CHAPTER 5

The Hidden Divers: Sponge harvesting in the archaeological record of the Mediterranean Basin

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Abstract: The aim of this study is to enhance the visibility of divers in the archaeological record of ancient Greece. Direct evidence of diving in antiquity is rather scarce, and this has contributed to hide their presence in the scholarship, failing to recognise the important roles divers played in their communities. Although references to divers and the use of sponges have been preserved in several texts, no attempt has been made to correlate these narratives with the archaeological record.

This research intends to transcend these limitations by applying a new theoretical framework derived from the principles of Middle Range Theory and Behavioural Archaeology. Their respective emphases on the importance of the ethnographic record and experimental archaeology have made it possible to reinterpret and correlate several artefacts to the work of divers in antiquity. The indirect evidence of their work, for example, in the use of sponges in arts, medicine or personal hygiene, points to an extensive use of this commodity that had to be provided by divers. This is the first step in an ongoing research aimed at providing a more accurate understanding of the important role that divers, and sponges as a commodity, played in the trade and economy of the Mediterranean in antiquity.

Introduction

This research starts with a paradoxical question: is it possible to carry out an archaeological study without the support of material evidence? The general assumption, and it is not necessarily an incorrect one, is that archaeology is, broadly speaking, the study of past times through its artefacts. Freediving is an activity that seems to offer no possibilities for the archaeologists, due to the apparently succinct and perishable nature of the toolkit of the diver. The goal of this work is to demonstrate that it is not only possible to develop an archaeological study of divers, but that the evidence to succeed in such a task is hidden in plain sight in front of us. Mediterranean archaeology, especially the archaeology devoted to Greek and Roman cultures, has found in divers none of their usual topics of interest, thus relegating their important socio-economic contributions to footnotes in translations of Oppian and Pliny, or studies related to the use and exploitation of the sea. So let us first explore what we know about divers in ancient times.

Divers in the Mediterranean: the state of the knowledge

Despite the importance of ethnographic records on communities of divers in the Mediterranean basin, especially regarding the harvesting of sponges,[1] scholarly interest in the topic has been extremely limited. The only systematic study of divers in the Mediterranean in antiquity is a paper entitled *Scyllias: Diving in Antiquity*, by Frank Frost.[2] The author compiled all the available literary evidence from Graeco-Roman sources who referred to divers, whether historically or metaphorically. The name Scyllias refers to a diver from Scione, in the Chalcidic peninsula, who, after being conscripted by the Persians to serve in Xerxes' invading army in 480 BCE, defected to the Greeks, but not before triggering the destruction of the Persian fleet at Cape Artemission.[3] A parallel

tradition recorded by Pausanias in the 2nd century CE mentions the existence of two statues erected by the Amphictyons of Delphi in this Panhellenic sanctuary to honour Scyllias and his daughter Hydne, who had also participated in the attack on the Persian fleet.[4] Pliny the Elder[5] also mentions a painting by Androbius representing the dive, now lost. The reference to Hydne is especially interesting, since women are not generally mentioned in the Greek literary tradition. This research provides some of the earliest references in Greek language to the use of divers to collect shellfish,[6] and concludes that there were three main areas of application of divers: commercial fishing, salvage, and war.[7] Frost's compilation of ancient authors was a detailed and meritorious work, that has served as an index for any scholar[8] or general writer,[9] dealing with the history of freediving.

Any search for artefacts related to diving in antiquity will lead, almost exclusively, to the figure of a young Etruscan plunging into the water (Figure 1). La *Tomba del Tuffatore* (The Tomb of the Diver, c. 470 BCE), discovered in 1968 in a cemetery of the Greek city of Posidonia (Roman Paestum, in Southern Italy) has been subjected to multiple symbolic interpretations, from Pythagorean interpretations based on the number of elements represented to the erotic connotations of death by lovers mad with passion jumping from cliffs (*katapontismos*) that we find in several literary works.[10] Ross Holloway interpreted the diving into the sea as a transition of the soul from the perils of life to the safety of the eternal symposium, represented in the side slabs of the cist, a motif inspired by similar representations in Etruscan burials.[11] Of all possible interpretations, none contemplates the figure as a diver plunging into the sea.

Figure 1: Slab cover of the Tomb of the Diver, Poseidonia, c.470 BCE. Creative Commons.

Theoretical Framework

The portrayal of divers presented above is not able to transcend the historical narrative due to its inability to "read" divers in the archaeological record. The main reason for this is the scope under which divers are studied. Rather than as active agents performing a task, they are portrayed as artefacts, passive objects of literary study that are unable to provide us with enough data to reconstruct their social and economic role in the past. In order to succeed in the task of increasing the visibility of divers in the archaeological record it is necessary to abandon this passive perspective and to provide a new theoretical

framework based on two main concepts: Middle Range Theory and Flow Models of Evidence in Behavioural Archaeology.

The concept of Middle Range Theory (MRT) was first introduced by Lewis Binford in the early years of Processual Archaeology.[12] After careful observation of present-day communities of hunter-gatherers, he concluded that they could provide us with first-hand examples of how similar tasks may have been performed in the past. The second theoretical perspective used in this study applies the Flow Models of Evidence (FME) from Behavioural Archaeology in order to contextualise our information. In an extremely brief description of this theory, we can state that at any given time a series of interactions between individuals and material culture is taking place (systemic context), and when this human behaviour stops, we are left with a set of material culture in a spatial matrix (archaeological context). The emphasis is made on human behaviour, divers as active agents rather than as passive objects of study, with the interaction between humans and their environment mediated by technology. One of the founders of Behavioural Archaeology. Michael Schiffer, defined technology as "[…] a corpus of artifacts, behaviors and knowledge for creating and using products that is transmitted intergenerationally".[13] This definition goes beyond the scope of the analysis of material culture to include social and symbolic aspects not only in the transmission but in the very practice of technology. Language, finally, plays a very important role: It is interesting to notice how classical authors distinguished "general" divers from sponge-cutters even in the same work, using the term *dutes* for the former [14] and *spongotomos* for the latter.[15]

What do we actually know about ancient divers?

The advantage of applying a new theoretical framework for the study of ancient divers is two-fold: on the one hand we can recover important misread evidence from the archaeological record and return it to its proper context, where it can help to provide us with a more accurate vision of ancient divers and, on the other hand, it serves to generate new evidence about them and their feats. This work provides several examples of misread and hidden evidence on the archaeological record, but before dealing with them let us consider the most obvious premise of all: divers in the past were human beings.

Physiological stresses in ancient divers

This statement might be considered simplistic, even naïve, but it encloses an important research consideration: all physiological stresses that affect modern divers, whether traditional shellfish and sponge collectors, sportive spearfishers or elite deep water freedivers, also affected sponge collectors and subsistence divers in the past. The collection of data regarding this topic is conditioned by the preservation bias that favours the presence of hard over soft tissue in the archaeological record. Since the development of apnea as a competitive sport, the studies on the physiological effects of freediving on the human body have flourished, being able to explain both the reasons why those depths can be reached and the damages that can be caused on several tissues. Although decompression sickness is less of a risk for freedivers than for SCUBA divers, arising from the alveolar collapse caused by the hydrostatic pressure,[16] there are several common risks to all divers, such as narcosis, haemoptysis and hypoxia ("blackout"). Past and present diver alike are obliged to equalise to relieve the pressure on the eardrums, because they can be damaged as a result of repetitive dives or the temperature of the water.

These risks affect mostly soft tissue and, when they occur, the diver might pay with his/her life. But even if the natural (e.g. arid landscapes, anaerobic conditions) or cultural conditions of the preservation (e.g. mummification) provide us with access to soft tissue, the short time between the accident and the deposition of the body will not allow for any trace to be left in the body that could withstand the passing of time. Only when diving takes place repeatedly during the lifetime of the subject and even by generations, can we expect an evolution of the soft tissue to adapt to the water. This is the conclusion that Melissa A. Ilardo *et al* [17] have reached after studying the genetic adaptations to diving among the Bajau people, a group of sea nomads from South East Asia. This study concludes that natural selection on genetic variants has favoured PDE10A, a gene that increases the size of the spleen, and the BDKRB2, which affects the human diving reflex. A larger spleen provides an extra reserve of blood cells to the diver that gets activated underwater but, and this is the significant element in evolutive terms, there is not statistically significant differences between those Bajau engaged in diving and those with a more land-based subsistence.[18] Measurements of spleen size could be taken for other groups such as the Chinchorro, in South America, which mummified their deceased and for whom the practice of apnea has been assessed by other methods.[19]

Despite the significance of the research on the Bajau, most physiological studies on freediving are usually linked to the record-breaking depths of professional apneists. The difference consists in diving as deep as possible, expending the least amount of oxygen and energy possible, and returning to the surface, calling it a day after one single dive. This contrasts with the more active work of fishing and collecting practised by ancient and traditional divers, or the skills shown by combat divers in several historical passages from ancient historians.[20] In modern terms, spearfishing is an activity much closer to ancient and traditional divers. For example, the species of sponge harvested in the Mediterranean grow at depths of between 4 and 40 meters, and most of the rock fishes can be found between 5 and 15 meters.[21] The revival of *skandalopetra* as a competitive sport, especially the annual festival celebrated in the island of Kalymnos, may also provide us with new physiological and ethnographic information. These disciplines are significantly different to the No-limits world records in freediving established by Herbert Nitsch (214m) and Tanya Streeter (160m). Thus, the physiological effects of diving in ancient times must be understood in the repetition of the same activity rather than the depths of a single dive.

Aristotle [22] addressed the problems of equalising, indicating that to avoid the problem divers made a permanent piercing in their eardrums, a behaviour that Frost[23] paralleled with some practices among pre-industrial divers, although he does not provide a specific example nor does he explain how the pierced eardrum was prevented from healing and closing up again. Oppian [24] recorded that on some occasions divers emerged with the face covered in blood and the nose bleeding profusely due to the changes in pressure. His description matches that of haemoptysis after breath-hold diving, caused by a rapid rise to the surface at depths of not even 25 m.[25]

The tools of the trade

As stated above, the tools of a diver were common ones and in most cases made of perishable materials, leaving a limited record to work with. Careful examination of this record, however, allows us to provide material evidence for this trade. Although several authors provide more or less extensive references for the work of divers, the texts of Pliny [26] and especially Oppian [27] present the most complete descriptions on the topic. Both writers are relatively late sources (1st and 2nd c. CE respectively), but the tools and

techniques described in their works are mentioned as well in earlier authors, so it is plausible to infer that their descriptions of diving can be applied, to some extent, to earlier periods. Oppian provides the most complete of these descriptions and considers that divers have the worst and most woeful of works.[28]

From these textual evidences we can list several tools used by divers, namely knives and bills, lead weights, ropes, oil, and, in order to reach the sponge beds, boats. Net bags are not mentioned, but their usage by divers is well attested. All these elements can be found in the archaeological record and can be associated to divers if the theoretical model presented above is applied and the misinterpretations are reinterpreted. The best, but by no means the only, example of misidentification is provided by a famous Caeretan *hydria* dated c. 525-510 BCE that is today in the private collection of the Niarchos Foundation.[29] On it, a sea-creature, identified always as a *ketos*, or sea-monster, is fighting a heroic figure, identified as Perseus by Isler[30] and Herakles by Boardman,[31] despite the fact that no attributes associated to these characters are present in the scene. Both heroes have

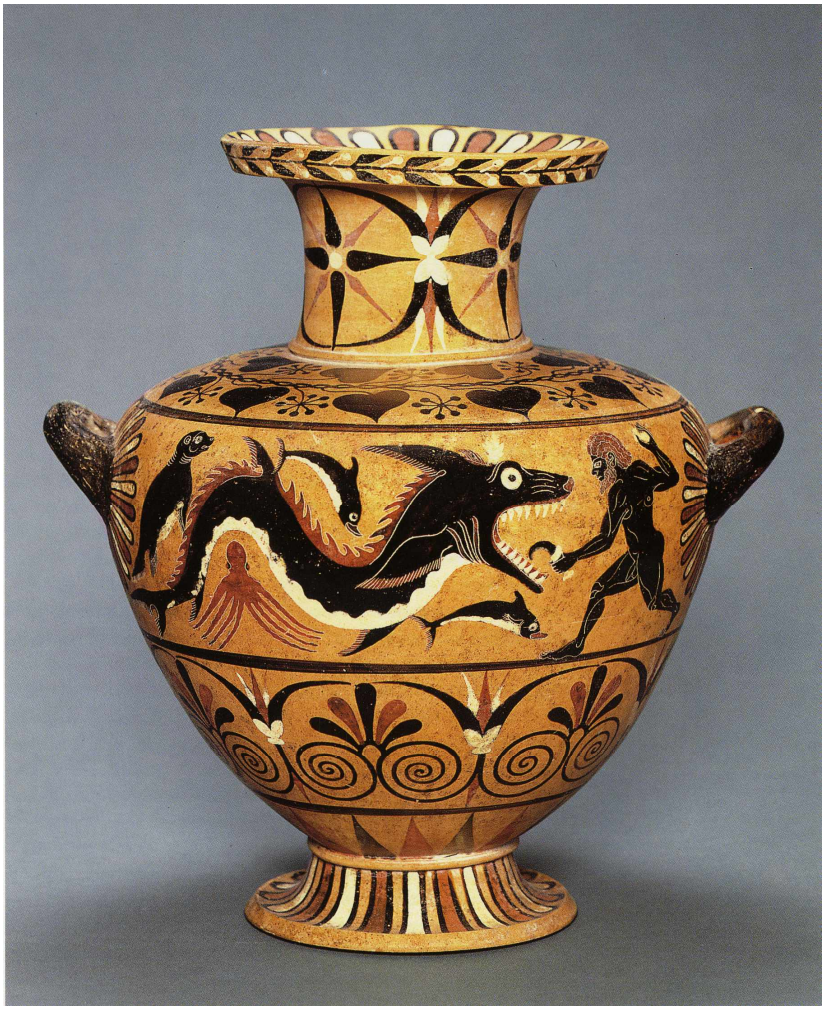

Figure 2: Caeretan *hydria*, 520-510 BCE. Side A, a human figure fighting a sea monster. Note the seal on the left side of the scene. Marangou 1995.

mythological feats ascribed to them regarding the liberation of a princess from a sea monster. Other authors such as Hemelrijk[32] and Marangou[33] consider the male figure an anonymous hero, and the scene probably the representation of an unknown myth from the Ionian city of Phokaia, due to the presence of a seal on the scene (*phoke* in Greek) and the Ionian style displayed by the Eagle painter, the craftsman to whom the manufacturing of the vessel is ascribed. The symbolic interpretation of this hydria is much simpler, especially if we analyse both scenes together and relate them to the cultural context they belonged to. The combination of a fishing and a hunting scene are common motifs in the funerary tradition of the Etruscans, the region where the *hydria* is considered to have been manufactured, and in this context, and also in the absence of any heroic reference or symbol, the simpler explanation for the scene is that it represents a diver fighting a dog-fish. He defends himself with a *harpe*, a curved knife resembling a bill-hook, a very common agricultural implement used especially for pruning but also as a multi-purpose tool. Its sickle-shaped blade makes it very useful tool for harvesting sponges, cutting them off with a single circular motion of the arm.

It could be argued that, given the lack of a proper excavation context, it is not possible to identify *harpes* used by divers as opposed to *harpes* used by farmers, but it is important to notice that several museums in Greece have in their deposits *harpes* made of bronze, and this material is an indicator of at least its maritime nature. In the Archaeological Museum of Eretria we can find an example of a *harpe* made of bronze and dated to the 6th c. BCE (Figure 3). By this date, iron, not bronze, was the standard metal in tool manufacture, not only due to its better overall resistance and performance, but also because of its price, since the copper and tin necessary to make bronze were, especially in the case of the second, luxury imports. Why then have a *harpe* made out of a metal that is going to perform worse and be substantially more expensive? Because salt corrodes iron very quickly, especially the low-carbon one of this period, but bronze performs better in the sea. The need for changing constantly an iron tool used at sea is compensated by the utilisation of bronze, in a period otherwise dominated by iron tools.

Figure 3: Central artefact, bronze harpe, 6th c. BCE. Archaeological Museum of Eretria. Author's collection.

Another element to analyse is the white object carried out by the diver in the left hand. Marangou [34] and Hemelrijk [35] interpret it as a stone the figure is throwing to the monster from the shore (none of them consider the action is taking place underwater despite the multiple animal figures that surround the dogfish). Oppian mentions the use of lead weights, which corrode into a white crust, but it is not possible to ascertain that the amorphous object represented might be one of these weights. There are, however, examples of lead weights that could be used for diving in the archaeological record. Piero Gianfrotta [36] pointed out the problem of distinguishing examples used for diving and/or other fishing activities if they are not recovered in very specific contexts. In a publication presenting several finds of remotely operated artefacts for the recovery of objects from the sea Ehud Galili and Baruch Rosen considered that salvaging-rings, made of lead and used to recover lines stuck into the reefs, could have had a second life as weights for divers.[37]

The last element to be discussed for the Caeretan *hydria* is the sea creature that is attacking the diver, and that in fact provides more evidence for the subaquatic interpretation of the scene. The pisciform monster has been generally identified as a *ketos*, a name that EXTENDS from mythological creatures to any large marine creature such as whales or large fishes in general. In a recent paper, John Papadopoulos,[38] who has published extensively on the biological nature of many of these monsters,[39] has interpreted this creature as a *Pelagecus glesne*, an oarfish, a deep water creature (100-1000 m) that can occasionally be captured by nets in shallower waters and that can reach lengths of up to 11m.[40] The reasons argued for this identification are the serpentine body, the lack of scales and dorsal fin, as well as the general naturalistic character of the rest of the animals represented. The problem with this identification is that it requires as many aspects to be ignored as those that are identified, especially regarding the head of the creature, that the author admits is an artistic licence in an otherwise naturalistic representation of the oarfish.[41] Furthermore, the real oarfish has very small fins and jaws, something that clearly contrasts with the image represented on the *hydria*. There is another interpretation that, without leaving the naturalistic scope of Papadopoulos' article, links more elements of the illustration to a real creature. The *ketos* is in fact a dog-fish, a shark. Although the red dorsal fin and perhaps the red traces on top of the head may resemble those of an oarfish, the large jaws, teeth and fins, the size and position of the eyes, the absence of scales, the red lines that represent the gills, and the contrast between the darker upper part painted black and the lighter lower part of the body painted white point to an *Isurus oxyrrinchus*, a short fin mako shark, an endemic species to the Mediterranean. There is no question that the upper part of the head has more characteristics of a mammal than a marine creature, but this depiction only emphasises the identifications of this creature as a dog-fish, especially due to the emphasis of the nozzle painted in red. Encounters between divers and sharks were known in ancient times [42] and even then divers knew that the most effective way to survive a shark attack was to attack its nozzle.

For the use of ropes in a diving context we need to rely on another scene from Greek pottery, in this case an Attic *oinochoe* dated between 510-490 BCE, excavated at Vulci (Etruria) and today deposited in the British Museum. In the scene a figure is standing on the prow of the ship with a rope attached to his waist that projects back to the hands of a second figure inside the boat. Although the scene can be interpreted as a diver getting ready to get into water, the weight of interpretative tradition that seeks a mythological meaning relates the scene to the landing of Protesilaos at Troy, despite the fact that no indicator of a hero, a city or a war can be found in the scene. Ropes are extremely perishable materials, and only special postdepositional conditions will allow their preservation in the archaeological record. Ropes, as well as nets, were made of linen or

flax, and under usual conditions would last only for 2 or 3 months; beyond that repairing became fruitless. This constant manufacturing and repairing of nets has provided us with a more tangible find, myriads of bronze netting needles of the "Mediterranean" type, a slim rod with forks at both ends.[43] Nets were used to collect sponges, coral and seashells underwater. T.B.A. Spratt describes a sponge collector's bag as having a long loop that goes around the neck,[44] and an example of this net can be found, according to Heinz-

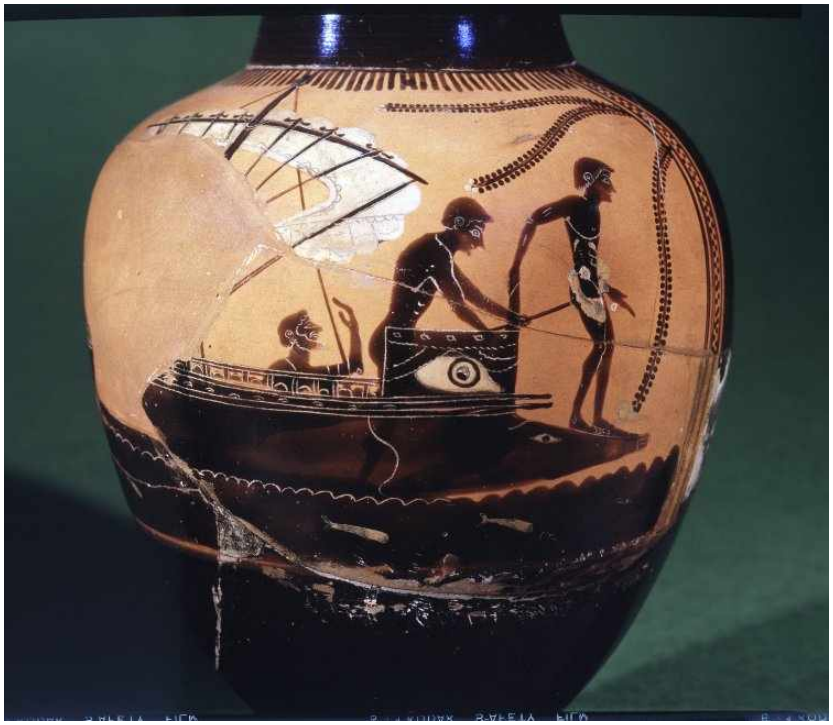

Figure 4: Athenian Black Figure oinochoe, c.510-490 BCE. British Museum

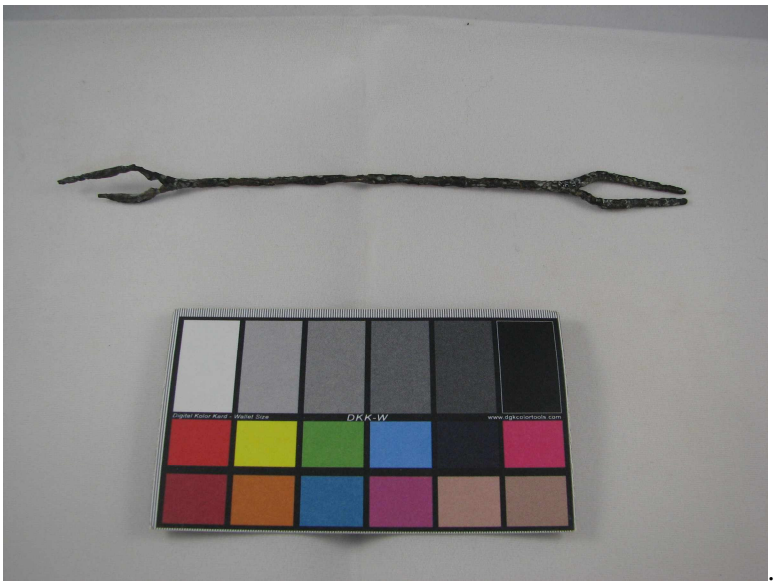

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Figure 5: Netting needle from the Archaeological Museum of Corinth. Author's Collection.

Eberhard Giesecke [45] in the fresco of the West House at Akrotiri. Although the traditional interpretation of this scene is that of a naval battle and sailors being tossed off the ships with weights on their necks,[46] Gieseke reinterprets is as a group of divers with net baskets around their necks collecting the coral that is represented on the reef.

Figure 6: Possible scene of divers collecting coral, West House at Akrotiri.

There are two elements related to diving mentioned in the literary sources that have caused multiple interpretative problems to scholars working with those texts. Aristotle[47] describes what seems to be some kind of snorkel made with reeds, and a *lebes* or cauldron in the water to give an extra lung of air. With regard to the snorkel, the *arundo donax*, a reed plant used in ancient times for musical instruments, can reach a diameter of 20-30 mm; most present-day snorkels measure between 15 and 25 mm. Regarding the cauldron, it is not explained very clearly how the diver may have dealt with the differential pressure of the air breathed from the cauldron once this was submerged.

Divers could have entered the water by the shore or, as we have seen in several artistic representations, by jumping from rocks and cliffs, but in order to reach the richest, and less exploited, areas a boat would have been necessary. There are a multitude of representations of small fishing boats, especially in Greek painted pottery, but the discovery of a 6th c. BCE boat in Marseille (Jules Verne 9 wreck) and the reconstruction that was made of this boat by a team of researchers lead by Patrice Pomey offers us the most direct insight on the performance of a Greek fishing boat of the Archaic period. The Jules Verne wreck was excavated in 1993 in Place Jules Verne, which occupies the area of the ancient harbour of the Greek colony of Massalia. It was a coastal sailing boat of c.10m in length used for the fishing of red coral, as the small fragments recovered from

the hull indicate.[48] The state of preservation of the hull and the ligatures that stitched the planks together, called sewn technique, encouraged the reconstruction of a sailing replica, the *Gyptis*, with which to perform tests on the capabilities of this boat.[49] These results are an invaluable archaeological and ethnographic insight on the labour organisation of these crews, who were directly involved in the harvesting of red coral.

The exploitation of marine sources

The study of the products harvested by divers can provide us with an extensive evidence of their activities and the economic role they played in their society. The presence of marine species that can only be accessed by means of diving is one of the easiest means of detecting the presence of divers in a community. The first divers exploited goods such as shellfish, which preserves rather well in the archaeological record thanks to the calcium carbonate of the shells, and the most skilful divers were able to capture fish by hand. We have no knowledge of the use of other tools by divers to catch them; small bronze tridents and forks have been recovered in the archaeological record, and several ancient authors[50] wrote about the catching of fish underwater, but not direct evidence has yet been clearly established. Present-day spearfishers pierce octopus in the crevices where they live with small tridents and kill them by biting them between the eyes, so it is at least feasible that some of these small tridents might have been used underwater.

That diving was considered to be an old activity is indicated by the several myths that take place underwater. On his way to Knossos to fight with the Minotaur, the Athenian hero Theseus, to prove to king Minos that he was favoured by the gods, had to dive to the palace of the goddess of the sea Amphitrite.[51] Bacchylides probably dedicated his ode to the god Apollo in his sanctuary in the island of Delos, itself famous for its divers.

Although fishermen diving to collect other seafood never disappeared, the increase in the demand for certain products triggered the appearance of full-time divers who specialised in the collection of murex (for purple dye), red coral, and sponges. The over-exploitation of the first two probably depleted the beds that were accessible to the divers, and new devices and methods were developed for their collection.[52] Although it has been claimed that the basins found on dye factories were devoted to the breeding of murex, there is not yet convincing evidence based on the biology of this species to support that interpretation, and it is possible that these basins were just used for storage before processing.[53] But even if such breeding basins existed it is clear that, at least in origin, the collection of murex was carried out by divers, since this mollusc lives in depths of between 4 and 150 metres. Sponges, on the other hand, regenerate faster than populations of murex or corals.

Of all the products harvested in the sea, sponges were undoubtedly the most commonly exploited. Their direct presence in the archaeological record is not common, although it is possible, as the findings in Bramdean (Hampshire) and York indicate.[54] Indirect presence of their use is early and abundant; an example of this is the texture of a Middle Minoan IIA wall from the North West Portico at Knossos, decorated with a pattern obtained by pressing a sponge on the wet plaster.[55] The use of sponges in forming and finishing pottery is also well attested, and sponges, corals, and other marine motifs are common decorative elements in painted pottery from the Bronze Age onwards.

Despite this artistic source, the main use of sponges was related to medicine and hygiene. In a detailed survey of the use of sponges in ancient authors, Eleni Voultsiadou[56] provides us with comprehensive list of the application of sponges, in which medicine, especially the works assigned to Hippocrates (5th c. BCE), have a central role. It is important to

remember that up to the appearance of synthetic components, sponges were the only materials that could fulfil certain medical tasks. If we consider how extensive the use of sponges was in medicine, and we infer from that their commercial importance, then the addition of the evidence for the use of sponges as elements of personal and household hygiene only adds to the ubiquity of this product all across the Mediterranean and, in later centuries, to the Roman empire, from baths to latrines.

New depths

This study has demonstrated that, if low-visibility communities are studied under a light that emphasises the importance of the contributions of anthropology in the development of archaeological theory, we can provide a much more detailed picture than the one with which this chapter started. Despite this achievement, it is not possible to ignore a very important reality regarding the nature of the record: it is fragmentary and de-contextualised. The collection of data and artefacts mostly from museum collections is painstakingly slow due to the misidentification of these objects, making each discovery an isolated event. These are all important contributions for our knowledge not only of divers and the economic role they played in their societies, and more research on their technology must be encouraged for other cultures of the Mediterranean, such as the Carthaginians, the Etruscans and the Phoenicians. Research on traditional divers must be also encouraged, emphasising especially the material aspects not only of their work but of their lives as a whole, with the intention of providing an analytical framework against which our dataset can be compared. But if we really want to understand the life and work of ancient divers we need to excavate settlements in which diving was one of the central elements of society and economy.

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NOTES

1. E.g. Bernard 1976.
2. Frost 1968.
3. Herodotus 1922: 7.189; Paton 1916: 3:3 Ant. Palat. IX.296.
4. Pausanias 1994: 3:19.1-2.
5. Pliny the Elder 1945: XXXV.139.
6. Homer 1925: 16.750.
7. Frost 1968: 183.
8. E.g. Voultsiadou 2007; Oleson 1976; Galili 1985; Meijer 2014.
9. Pelizzari & Tovaglieri 2004; Donald 2013.
10. E.g. Anacreon fr.21 in Edmonds 1961.
11. Holloway 2006; DeVries 1978.
12. Binford 1965a; Binford 1962; Binford 1965b.
13. Schiffer 1995: 230; also Schiffer 1992: 44.
14. Oppian et. Alii 1928: Hal. 4.593.
15. Oppian et. Alii 1928: Hal. 5.612.

16. Fitz-Clarke 2009; Fitz-Clarke 2007.
17. Ilardo et al. 2018.
18. Ilardo et al. 2018: 580.e4.
19. Standen et al. 1997.
20. Herodotus 1925: 8.8; Thucydides 1920: 4.26; Thucydides 1921: 25.6-8; Dio Cassius 1917: 46.35.6; Appian 1912: 6.91.
21. Powell 1996: 86-87.
22. Aristotle Prob. Phys. 1936: 32.2-11.
23. Frost 1968: 182.
24. Oppian Hal. 1928: 5.612-674.
25. Boussuges et al. 1999: 697.
26. Pliny 1940: 9.148-153.
27. Oppian 1928: Hal. 5.612-674.
28. Oppian 1928: Hal. 5.612-613.
29. Marangou 1995.
30. Isler 1983.
31. Boardman 1989.
32. Hemelrijk 1984; 2009; Schaus & Hemelrijk 1985.
33. Marangou 1995.
34. Marangou 1995.
35. Hemelrijk 1984.
36. Gianfrotta 1999: 16.
37. Galili & Rosen 2008: 290.
38. Papadopoulos 2016.
39. E.g. Papadopoulos & Ruscillo 2002.
40. Papadopoulos 2016: 79.
41. Papadopoulos 2016: 81.
42. Oppian *et al.* 1928: Hal. 5.612-674; Pliny 1940: 9.148-153.
43. Alfaro Giner 2010: 64.
44. Spratt 1865: 225.
45. Giesecke 1983: 151.
46. Powell 1996.
47. Aristotle *De partibus animalium* 1936: 2.16.
48. Pomey 1995.
49. Pomey & Poveda 2018.
50. Oppian *et al.* 1928: Halieutica 4.593-596; Heraclides of Pontus & Gottschalk 1980: 1.23-24.
51. Bacchylides 1992: Ode 17.
52. Galili & Rosen 2008; Bernal Casasola 2010: 128.
53. Marzano 2013: 146.

54. de Grossi Mazzorin 2008: 5–6.

55. Powell 1996: 89.

56. Voultsiadou 2007.

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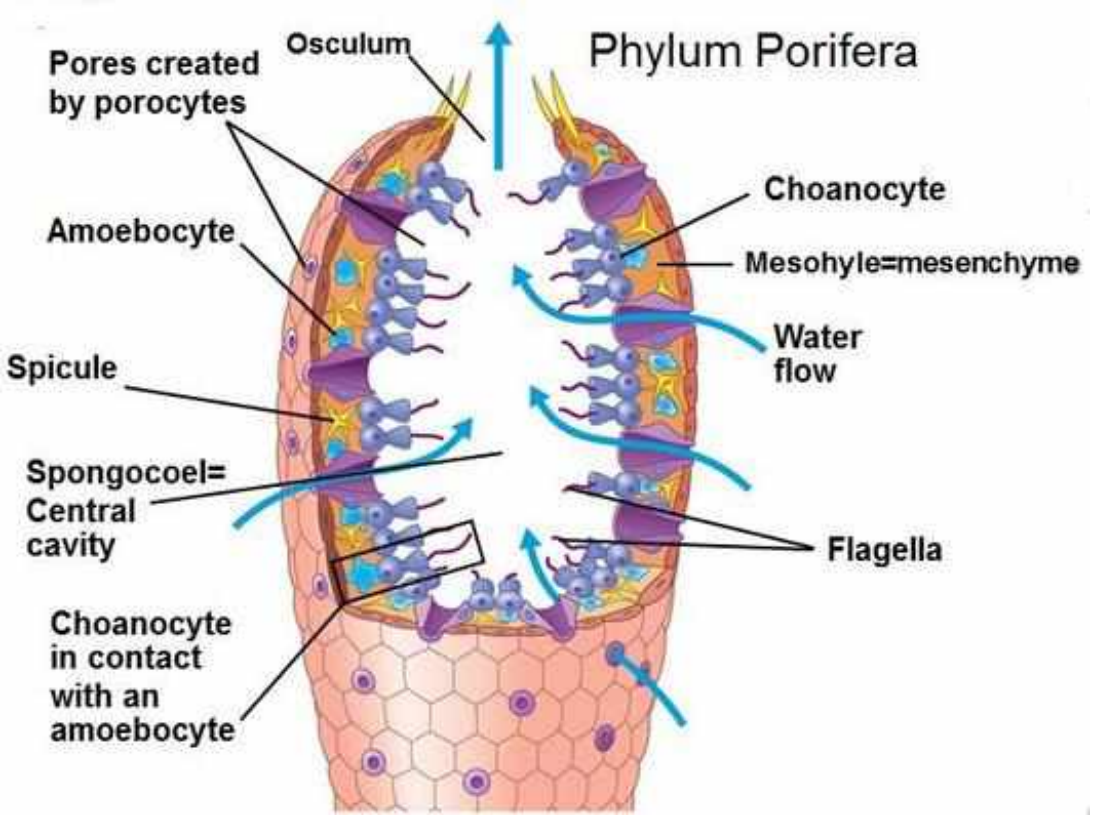

Figure : *Phylum porifera* :: Life activity of the sponge.