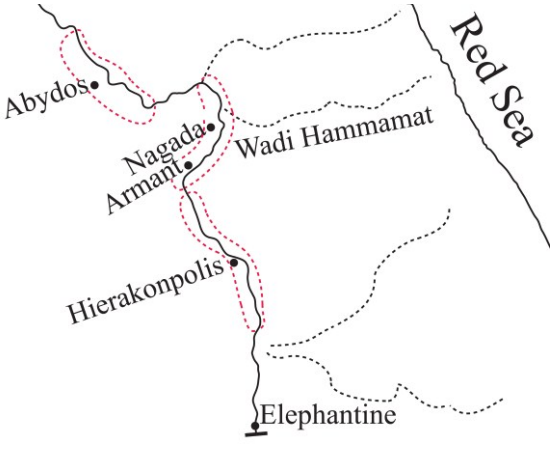

Figure 5: Three hypothesized proto-kingdoms in Upper Egypt, after Barry Kemp, *Ancient Egypt: Anatomy of a Civilization* (New York: Routledge, 1991), 32 fig. 8.

There are, however, obstacles to any theory dependent on an invasion to explain the Naqada expansion. A basic tenet of military strategy is never to overextend supply lines. As previously noted, Upper and Lower Egyptian sites were separated by *c.* 250 km. It seems unlikely that caravans of donkeys could transport the volume of supplies needed to support an invading army in a timely manner, and, if used, slow moving caravans would require a significant force to defend them over very long distances. Moving men and materiel down the Nile in boats without sails would be possible and easier to defend than caravans, but there would be no practical way to return such large craft upstream, especially over such a long distance. Furthermore, to support an army a large number of boats would be needed. Even if an army and support materials could be successfully transported into Lower Egypt without sailed craft, maintaining timely contact between an army on the move and Upper Egypt, especially in such a large region, would be difficult if not impossible, as would the timely resupply and reinforcement of a moving army. Under these circumstances, supply lines for any invasion would be overextended at the outset.

In contrast, sailboats could move large numbers of men and materiel as well as the means to resupply them over long distances. In addition, sailed craft would be the easiest to defend due to their greater speed and maneuverability. Even with sailboats, however, such an undertaking would require considerable logistical capabilities. It has been pointed out that mounting an expedition to transport a ship across *c.* 150 km of desert to the Red Sea would require "impressive logistics as well as a highly organized state bureaucracy,"[59] for which no evidence exists before the First Dynasty.[60] Mounting and supporting an invasion over a minimum distance of *c.* 250 km even with sailboats would require a similar level of logistical capability for which no evidence exists at this time. In effect, there is a tendency to underestimate the difficulties of invading and conquering Lower Egypt.

Further drawbacks to any invasion theory are that Lower Egyptian sites lack destruction layers.[61] Furthermore, to conquer, hold, and colonize such a large area would require both a large army and an excess population in the south to colonize this region, but, as previously mentioned, no evidence exists for excess populations in Upper Egypt at this time. E. Christiana Köhler argues that the archaeological data from some sites, such as Minshat Abu Omar, suggest no Naqada expansion took place, and instead these data are consistent with a slower cultural transition.[62] While this interpretation is supported by evidence from some sites, at others, such as Gerzeh, changes were too rapid to fit this model.[63] Recently Kathryn Bard has proposed that this expansion was smaller and more gradual. Traders moved north, followed by colonists, and eventually some degree of warfare unified Egypt.[64] An advantage to this theory is that colonies along the Nile would be easier to resupply and support, but to do so without sailed craft seems unlikely considering the distance between these sites and Upper Egypt.

A modified competition theory presented here is also consistent with the previously stated evidence for a Naqada expansion. In the Naqada I Period the same three chiefdoms existed as noted above. The Naqada chiefdom was dominant because it controlled raw materials passing through the Wadi

Hammamat. The earliest shift in power may have started as early as the Naqada Ic Period with trade between the Hierkonpolis chiefdom and the A-Group culture. In addition to trade, the A-Group culture may have provided troops. The recruitment of mercenaries by Egyptian kings has been cited as a possible source of Nubian wealth during the Late A-Group Period.[65] If so, this practice may have started earlier, giving an additional advantage to the southern polity. To offset these advantages the northern polity increased trade with Lower Egyptian sites, such as Maadi, but the volume of trade would be limited by a lack of sailboats and was conducted via land routes. Thus, before the Naqada IIc Period Hierakonpolis had an advantage due to their close proximity to Lower Nubia. The establishment of a Naqada settlement on Elephantine may also suggest an attempt at greater control of trade with Nubia by the southern polity or even a southern expansion of its borders, coinciding with a northern expansion.

Even with the introduction of the sail, the northern paramount chiefdom or proto-state or statelet would be in a tenuous situation. Due to population constraints, small groups as suggested by Bard were sent to the north to establish small but well-armed settlements only along the Nile, and they either gradually assimilated or conquered surrounding populations, depending on the reaction of a local population. These settlements were established to control trade along the Nile, as previously proposed. In addition, Naqada sites traded for bulk supplies of food from surrounding Lower Egyptian sites, which would be shipped upriver, freeing men in Upper Egypt to fight instead of farm, and northern sites could have been used as recruitment centers. Over time, these Naqada settlements would gradually move north along the Nile. Since these are fixed sites, it would be easier to resupply and support them by using sailboats as a constant and timely link with Upper Egypt. Once these settlements controlled the Nile and were self-sufficient, a westward expansion could take place. Such a strategy would be possible because no evidence exists for a unified polity in the north to oppose them, eliminating the need of a large invasion force.

A lack of damage to settlements would be understandable because many if not most may have been assimilated instead of conquered, and, for those that were conquered, preserving people and settlements, as well as the products they produced, was a primary objective. Taking land without people to populate it would have no value to a conqueror beyond initial spoils. Battles thus took place away from settlements. This strategy would also be consistent for a modified cooperation model as proposed by Bard.

It has been proposed that an alliance between northern and southern proto-states led to the demise of the central proto-state.[66] Another possibility is that the northern polity made an alliance with the central polity against the south. A buffer state would give the northern polity more time to develop resources in Lower Egypt. Such an alliance would also explain why imported Near Eastern items are significantly rarer south of Armant,[67] which is near the proposed southern border of the central polity (Figure 5). The Naqada expansion would therefore have been an event peripheral to a power struggle taking place in Upper Egypt. Once the northern polity had consolidated its position in Lower Egypt along the Nile, the central polity became expendable and was assimilated or conquered.

Both cooperation and game theory models based on establishing small settlements along the Nile have merits. Both, however, require the use of sailboats to establish, resupply, and support them, especially over a minimum distance of *c.* 250 km. A lack of sailboats would lead to another drawback. Without them Upper Egyptian sites would have no real method of controlling their Lower Egyptian colonies due to the considerable distance between them. Instead of an Upper Egyptian polity spreading its influence into Lower Egypt, it could inadvertently establish an independent competing political entity that controlled the flow of goods between the Mediterranean and Upper Egypt. Sailboats would allow a greater degree of direct control. If so, sailboats must be a requirement for any theory explaining a Naqada expansion.

Seafaring on the Red Sea and the Disappearance of the Late A-Group Culture

Finally, as previously mentioned, it is unlikely Egyptians were sailing on the Red Sea prior to Early Dynastic times due to logistical and organizational constraints. Large-scale mining operations in the Eastern Desert begin at roughly the same time as evidence for moving ships across this desert, and these two undertakings may have been logistically integrated, explaining why mining expedition leaders had naval titles.[68] Training of seafaring sailors is also an important consideration. The Nile has been described as a gentle body of water, and consequently sailors working on it would lack the training necessary to sail on the open seas.[69] On the Mediterranean Sea storms can suddenly appear, but during the sailing season they are rare while winds and currents move in a consistent counter-clockwise direction in the eastern Mediterranean. If a ship was seriously damaged during a voyage, harbors existed all along the Levant where even large-scale repairs could be made. In contrast, the Red Sea has more numerous and extensive coral reefs than any other sea. Seafarers also had to contend with "notorious" winds, gales, and sand storms, which sometimes struck while sailing in brown seas that hid reefs from view. These conditions have been described as "treacherous."[70] Moreover, no known established harbors existed to obtain assistance or to carry out repairs while sailing on the Red Sea. Before sailing on the treacherous waters of the Red Sea, Egyptian seafarers probably became proficient sailors on the Mediterranean.[71]

If voyages to Punt via the Red Sea began in Early Dynastic times, they roughly coincide with the disappearance of the Late A-Group culture. This sudden disappearance is a mystery. The most common explanation is that Egypt launched a military invasion to control trade,[72] but no evidence exists of significant

trade through this region after the disappearance of the A-Group. The A-Group culture flourished because it was an effective trade center between Egypt and groups as far south as Punt. By destroying it, the acquisition of exotic goods would be less efficient, reducing Egyptian access to them at a time when demand was increasing. Considering the value of these goods, the Late A-Group people could have relocated farther south into Upper Nubia, like Kerma during the Middle Kingdom (Figure 1). By doing so they would have been out of reach of the Egyptian army while still controlling the flow of exotic goods. It has also been proposed that Egypt saw the Late A-Group as a threat to its southern border.[73]

Bruce Trigger proposed Egyptians circumvented A-Group settlements, leading to the latter's weakening, followed by military raids.[74] A means of circumventing the A-Group culture would be sailing on the Red Sea. The fact that the ancient Egyptians chose to transport ships across the Eastern Desert to the Red Sea for direct trade with Punt, a process requiring a large expenditure of resources and men (minimum of *c.* 3,000),[75] as well as complex logistical support, instead of relying on a well-established trade route via the Nile, suggests that trade along the Nile could not deliver the required volume of goods or that numerous middlemen made goods prohibitively expensive or both. As previously mentioned, an advantage to sailboats is their ability to carry large and heavy quantities of goods over long distances.

Evidence of this advantage comes from the Palermo Stone, which states that in a single sailing season, Year 13 of his reign, Sahure imported "80,000 measures of myrrh, [6,000] — of electrum, 2,600 [—] staves [— —]."[76] This appears to have been only a part of the cargo. A recently discovered relief depicting Sahure's ships returning from Punt also portrays imports of monkeys, baboons, dogs, incense trees, and even families.[77] A consequence of this direct trade, either unexpected or planned, is that both Puntites and Egyptians would get more value in a direct exchange of goods, leading to a shift in the flow of goods away from the Nile to the east coast of Africa. This realignment would remove a need for a middleman, making the A-Group people expendable. As a result, the Egyptian state may have seen this wealthy, state-level society that produced high-quality mercenaries and that had lost its main source of income situated directly on their southern border as a serious threat. Decisive military action would remove it and provide a wealthy return in spoils. Since fewer trade goods were traded along the Nile, neither surviving A-Group people nor anyone else would have resources to rebuild. This would, however, make Egypt dependent on trade via the Red Sea.

Indirect evidence exists to support such a theory. Near the end of the Old Kingdom the C-Group culture appears and is the first culture to fill the void left by the Late A-Group, coinciding with a weaker Egyptian state. At this time Egypt may have lost the logistical ability to support consistent voyages to the land of Punt. A corresponding increase of goods would thus have been traded along the Nile, requiring a middleman to manage it. With the collapse of the Old Kingdom, Red Sea voyages ceased, resulting in a dramatic increase in the quantity of goods traded along the Nile, allowing an increasingly rich and powerful state to develop in Upper Nubia.

Conclusion

By the Neolithic Period trade within Egypt was carried out via a well-developed indirect-trade network primarily via land routes. From the Naqada I to Naqada IIc Periods the only apparent change in long-distance trade is a greater volume of the same small, easily transportable goods, which is consistent with the use of donkeys via land routes. During the Naqada IIc/d Period, dramatic changes take place in Egypt, including the shipping of bulk cargoes, the movement of settlements to the Nile floodplain, and intensification of Naqada influence in Lower Egypt and Nubia, all of which coincide with the appearance of the sail in Egyptian iconography. If the sail was adopted at this time, it may have been the catalyst that led to all of these changes, including a northern expansion of Naqada culture.

Notes

1 Lionel Casson, *Ships and Seafaring in Ancient Times* (Austin: University of Texas Press, 1994), 13.

2 British Museum Registration number: 1901,0608.56. http://www.britishmuseum.org/research/search_the_collection_database/search_object_details.aspx?objectid=119534&partid=1&IdNum=1901%2c0608.56&orig=%2fresearch%2fsearch_the_collection_database%2fmuseum_number_search.aspx.

3 Björn Landström, *Ships of the Pharaohs* (Garden City, New York: Doubleday & Company, Inc., 1970), 13, fig. 15; Casson, 14, fig. 6.

4 See respectively, Landström, 13, fig. 14; Werner Formen Archives, No. 55401774, http://wfa.glbx.image-data.com/preview-action-nl.do?a=search-action-nl.do%3Fpage%3D0%26searchstring%3Dotago+museum&prevbarcode=55401774&searchstring=otago%20museum&bl=%2Fsearch-action-nl.do%3F%26searchstring%3Dotago%2Bmuseum%26channel%3Dall).

5 Pavel Červíček, *Felsbilder des Nord-Etbai, Oberägyptens und Unternubiens* (Wiesbaden: Steiner, 1974), fig. 156.

6 Steve Vinson, *Egyptian Boats and Ships* (Buckinghamshire: Shire Publications, 1994), 12–3.

7 See Samuel Mark, *From Egypt to Mesopotamia* (College Station, Texas: Texas A&M University Press, 1997), 112–5.

[8] Kenneth A. Kitchen, "Egypt, Middle Nile, Red Sea, and Arabia," in Serge Ceuziou, Maurizio Tosi, and Juris Zarins (eds), *Essays on the Late Prehistory of the Arabian Peninsula* (Rome: Istituto italiano per l'Africa e l'Oriente, 2002), 392.

[9] Cheryl Ward, "Boat-Building and its Social Context in Early Egypt: Interpretations from the First Dynasty Boat-Grave Cemetery at Abydos," *Antiquity* 80 (2006): 126.

[10] Samuel Mark, "The Abydos BG 10 Boat and Implications for Standardization, Innovation, and Timber Conservation in Early Dynastic Boat-Building," *Journal of Egyptian Archaeology* 98 (2012): forthcoming.

[11] Kitchen, 392.

[12] See Mark 2012, forthcoming.

[13] Ward, 126.

[14] Ward, 126.

[15]. Lamya Khalidi, "The Formation of a Southern Red Seascape in the Late Prehistoric Period: Tracing Cross-Red Sea Culture-Contact, Interaction, and Maritime Communities along the Tihāmah Coastal Plain, Yemen, in the Third to First Millennium BC," in Janet Starkey, Paul Starkey, and Tony Wilkinson (eds), *Natural Resources and Cultural Connections of the Red Sea* (Oxford: Archaeopress, 2007), 35–43.

[16] Kitchen, 385.

[17] I have also made this assumption. See, Mark 1997, 123–7.

[18] Séan McGrail, *Boats of the World* (Oxford, Oxford University Press, 2001), 104–5.

[19] Kitchen, 385.

[20] Mark 2012, forthcoming.

[21] Renée Friedman and Joseph J. Hobbs, "A 'Tasian' Tomb in Egypt's Eastern Desert," in Renée Friedman (ed.), *Egypt and Nubia: Gifts of the Desert* (London: British Museum Press, 2002), 188–9. See also, Michal Kobusiewicz, Jacek Kabaciński, Romuald Schild, Joel D. Irish, and Fred Wendorf, "Burial Practices of the Final Neolithic Pastoralists at Gebel Ramlah, Western Desert of Egypt," *British Museum Studies in Ancient Egypt and Sudan* 13 (2009): 149–50.

[22] Stan Hendrickx and Pierre Vermeersch, "Prehistory: From the Paleolithic to the Badarian Culture (*c*. 700,000–4000 BC)," in Ian Shaw (ed.), *The Oxford History of Ancient Egypt* (New York: Oxford University Press, 2003), 29–30.

[23] Friedman and Hobbs, 178.

[24] Friedman and Hobbs, 187–8.

[25] Mark 1997, 12.

[26] Guy Brunton, and Gertrude Caton-Thompsen, *The Badarian Civilization and Predynastic Remains near Badari* (London: B. Quaritch, 1928), 62.

[27] Gertrude Caton-Thompson and Elinor Wight Gardner, *The Desert Fayum* (London: The Royal Anthropological Institute of Great Britain and Ireland, 1934), 34.

[28] Midant-Reynes, 106.

[29] Midant-Reynes, 215.

[30] Midant-Reynes, 211, 214.

[31] Midant-Reynes, 210–5.

[32] Eliot Braun and Edwin C.M van den Brink, "Appraising South Levantine-Egyptian Interaction: Recent Discoveries from Israel and Egypt," in Béatrix Midant-Reynes and Yann Tristant (eds), *Egypt at its Origins* 2 (Dudley, MA: Peeters, 2008), 644–57.

[33] Midant-Reynes, 215.

[34] Midant-Reynes, 211–4.

[35] Midant-Reynes, 214.

[36] Midant-Reynes, 215.

[37] See Maria Carmela Gatto, "The Nubian A-Group: A Reassessment," *Archéo Nil* 16 (2006): 62–4, 73; Gatto 2011, 860–2, 874–5.

[38] Gatto 2011, 859–65; 875.

[39] See P.L. Shinnie, *Ancient Nubia* (New York: Kegan Paul International, 1996), 44; Bard 2008, 104; Maria Carmela Gatto, "Egypt and Nubia in the 5th–4th Millennia BC: A View from the First Cataract and its Surroundings," in Renée Friedman and Peter Fiske (eds), *Egypt at its Origins* 3 (Walpole, MA: Peeters, 2011), 861–5.

[40] Midant-Reynes, 220.

[41] Midant-Reynes, 221.

[42] Midant-Reynes, 222.

[43] Midant-Reynes, 223–4.

[44] Diane Craig Patch, "Settlement Patterns and Cultural Change in the Predynastic Period," in Stan Hendrickx, Renée F. Friedman, Krzysztof Ciałowicz, and Marek Chłodnicki (eds), *Egypt at its Origins* (Dudley, MA: Peeters, 2004), 913–4.

[45] See respectively, Patch, 914; Midant-Reynes, 207.

[46] Midant-Reynes, 204.

[47] Midant-Reynes, 204 [tubular spouted, footed, and loop handled containers]; Mark, 1997: 22–30 [tubular spouted, triangular-lugged, and loop handled containers]; Luc Watrin, "From Intellectual Acquisitions to Political Change: Egypt-Mesopotamia Interaction in the Fourth Millennium BC," *De Kêmi à Birît Narî* 2 (2004): 58–63 [tubular spouted and triangular-lugged containers].

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[50] Mark 1997, 31–7.

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59 Kathryn A. Bard, "Spatial Use of the Twelfth Dynasty Harbor at Mersa/Wadi Gawasis for the Seafaring Expeditions to Punt," *Journal of Ancient Egyptian Interconnections* 2 (2010): 2, 11. See also Mark 2012, forthcoming.

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65 Shinnie, 52.

66 Bard 2008, 107.

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75 James Henry Breasted, *Ancient Records of Egypt* I (Chicago: The University of Chicago Press, 1906), 209, n. 430.

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