ACUA Underwater Archaeology Proceedings 2023

edited by

Sarah E. Holland and Bert Ho

Dave Ball, Series Editor

An Advisory Council on Underwater Archaeology Publication

The Editorial Team extends its many thanks to José Bettencourt and Marc-André Bernier for the Portuguese and French translations of all paper abstracts within this volume.

ISBN: 978-1-939531-51-3

Made possible in part through the support of the
Society for Historical Archaeology and the PAST Foundation.

SOCIETY *for* HISTORICAL ARCHAEOLOGY

Cover Image: Fishing boats off the Rock of Lisbon, 24 December 1856
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The Underwater Deposit of Roman Building Clay Weights of the Moaña Port (Northwest Spain)

Laura Casal Fernández, Víctor José Barbeito Pose

Roman building clay constitutes an ideal material for making weights by trimming fragments of tegula, imbrex, *and* later *to an appropriate size and shape, and adding perforations or lateral notches, for suspension. These types of weights have been documented in Roman coastal sites directly linked to fishing across the Atlantic-Mediterranean region. This paper presents a collection of 62 Roman building clay weights that were recovered from the coastal inlet of the Ría de Vigo (an estuary in Galicia, Spain) in 2005, and the presence of traces of synthetic rope tied around two artifacts introduces a certain amount of controversy concerning their interpretation.*

A cerâmica de construção romana constitui um material ideal para o fabrico de pesos, cortando fragmentos de tegula, imbrex, *e* later, *de forma e tamanho adequados, e acrescentando perfurações ou entalhes laterais para suspensão. Este tipo de pesos foi documentado em sítios costeiros romanos diretamente ligados à pesca em toda a região atlântico-mediterrânica. Este artigo apresenta uma coleção de 62 pesos pesos em cerâmica de construção romana que foram recuperados da enseada costeira da Ría de Vigo (um estuário na Galiza, Espanha) em 2005. A presença de vestígios de corda sintética atada em torno de dois artefactos introduz uma certa controvérsia quanto à sua interpretação.*

L'argile de construction romaine constitue un matériau idéal pour fabriquer des poids en découpant des fragments de tegula, *d'*imbrex, *et de* later *à une taille et une forme appropriées, et en ajoutant des perforations ou des encoches latérales, pour la suspension. Ces types de poids ont été documentés dans des sites côtiers romains directement liés à la pêche dans la région Atlantique-Méditerranée. Cet article présente une collection de 62 poids d'argile de construction romaine qui ont été récupérés dans l'anse côtière de la Ría de Vigo (un estuaire en Galice, en Espagne) en 2005, et la présence de traces de corde synthétique attachée autour de deux artefacts introduit une certaine controverse concernant leur interprétation.*

Introduction: Geographical Location and Roman Archaeological Context

The Port of Moaña (Galicia, Spain) is located on the inlet of the same name, on the northern shore of the Ría de Vigo, which lies on the coastal stretch known as the Rías Baixas in Galicia. This region in the northwest section of the Iberian Peninsula's Atlantic coast stands out for the wealth of its fishing and shellfish resources, a fact which was already well-known in Roman times, judging by the testimony offered in the writings of the classical author, Martial (*Epigramas* X 37). The original layout of the maritime and terrestrial space occupied by the Port of Moaña has been profoundly altered by a series of works carried out on the port (landfill to the sea, breakwater, and harbor works) between the first half of the 20th century and the present (Figure 1). The long and deep-rooted tradition of exploiting the marine resources of the Ría de Vigo reaches back to antiquity. The archaeological record of numerous coastal hill forts

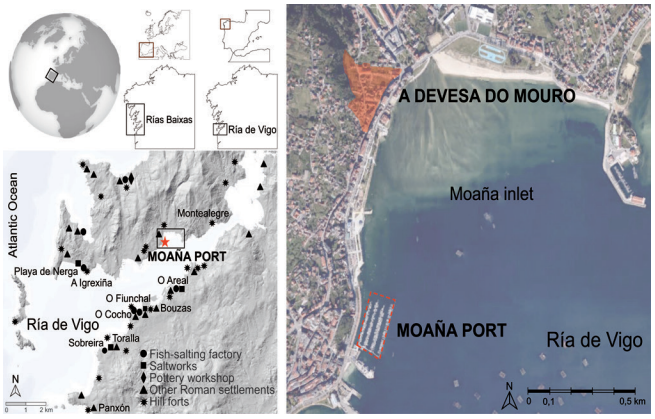

FIGURE 1. Location of Moaña Port in Northwest Spain. Left: Map of Roman occupation of the Ría de Vigo coast with sites mentioned in the text. Right: Details of the dredged area in Moaña Port and of the close Roman site of A Devesa do Mouro (PXOM Moaña 2016). Cartographic bases and archaeological sites data made available by Información Xeográfica de Galicia (Plan Básico Autonómico (Galicia) [PBA] 2022). North arrows represent true north. (Figure created by the primary author, 2023.)

indicates that the reliance on marine resources for sustenance in pre-Roman times was relatively high.

This is shown by the zooarchaeological remains (ichthyofauna and malacofauna), which are sometimes concentrated in large shell middens (known as *kjokkenmoedding* in the archaeological historiography of the late 19th and early 20th centuries), as well as by fishing instruments (González 2006–2007:298–302; González 2013; Bejega 2015). Following the Roman conquest of the northwestern Iberian Peninsula, the Rías Baixas coastal region experienced a growing, economically driven occupation aimed at exploiting the marine environment. This process was favored by particularly suitable physical conditions for human settlement and navigation, with sandy and marshy areas, sheltered bays, and natural harbors. The archaeological evidence from the Ría de Vigo clearly supports this: four saltworks (Punta de Toralla, Bouzas, O Areal, and Playa de Nerga/As Forcadas creek) (Castro 2007; Pérez et al. 2008:195–198, 502–503; Gorgoso and Acuña 2016:73, 93, figure 3; Currás 2017; Casal 2018:300–303); five fish-salting factories (Sobreira, O Cocho/Punta Borralleiro, O Fiunchal, O Areal, and A Igrexiña) (Hidalgo 1990–1991:195–196; Castro 1992–1993; Hidalgo and Rodríguez 1995; Torres et al. 2007; López 2009, 2010; Gorgoso and Acuña 2016; Currás 2017; Fernández 2017, 2018); and two *villae a mare* (Panxón and Toralla) (Pérez et al. 2008; Pérez 2009; Villar and Villacieros-Robineau 2010; Acuña 2013:146). Other coastal settlements of Roman origin and whose exact nature cannot always be ascertained, have been discovered (Pérez et al. 2008: figure 1), including some that show evidence of fishing and shellfish harvesting (Villar 2008; Casal 2022:198–201, 338–341).

The typology of weights obtained through trimming and adapting miscellaneous pottery fragments (amphorae, common pottery, and Roman building clay) with perforations or lateral notches is included in the classification of fishing instruments used in antiquity as proposed by Bernal (2010:101–103, figure 1). Their presence has been recorded in different coastal regions of the Iberian Peninsula displaying thriving fishing and related activities during antiquity, such as the Circle of the Strait (Vargas 2020:71–73); the area surrounding the ancient city of Olisipo and the large fish-salting plants of Tróia on the Portuguese Atlantic seaboard (Mayet and da Silva 2000:66, figures 28–167); or ancient Barcino in the northeast of the Iberian Peninsula (Beltrán 2007:279, figures 4-3, 5). Depending on their size, weight, and perforation diameter, trimmed clay weights have been regarded as depth-adjusting devices for various fishing gear, such as single- and multiple-hooked lines, as well as nets and creels, either simple or line linked (Bernal 2010:102; Vargas 2020:73).

A significant amount of Roman building clay weights used for suspensory purposes and made from *tegula*, or Roman flat tile; *imbrex*, or Roman curved tile; and *later*, or Roman brick, have been documented in the Ría de Vigo area. These items were found on coastal sites of Indigenous origins, such as the hill fort of Montealegre, where 23 specimens were discovered, as well as settlements of clearly Roman origin, such as the *villa* of Toralla or O Areal, yielding 6 and 56 items, respectively (Casal 2018:304–305; 2022:206, 238, 247–248, 500–502, figures 173–175). However, attributing these types of clay artifacts to fishing is not without its problems in the case of items recovered on land, as they might also have been used as loom weights in the weaving industry. In any case, it should be pointed out that while the heterogeneous shapes and sizes, as well as the strongly worn surfaces of certain items, do not guarantee their functional attribution to fishing, they nevertheless provide strong support for this hypothesis.

2005 Archaeological Control Project: Description and Results

In 2005, the dredging works carried out on the seabed of Moaña Port to accommodate the planned sports facilities were accompanied by an archaeological control and monitoring project (Barbeito 2005). The dredging affected a rectangular area of 22,843.80 square meters (m^2), where a total of 77 extractions were performed. The methodology applied during this preventive archaeological measure was mainly limited to a continuous visual inspection of the dredged materials.

The area that was examined corresponds to a sedimentary marine environment, with a clearly aggrading sequence. Based on the granulometric properties of the seabed surface, three phases are clearly distinguishable: the area closest to the coast, which coincides with the highest level, contains a high percentage of coarse sand and gravel, containing shell remains (SP01); the next phase corresponds to medium- and fine-fraction sands associated with more fragmented mollusk shell remains (SP02); finally, the third phase is characterized by the predominance of terrigenous materials (mainly silts and mud), and an abundance of finely crushed shells (SP03). In general, the materials originating from the SP01 zone

are less eroded than those from the areas furthest from the coastline.

Dredging alters the structure of the seabed as it deforms the preexisting stratification. Given the impossibility of contextualizing the collected remains of material culture from a stratigraphic point of view, a criterion based on areas of concentration and dispersion of materials was applied (Figure 2). The area showing the highest density corresponds to the section closest to the coastline (SP01), where the presence of the current port structures favors access and movement, thus converting it into a recipient area for waste and lost materials. More specifically, the highest concentration was identified in the area that matches the current port and adjacent reclaimed land, while it gradually decreases towards the north and the east. The areas showing higher concentrations tend to lie to the southwest due to predominating currents, the latter encountering physical barriers in the port structures (reclaimed land, breakwater, and harbor) preventing normal movement.

FIGURE 2. Plane of correlation between density graph and sedimentary sequences. Concentration areas of materials and their orientation. North arrow represents true north. Images of dredging works. (Figure from Barbeito 2005:figure 5, photographic documentation.)

The available data suggests a continuous resedimentation process within a low-energy environment that finds itself locked in by the port structures. This directly results in clustering processes whereby various sources (isolated events that occur when material culture items are lost) contribute materials that gravitate towards a common point where it is deposited in growing concentrations. The nature of the archaeological record supports the hypothesis of clustering processes, as it comprises a heterogeneous set of materials, originating from different historical periods, displaced and mixed within the same archaeological entity. The accumulation of this artifact assemblage implies a human input of waste and lost materials that is later altered by natural and environmental variables (e.g., the topography of the seabed or marine currents), as well as by human and cultural ones (e.g., building of port structures or shellfish-harvesting). The result is the formation of a new entity or formative context (Renfrew and Bahn 1993:43–63), which is purely natural, rather than cultural, i.e., devoid of any cultural stratigraphic context. The remains of material culture that were recorded and studied show that the area was the scene of, more or less, uninterrupted human activity of varying intensity during a certain period, as indeed it continues to be.

Material Culture: Roman Building Clay Weights

The 77 extractions carried out on the area under archaeological scrutiny in the Port of Moaña resulted in the recovery of an assemblage of 218 items belonging to different historical periods. This did not include any building remains of note. Most of the archaeological record consists of hand-crafted or industrial clay fragments of relatively recent manufacture (19th and 20th centuries). Occasional items dating back to a period ranging between the 16th and 18th centuries were also noted. A significant part of the assemblage—nearly a third—consists of clay fragments from the Roman to Late Roman period, the majority of which (91.2%) are Roman building clay fragments trimmed and suitably adapted to a new purpose by applying perforations or lateral notches allowing them to be tied to a line. In addition, two pebbles with lateral notches were identified that were undoubtedly used as weights for fishing tackle or gear (Figure 3*f*). These types of stone weights have been documented across the northwestern Iberian Peninsula from the Late Bronze Age/Early Iron Age to the 20th century, while their massive use as fishing weights has been attested since the Early Modern period

(Rodríguez 1923:578, 674–676; Vázquez 2000:53–55; Casal 2022:81–85-, 511–516).

The assemblage of Roman building clay found on the seabed of Moaña Port is made up of a total of 62 fragments. Two main types of weights can be distinguished according to the system used for suspending or tying: perforated items with a single hole (32.3%) (Figure 3*a*) and weights with lateral notches (35.5%) (Figure 3*b*). A significant part of the assemblage (29%) is made up of items without perforations or clearly visible notches, which raises initial doubts as to their use for suspensory purposes. However, the presence of possible tying traces on the surface of certain specimens, the fact they were discovered close to one another, and similar specimens with an unmistakable suspensory function account for the decision to include them in the current study. The remaining 3.2% are represented by two *tegula* fragments, with traces of unfinished perforations, which have been interpreted as possible pre-shaped or unfinished examples of perforated trimmed weights.

Perforated Weights

Regarding the assemblage of perforated weights, this discussion looks at various factors, such as the weight, size, hole diameter, shape, and the type of fragment of Roman building clay used for their manufacture (Table 1). The total of 20 items constituting the set of perforated weights presents a wide range of weights between 160.17 and 799.50 grams (g), with the items' thickness rather than their length accounting for the weight, which is ultimately determined by the type of Roman building clay fragment selected for making the artifact. The thickness varies considerably between items obtained from *imbrex*, or from the flat part of *tegula* (2.10 centimeters [cm] or more), and those made from fragments of *later*, or from *tegula* including the raised edge (up to 5.05 cm). Thus, the range of weights of the artifacts stands in contrast to the limited range of lengths, which ranges between 8.75 and 13.15 cm. Regarding the size of the hole serving to secure the weight to the fishing tackle or gear, the set of weights recorded and studied includes diameters ranging between 0.4 and 1.35 cm.

Likewise, the set of perforated weights displays a wide range of shapes, leading to the following classification in decreasing order of frequency: near-oval (35%), near-triangular (25%), near-trapezoidal (15%), near-rectangular or near-quadrangular (15%), near-rhomboid (5%), and near-pentagonal (5%). A clear predominance of weights is made from *tegula* fragments (70%), whereas only a minority of items is made from fragments of *later* (15%) and *imbrex* (5%). The other group of weights, 10% of the total, is problematic in terms of determining the kind of recycled Roman building clay employed, *later* or raised edge sections of *tegula*, both having a similar thickness.

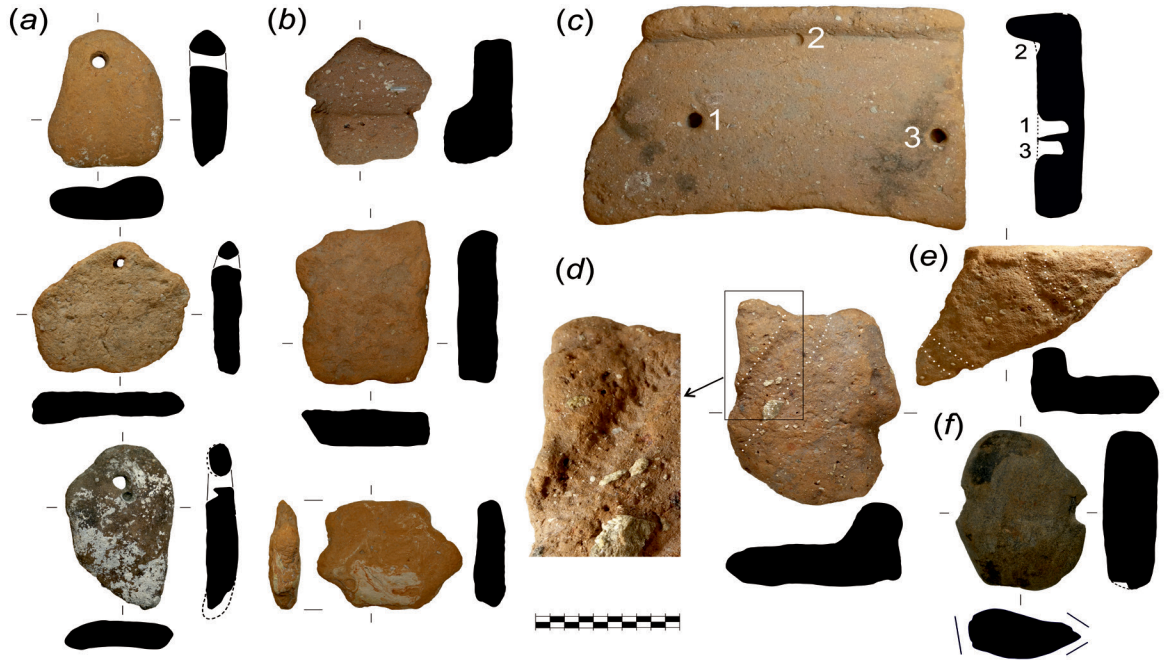

FIGURE 3. Roman building clay: (a) perforated weights; (b) notched weights; (c) *tegula* with remains of unfinished perforations; (d) *tegula* with notches on the edge and detail of tying trace; (e) possible weight obtained from a *tegula* fragment. (f) pebble with lateral notches. (Photos and drawings by the primary author, 2021.)

Shape	No.	Roman Building Clay Fragment	Weight (g) min.-max.	Hole diameter (cm) min.-max.	Length (cm) min.-max.
Near-oval	7	4 *tegula* , 1 *imbrex* , 1 *later* , 1 indeterm.	163.9–413.8	0.6–1.35	10.9–>13.15
Near-triangular	5	4 *tegula* , 1 *later*	198–298.3	0.55–1.05	10.15–11.9
Near-trapezoidal	3	3 *tegula*	160.1–392	0.4–1.2	9.3–12.1
Near-rectangular or near-quadrangular	3	1 *tegula* , 1 *later* , 1 indeterminate	262–799.5	0.9–1.25	8.75–17.3
Near-rhomboid	1	1 *tegula*	205.07	0.65	12.5
Near-pentagonal	1	1 *tegula*	209.98	0.55	10.65
Total	20	14 *tegula* , 1 *imbrex* , 3 *later* , 2 indeterm.	-	-	-

TABLE 1: Inventory of Roman building clay perforated weights.

Shape	No.	Roman Building Clay Fragment	Weight (g) min.-max.	Length (cm) min.-max.
Near-rectangular or near-quadrangular	15	13 *tegula* , 2 *imbrex*	116.74–841.6	5.6–17.9
Irregular	4	4 *tegula*	97.36–399.53	5.0–14.9
Near-oval	1	1 *tegula*	202.48	12.35
Near-pentagonal	1	1 *tegula*	276.35	9.9
Star-shaped	1	1 *tegula*	136.02	8.7
Total	22	20 *tegula* , 2 *imbrex*	-	-

TABLE 2: Inventory of Roman building clay weights, with notches.

The relative evenness of size documented for perforated trimmed artifacts could be due to a manufacturing method based on relatively rudimentary techniques giving rise to weights of variable shapes. The exceptional finding of two sizable *tegula* fragments, with traces of unfinished perforations (Figure 3*c*), provides hints as to the process employed in obtaining perforated trimmed weights from Roman building clay material. Curiously, the best-preserved *tegula* presents two cavities on the flat section and a third on the transition between the raised edge and the flat section. These positions match the perforations found on the perforated weights recorded.

It should be pointed out that during the fieldwork two perforated weights were identified that were tied to a piece of synthetically made rope by means of a thin piece of string holding them together through the perforations. The presence of synthetic thread complicates the interpretation of the assemblage, as it introduces a *terminus post quem* in the second third of the 20th century.

Notched Weights

The set of trimmed weights, with lateral notches, is represented by a total of 22 specimens. The following aspects were examined: weight, size, shape, and type of repurposed Roman building clay fragment used (Table 2). The weight range of the notched fishing weights is slightly wider than that of the perforated weights, varying between 97.36 and 841.6 g. Unlike the perforated weights, the notched weights show a proportional relationship between their weight and length. In terms of shape, a certain degree of uniformity is present in that near-rectangular and near-quadrangular items clearly predominate (68.2%). The rest includes irregularly shaped (18.2%), near-oval (4.5%), and near-pentagonal weights (4.5%), in addition to one star-shaped weight (4.5%), which illustrates better than any other item the crosswise tying pattern that can be inferred from the position of the notches found on the majority of weights. On the other hand, the vast majority of notched weights seem to be made from repurposed *tegula* fragments (91%), as compared to the only two specimens made from *imbrex* (9%).

It should be noted that rope traces are present on the surface of certain notched weights (Figure 3*d*). Examining these traces, together with the position of the notches along the edges, presents hypotheses regarding the type of system employed for tying and how the weights would have been secured to the fishing tackle or gear (Figure 4). Some of the notches on the weight edges seem to have been produced by wear, resulting from the rope tied around them. The erosion produced by the water, in combination with the sand of the seabed, would have progressively worn away any sharp points and projections giving rise to their rounded aspect.

As mentioned above, 29% of Roman building clay fragments documented on the seabed of Moaña Port corresponds to items with an uncertain function (Figure 3*e*). This group comprises a total of 18 items characterized by the presence of slight depressions on the edge pointing to a possible suspensory function and, thus, supporting the hypothesis of their use as fishing weights, like their perforated and laterally notched counterparts.

Discussion and Conclusion

The discovery of 62 Roman building clay fragments on the seabed of the Galician Port of Moaña, 42 of which are suitably adapted for suspending by means of perforations or lateral notches, leaves no doubt as to the repurposing of this set of clay materials for use as fishing weights. Unlike artifacts found on land sites, the underwater context of the find guarantees its attribution to fishing activity. However, the presence of remnants of synthetic rope found attached to two perforated items is disconcerting and poses a problem in terms of interpreting the assemblage as a whole. This unexpected finding confirms the 20th-century reutilization of Roman or Late Roman clay materials in a geographic environment, with a high rate of occupation during antiquity where the strong tradition of exploiting marine resources has continued to the present day. Given the fragility of the primary material, it can be ruled out that Roman building clay weights survived from antiquity until the 20th century. Therefore, one may infer that at some point during the second third of the 20th century, the local traditional fishing community provided itself with pre-existing clay items to manufacture their own fishing gear and tackle. In fact, recycling of contemporary building clay fragments as fishing weights is well documented in Spain during the Early and Late Modern periods (Sáñez 1793:342). Indeed, this kind of material is ideally suited for obtaining weights, as it is easy to work with rudimentary tools, in addition to its easy accessibility and affordability, and the speed of replacement in case of loss or breakage. More specifically, Roman building clay enables fishers to obtain weights of more or less appropriate shapes and sizes for each individual application, as it can be adapted to specific needs, which fits with the highly pragmatic and opportunistic nature of this craft-based activity.

FIGURE 4. Hypothetical examples of nets, fishing tackle, and systems used for tying. (Figure created by the primary author, 2023, and inspired by Lorenzo 1982:59, 149.)

Building on the assumption from the previous paragraph, namely that local fishers started reusing Roman building clay fragments to make their fishing gear sometime after the second third of the last century, the question arises as to the source of the clay material. The most plausible hypothesis is that materials encountered by accident at the Roman site of A Devesa do Mouro, located in the current town center of Moaña next to the port, were deliberately collected, notwithstanding alternative sourcing from other coastal sites in the vicinity. This hypothesis is strengthened by the record of two *tegulae*, with traces of several incomplete perforations, which have been interpreted as weights in the process of being manufactured or left unfinished. In reality, what is known of the site of A Devesa do Mouro derives from an area of dispersion where remains of clay material—essentially *tegulae* and amphorae—were discovered during various home development works and farming-related activities, with the consequent altering of the archaeological site (Plan Xeral de Ordenación Municipal [PXOM] Moaña 2016).

Comparing the results obtained from archaeological control projects linked to recent dredging operations in some of the traditional Galician ports, such as the inlet of Baiona (Pontevedra) (San Claudio 2009), the bay of A Coruña (San Claudio 2007), or the Port of Ares (A Coruña) (San Claudio 2004), a conspicuous difference with Moaña Port exists, namely the marked predominance of stone weights—mainly pebbles, with lateral notches (widely used in Galicia since the Early Modern period)—against a minority or absence of clay

weights in the case of the other locations mentioned. It may be assumed that the substantial presence of Roman building clay weights in Moaña Port is due to a one-off and circumstantial event.

While the archaeological data available is not sufficient to extrapolate the discovery of synthetic rope remains found on two items to the whole set of weights recorded at Moaña Port, this supposition cannot be completely dismissed. Indeed, it could be argued that it offers sufficient ground for questioning the assumption that attributes the scarce number of Roman building clay weights retrieved from underwater archaeological works in Galicia to the Roman period, both in the Rías Baixas (Peña Santos 1985:214–215; Casal 2022:298) and on Galician coastal stretches located further north (López 1980:150, 155, figure 18).

Few archaeological parallels exist to draw on when it comes to Roman building clay weights recovered from underwater contexts, and hardly any archaeological historiography is available covering this line of research—fishing archaeology and, more specifically, the study of fishing implements—as it is still a young discipline. Even Atlantic-Mediterranean regions that have been the subject of studies to compile a *corpus* of ancient fishing equipment, such as the Circle of the Strait and the East Coast of the Iberian Peninsula, have not yielded any Roman building clay weights from underwater contexts, only from terrestrial archaeological sites (Vargas 2020:71–73). One of the closest parallels is the assemblage of 91 clay weights without a defined context (shipwreck, submerged site, or port structures) that were retrieved from the sea in the vicinity of the large fish-salting plants of Tróia, near the mouth of the Sado River, and in Quarteira, on the Portuguese Algarve, and that have been interpreted as fishing net weights (Loureiro and Martinho 2003). The authors used a type-chronological classification, which distinguishes six categories of weights whose dating extends from the Roman period to the 20th century. However, weights made of reused Roman building clay do not feature among the 91 recovered pieces.

In short, the archaeological record of Moaña Port constitutes an unprecedented discovery. Irrespective of the chronological attribution, the unexpected underwater discovery in Moaña Port proves the feasibility of reusing Roman building clay as fishing weights. In truth, it is difficult to argue against an extrapolation of this phenomenon to the Roman period, especially considering the archaeological evidence concerning the use of clay weights in ancient nets and fishing gear (Bernal 2010:98–103, figure 1).

It is not known what type of fishing gear these weights would have been tied to, but the finding of two perforated items tied to one main rope (in this case made of synthetic fiber) by means of strands that were threaded through the perforations suggests that they were used together with nets or with multiple-line rigs, consisting of a main line branching into several secondary lines holding hooks, creels or a combination of both. The overall diversity of the pieces may point either to the use of different-sized nets and rigs or to a poor or hasty workmanship, lacking in regularity.

The find of various specimens showing clear rope-wear signs on their surface invites future research focused on traceology. Use-wear marks analysis could shed some additional light on the composition of the tying ropes and on the fastening system to the nets and fishing tackle. Perhaps future underwater archaeology works in the Ría de Vigo or other areas showing evidence of marine resource exploitation in antiquity, combined with greater research efforts on the study of fishing instruments, will allow this recent and, as yet, scarcely studied research line to move forward.

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