CHAPTER ONE

MARITIME NETWORKS, CONNECTIVITY, AND MOBILITY IN THE ANCIENT MEDITERRANEAN

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CREATING CONNECTIONS

In an exponentially hyper-connected modern world it is tempting to imagine that the past was a different place, one of sedentary villages in which most people barely ventured beyond familiar confines. Indeed, for Mediterranean prehistory, it is farms and hamlets that dominate the settlement record (Whitelaw 2017, 118). One might, then, easily assume that in such societies most interactions were with family and neighbors, and of a frequency and regularity that made for an almost intuitive communication. In the study of antiquity this perspective is perhaps best encapsulated in Finley's assertion that ancient societies must have operated primarily on a face-to-face basis (Finley 1973). With this notion of the face-to-face, it is all too easy to portray society as static (Moatti 2006; see also Osborne 2011, 217). Mobility becomes an optional add-on, something that might well have happened, but certainly not an inherent societal condition (Clifford 1997).

A strong response to this sedentarist bias emerged in the form of a so-called "mobility turn" that put movement center stage (Clifford 1997; Moatti 2004; Cresswell 2011). What are the implications of a perspective privileging mobility for the study of antiquity? That there was considerable movement in the ancient Mediterranean is hardly in doubt; it is quite clear from written sources and artifact distributions (de Ligt and Tacoma 2016). Furthermore, the sense of it being a precondition for Mediterranean life emerges once one takes into

1

account the region's heterogeneous environment and unpredictable ecology; it would have been highly beneficial in many cases not to limit oneself to any one ecozone (Woolf 2016; Broodbank 2013). This is a just a general overlay, and over time there would have been diverse motives behind mobility, motives we should no doubt continue to explore. But the more basic question of how mobility was made possible has certainly received insufficient attention. This is a question not only of transportation technology—more on this below—but also of the fundamental conditions enabling communication beyond the face-to-face. For example, Moatti (2006) has identified "translation" as a key process in movement between cultures, and not just in a textual sense. She also describes translation in relation to art, and specifically the "translations" of Greek art in the Roman world. When it comes to the movement of people, the Roman world had various means for assigning identity to migrants, though it was far from categorical; ancient sources tell us that migrants may have carried recommendation letters, or been asked to narrate biographical details, while particular insignias or objects may also have helped establish identity (Moatti 2006; see also Moatti 2004).

For prehistory, we may not have access to the documents that helped establish the identity of a migrant, which in turn could open the door to trust and communication. But the insignias and objects of identity ought not to be completely lost to us. And we need not limit ourselves to such obviously symbolic artifacts. Perhaps it was not only artifacts associated with personal identity that helped establish the conditions for interaction beyond the face-to-face. Might not more prosaic and less personalized artifacts also have provided some of the means for regulating and establishing the basis for interaction? We generally think of artifacts like transport amphoras as impersonal commodities, and as such mere *symptoms* of movement: "material diasporas, the scattering of objects left behind by human vectors," according to Woolf (2016, 442). But might we not also argue for the infrastructural support provided by things and technologies, themselves variably mobile (Knapp and van Dommelen 2010; Knappett and Kiriatzi 2016)?

This tension between seeing artifacts as simply a reflection of human movement and exchange relations, on the one hand, and as actively constitutive of social relations, on the other, is played out in the history of archaeological approaches to exchange. The processual archaeology of the 1970s saw attempts to systematize the relationship between the distributions of circulating materials and their underlying social mechanisms (e.g., Renfrew 1975; Sabloff and Lamberg-Karlovsky 1975; Oka and Kusimba 2008), though since then archaeologists have become less certain that any kind of predictable link exists. The idea slowly began to emerge that rather than just being the material outcome of social processes, circulating artifacts may themselves contribute to the formation of social ties across regions, and in turn to the creation of social place.

Ancient historians and archaeologists have introduced considerable theoretical sophistication into studies of space and place in the ancient world, from the domestic space of the household to sacred realms of sanctuaries and vast landscapes of power; in these approaches, the active role of artifacts is pivotal (e.g., Smith 2003; Khatchadourian 2016). Such work is mostly concerned with terrestrial landscapes, however; approaches to analyzing the human geography of *maritime* space and place remain comparatively underdeveloped (though see Knapp and van Dommelen 2010). In general, the sea represents either a flat and featureless plane free to be crossed or a deterministic mix of environmental constraints (winds, currents, visibility, etc.) that essentially predefine a few major vectors of movement and communication.

WE ARE SAILING (OR CANOEING)

Whether we consider maritime connectivity as uniquely enabling or constraining, as offering unparalleled benefit or prohibitive cost, we surely must recognize its uniqueness in circumventing proximity, in collapsing space—and to some extent time—in contexts like the Mediterranean. If the face-to-face basis of interaction is undermined by connectivity, then perhaps maritime mobility offers a particularly dramatic challenge to that principle. Travel overland largely involves a graded movement, such that one culture gives way to another gradually; or an abrupt transition will be marked by some kind of frontier. At sea, such frontiers—to the extent that they actually existed in concept or practice (Rougé 1966, 41–44; Lytle 2012)—cannot be marked, and the unpredictability of maritime movement might throw one upon unexpected shores. These circumstances create more acute challenges for establishing interaction and communication. While maritime research has often focused on the obvious physical constraints enforced by water transport, the sea also influences the development of social bonds centered firmly on maritime rather than terrestrial space. Engagement with seafaring should force us to grapple at once with both the physical and the social factors of mobility.

When we think of the unique benefits of maritime movement that fundamentally distinguish it from terrestrial movement, we might focus on its capacity for fast and reliable longer-distance voyages (noted above) and hence easier and often direct access to exotics of low bulk but high value. Alternatively, its greater transportation capacity for bulky commodities—especially mineral resources, building supplies, and agricultural staples—might serve as the primary driver behind its development. If both motivations are relevant in different conditions, and forms of seaborne exchange are carried out variously over short, medium, and long distances, then what infrastructural and technological considerations come into play for these different kinds of maritime movement? How might persistent patterns of maritime interaction play a role in structuring other

political, social, and economic relations? Does the higher opportunity cost—in technical skill and resource investment—of boats and ships render maritime transport more or less relevant for different individuals, commodities, and mechanisms of exchange? Is there a fundamental distinction between formal connections and "routes" prescribed by those administering exchange and less official geographies derived simply from repeated opportunistic movements and shared experiences among seafarers? And might such seaborne routes persist, exhibiting a form of institutional memory, on the basis of embedded social structures and knowledge, ongoing needs or desires for resources and goods, or simply the continuity of environmental parameters and coastal topography? These and many other broad questions quickly emerge when investigating how maritime interaction shapes past societies, and any such modeling undeniably requires consideration of both environmental and social variables.

When interrogating the interrelated environmental factors and social structures behind Mediterranean maritime activity, a distinction must be made— and here we borrow from Woolf (2016), who draws in turn on Horden and Purcell (2000)—between connectivity as potential or precondition, and mobility as the instantiation and realization of that potential. To reframe some of our questions above, we might ask the degree to which mobility was shaped by the distinctly connective landscape of the maritime Mediterranean world, and thus persistent over time regardless of political and social change. Or were mobilities completely reconfigured in light of changing social conditions? The need to consider connectivity and mobility, environment and society, together is thus obvious, yet there often remains a polarization in approaches to ancient maritime interaction. Archaeologists studying this sphere can become too narrowly focused on particular parameters like winds and currents, harbor and ship technologies. On the other hand, more social approaches to human mobility across the sea can at times be essentially unfettered by such key constraints. It is no accident that this conceptual separation runs parallel to a specialist division between, to put it bluntly, historians and prehistorians respectively. With comparatively few clues offering direct insights into maritime technologies like ships and harbors (Wachsmann 1998), the prehistorian has a limited set of parameters for understanding connectivity. Considerable emphasis is therefore placed on broad environmental conditions and constraints (Morton 2001), which have allowed prehistorians to be among the most active in constructing models focused on connectivity. Yet this lacuna allows, or perhaps forces, more freedom and flexibility for prehistorians in discussions of place. On the other hand, an abundance of technical information on the ships, harbors, and even specialized sails and transport jars can leave a Romanist feeling less compelled to engage with social worlds that inhabited these spaces even though the period was ripe with vivid testimony of individual voyages and patterns of mobility.

Such a picture of separation is, of course, a caricature, particularly for the Mediterranean that forms the focus of this volume.[1] In this region a number of pivotal studies have had a global impact on the scholarly treatment of maritime space. Fernand Braudel's *La Méditerranée et le monde méditerranéen à l'époque de Philippe II* (1949) was transformative in promoting the sea as an integral factor in structuring the awareness and experience of past Mediterranean populations, followed by Peregrine Horden and Nicholas Purcell's *The Corrupting Sea* (2000), and recently joined by Cyprian Broodbank's *The Making of the Middle Sea* (2013). Along with other important contributions (e.g., Sherratt and Sherratt 1993; Harris 2005; Abulafia 2011; Tartaron 2013), these serve to create a more nuanced perspective on how ancient communities viewed, experienced, and exploited maritime space for different social, economic, and political goals. In the eastern Mediterranean, for example, scholars have recognized that some large islands like Crete and Cyprus function effectively as "miniature continents" (Brun 1996; Rackham and Moody 1996; Cadogan et al. 2012), while some continental landmasses like the Peloponnese are almost archipelagic. We should not minimize the interwoven environmental and socioeconomic constraints—including a remarkably heterogeneous resource landscape and fragmented "micro-ecologies" on the one hand, and diverse communities with varied consumer needs, interests, and institutions on the other—that framed maritime connectivity and promoted seaborne mobility for communication and exchange. Both island-studded and with an "inside-out geography" (Horden and Purcell 2000)—water surrounded by land rather than vice versa—the Mediterranean nudged its coastal populations toward the sea as an obvious topography of interaction and recourse for livelihoods. Yet patterns of mobility in either direction from the coast, both across the sea and inland, contributed vitally to the development of community identities in shared social space. That the sea was not only a source of immense potential but one laden with uncertainty and even great risk is evident in coastal raiding and the resulting fear of seaborne visitors, the fortunes and lives lost to a sea capable of sudden transformation into a tempest; the tragic refugee plight reminds us of the ongoing precariousness of maritime mobility even into the modern Mediterranean. Despite important advances in how to approach such a heterogeneous space, scholarship still struggles to create the sorts of meaningful dialogue between specialists of different periods that are so essential. We certainly do not wish to project the notion of a "Great Divide" discussed nearly four decades ago (Renfrew 1980), but significant gaps do remain between different scholarly traditions.

Some of these differences, as noted above, are more the product of the contrasting forms of evidence at our disposal than of any profound epistemological split. For the broadly historic context of the Greco-Roman period onward, scholars are able to consult a number of sources that offer quite direct

testimony to patterns and structures of maritime activity. Texts encompassing a wide range of topics and written for a host of purposes—*periploi* and geographies, poetic narratives, historical sources, epigraphic inventories—can offer indirect, and occasionally direct, evidence (e.g., Arnaud 2005). Of course, *direct archaeological* evidence for actual sea routes, ephemeral by their nature, in the densely interconnected Mediterranean is hard to find, posing particular challenges for the study of human interaction (e.g., Rice 2016). To the extent that prescribed routes ever existed, they are largely invisible, possibly arising and persisting over generations only from tradition, marine knowledge, technology, opportunities, and hazards (Pomey 1997; Andreau and Virlouvet 2002; Arnaud 2014). To some extent there may be fewer significant "sunk costs" for sea travel than in overland transport and communication, where infrastructure aggregates over time as roads and passes remain in use well beyond an initial investment (Laurence 1999). Communication by sea can be undertaken from widely varying maritime installations, some as simple as unadorned and only seasonally protected sandy beaches, yet certain forms of interaction may only be practical with built all-season harbors that (if well attended) can represent long-lived installations and landscape features (Marriner and Morhange 2007; Oleson and Hohlfelder 2011). Shipwrecks provide another critical and increasingly abundant source of data in the form of artifact movements, particularly when cargos of transport amphoras or other durable goods are sufficiently diagnostic to ascertain origins (e.g., Parker 1992; 2008). Even so, identifying the origin of a cargo object is hardly the same as understanding the origin of a cargo, and the ultimate destinations of such wrecks can only rarely be discerned with any precision or confidence. Ceramics, anchors, and other objects that gradually accumulate at architecturally invisible anchorages, opportunistic ports, or other points of casual maritime activity among individuals or groups may likewise provide underutilized evidence for evaluating patterns of maritime connectivity and the inscription of distinctive social words on coastal and sea space (Ilves 2009; 2011; Leidwanger 2013; 2018). The adoption of maritime cultural landscape studies, originally a feature of Scandinavian archaeology but now more widely incorporated in both historic and prehistoric contexts in the Mediterranean, has helped to remedy some of this dichotomy (Ford 2011). The landscape approach to long-term patterns of maritime and coastal activity has broadened the traditional focus of such studies, in effect embracing the full material and nonmaterial record for connectivity and mobility: rock carvings, mooring devices, portages, canals, shipyards, ship types, landing sites, beliefs, ritual, mythology, folklore, symbolism, and the like (Westerdahl 1992; 2010; 2011).

Yet this relative abundance of Mediterranean material and historical evidence has perhaps encouraged descriptive approaches of connectivity tied to physical geography that have sometimes inhibited the development of more

social explorations of maritime mobility and the formation of place. After all, when it comes to prehistory, what can we say *directly* and *securely* about Neolithic or Bronze Age seafaring in the Mediterranean? From the Bronze Age Aegean, for example, we have only a tiny number of shipwrecks, with at best a couple that may be slightly earlier than the Late Bronze Age and certainly none that can comfortably inform pre–Bronze Age models. To this we might add a handful of contexts where boats are depicted; mostly stylized renderings serving purposes generally unknown but certainly other than our own, these need not be especially accurate or representative (Basch 1987; Wachsmann 1998; Strasser 2010). The contrast is therefore quite pronounced with the Roman period, where far more direct evidence is available: hundreds of shipwrecks surveyed or excavated (Parker 1992; McCormick et al. 2013; Strauss 2013), scores of larger and smaller harbors, and numerous literary and iconographic portrayals of ships from a variety of contexts (Rougé 1966; Casson 1995). Arnaud's (2005) comprehensive study of the seaborne routes documented in the surviving sources for the Roman Mediterranean is a particularly strong case study in what can be done to promote a holistic view of the structure of maritime activity for one crucial period from just the historical, literary, and epigraphic record. This is not to say that prehistorians have not problematized maritime interaction in their period; it is simply a reflection that the theme has, by necessity, been tackled primarily indirectly, by focusing more on *connectivity* than on *mobility*. One powerful example is provided by Broodbank's (2000) landmark work on the Early Bronze Age (EBA) Cyclades. Armed with a very small number of boat depictions and a generally limited range and resolution of archaeological data (i.e., site size and location, artifact imports), he used basic network analysis to model some likely interaction patterns between islands and to explore how the location and centrality of certain sites may have arisen from these dynamics. This is a rather uncommon example not only of recognizing in principle and acknowledging the paramount importance of specifically maritime connectivity, but also of structuring a formal inquiry around such marine dynamics despite the limited evidence available. For other prehistoric periods where we have significant maritime mobility, like the Middle and Late Bronze Ages, similar investigations have been thin on the ground (see early work on Delos and centrality in Davis 1982, and recent analysis of Mycenaean interaction in Tartaron 2013).

This observation suggests that the fundamental dilemma in addressing questions of maritime connectivity and mobility across the Mediterranean is primarily one of method. The brilliant but rare syntheses of huge datasets into convincing narratives can inspire the field but can also leave the wider swath of scholarship in their wake. It is one thing to appreciate the success of well-constructed and well-analyzed case studies of maritime mobility, but quite another to derive detailed methods and implement them more broadly against a

long-term backdrop of connectivity across periods and increasingly complex
bodies of material and other evidence. How can scholars effectively pursue
similar fundamental maritime questions for other periods, regions, and datasets?
Broodbank's seminal Aegean study was inspired by similar use of proximal-
point analysis in another archipelagic setting, Oceania (e.g., Terrell 1977; Hage
and Harary 1991; 1996). The success of such network methods inspired one of
us (CK) to employ a similar approach to later periods of the Bronze Age in the
Aegean, stimulating a long-term collaboration far beyond the traditional dis-
ciplinary boundaries to engage with particle physicists (e.g., Knappett, Evans,
and Rivers 2008; 2011; Evans, Knappett, and Rivers 2009; Rivers, Knappett,
and Evans 2013; Rivers, Evans, and Knappett 2016). Notwithstanding certain
earlier applications in archaeology more broadly (for reviews, see Knappett
2011; Brughmans 2013), Broodbank's was a pioneering example of the success-
ful application of formal network analysis to a maritime problem, particularly
for the Mediterranean. Broad network metaphors had long been employed in
discussions of early trade and interaction ("trade routes," "hubs," etc.), but
rapid advances from the social and physical sciences regarding formal network
analysis over the past ten to fifteen years (e.g., Newman, Barabási, and Watts
2006) have offered new opportunities for engaging systematically with the
breadth and dynamism of structures of socioeconomic interaction within
complex societies. The practical impact of network thinking is evident in the
boom that began in the mid- to late 2000s and continues apace. Classical
archaeology may at times appear behind the vanguard of innovative metho-
dological approaches compared to other branches of the discipline, but this
field too has been quite active in the uptake of network approaches drawing
from complexity science as well as social network analysis (SNA) (e.g., Graham
2006; Isaksen 2008; Larson 2013).

One of the central aims of the present volume is therefore to advance this trend
in the maritime realm, to promote network thinking broadly across the distinc-
tive problems and potential of maritime themes within the Mediterranean.
Several important reasons lead us to believe that networks can provide a strong
methodological common ground where both prehistorians and historians can
productively tread. First, networks allow for a conceptual starting point in either
physical or social space. For example, one can begin with a spatial distribution of
artifacts (as one tends to find archaeologically) or a set of attested social interac-
tions (as might be described in texts). Though network analysis has not always
prioritized combining these two facets, they can indeed help us bridge the
persistent gap noted above between the physical and the social. Second, net-
works encompass a wide range of approaches from which one might choose.
This in turn creates its own new challenges that must be addressed explicitly, but
it also underscores how the generally flexible network framework can accom-
modate both data-poor and data-rich scenarios as described above. For example,

if a prehistorian aims to model some most likely interactions across a certain space, it is entirely feasible to do so with only minimal inclusion of data beyond basic details of site location. Similarly, if a Roman archaeologist has masses of data on quantities, types, and co-occurrences of amphoras, then this too can be addressed through the same basic network approach, albeit with certain modifications to account for numbers and variability in the dataset. This flexibility within a single overall method is likely to be a significant factor in the long-term success or otherwise of network approaches in archaeology and history; these are evidently already seeing significant use and adaptation across a broad range of global contexts, from the American Southwest to the North Sea,[2] a phenomenon underscored by the final commentary by Mills, which aims to contextualize further the central contributions to the present volume. As a methodological lynchpin, networks can accommodate a broad range of epistemological positions, from the humanistic network metaphors of Constantakopoulou (2007) or Malkin (2011) to the more formal scientific approaches of Evans or Rivers (this volume; see also Knappett 2016). To rephrase these strengths in terms of our prior discussion, network approaches allow us to bridge connectivity (as network potential) and specific patterns of human mobility.

A DEEP HISTORY OF MEDITERRANEAN MARITIME INTERACTION?

By adopting a specifically network approach to the archaeological and historical evidence for seaborne communication and exchange in the Mediterranean world, this volume examines the predominant model of maritime connectivity with analytical tools that can shed light on continuity and discontinuity of mobilities across periods and areas. What long-term and interregional trajectories can we identify in the networks that guided movement, communication, and exchange? The Mediterranean offers an unparalleled diachronic case study for maritime network structures across millennia from before the Neolithic up to the early modern era; here our focus is squarely on the pivotal period extending from the Bronze Age into the early medieval world, though many of the themes and perspectives have much broader temporal and spatial relevance. The region has attracted much large-scale multi-period research, focused, however, predominantly on environmental angles (e.g., Vita-Finzi 1969; van der Leeuw 1998; Leveau et al. 1999; Grove and Rackham 2001; Butzer 2011). What is sorely needed now is the fuller integration of different social variables as active agents, which in turn bring their own challenges as scholars attempt to bridge multiple disciplines, principally archaeology, Classics, and history.

Drawing together a range of experience among researchers in these allied fields, the contributions collected here advance network approaches to maritime connectivity and mobility in the ancient world. In particular, we aim to

promote applications of diverse network thinking as well as methodologies that
investigate the motives, behaviors, and experiences of seaborne movement and
exchange by proposing and testing specific models of the Mediterranean
archaeological and historical record (see also Leidwanger et al. 2014). The
rapid growth in the size and availability of complex datasets in recent years—
including databases of primary maritime material evidence for ancient ship-
wrecks and ports[3]—challenges us to employ new management and analysis
tools that will allow us to capitalize on these earlier investments in data
collection. Network methodologies offer the opportunity to maximize the
utility of the multifaceted and often uneven archaeological and historical
evidence in a systematic and measurable way (e.g., Preiser-Kapeller 2015).

Moreover, this volume aims, where possible, to bridge what are traditionally
viewed as transitional junctures between periods, regions, cultures, and dis-
ciplines: for example, between the end of the Bronze Age and the Iron Age,
from the late classical era to the international Hellenistic world and the rise of
the Roman Empire, and across the dissolution of the Roman state in the early
medieval west and its resurgence in the late antique east. Under what condi-
tions do maritime networks manifest a form of "memory," continuing to
inform movement through the physical and social landscape despite significant
political and cultural change? As needs of exchange and interaction shift over
time, to what extent should we expect to see resilience and continuity in the
patterns of maritime mobility? When do networks, by contrast, change on their
own or to fit new sociopolitical realities? Do significant changes in maritime
technology, such as the innovation and widespread adoption of the sail
between the late 4th and the 3rd millennium, correspond to new networks?
When basic seafaring technologies remain essentially unchanged—as seems to
be the case from the Hellenistic into the Roman world—should we expect
resilience and robustness in the nodes and links of maritime networks, even in
the face of shifting supply and demand as well as evolving political and other
institutions?

A necessary concern therefore centers on the notion of institutional "mem-
ory" in Mediterranean maritime networks. Are there entanglements and
locked-in trajectories of such a kind that, once connections are firmly rooted,
it takes an extraordinary event or rupture to destabilize or even de-establish
them? To understand late Roman networks, then, would one need to under-
stand how their sea routes were inherited from earlier Roman and Hellenistic
traditions? Would evaluating this in turn require projection back to the classical
and Archaic periods, and perhaps even beyond? Early Iron Age exchange
networks themselves may not have represented entire reinventions, but rather
piggybacked on certain residues of pre-existing maritime structures from the
end of the Bronze Age. One could obviously continue back eventually to the
Neolithic and perhaps even earlier. This is no doubt an extreme example, but