

WEIGHT SYSTEMS IN MOTYA AND SICILY

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Motya is considered an important hub of Phoenician routes in the Mediterranean Sea. The metrological analysis of the weights discovered during the recent excavations revealed the presence of Phoenician, Greek, and Eastern units, indicating a strong connection with the motherland and a dense network of commercial relations with the rest of the Mediterranean Sea.

Keywords: scale weight; Sicily; archaeology; Phoenician weights; Greece

1. INTRODUCTION

The island of Motya is located in the center of Marsala Lagoon, on the western coast of Sicily. Nowadays called “San Pantaleo Island”, this site represents one of the most important Phoenician colonies of the Western Mediterranean Sea, strategically located between North Africa, Iberia and Sardinia.¹ Since 2002, the renewed excavation in Motya by the University of Rome «La Sapienza» (under the direction of Professor L. Nigro) dug more than ten excavation areas and identified the main periods of occupation of the site.² Among all the findings coming from these works, an important material class is represented by the balance weights, which can show a glimpse on the evolution of society and commerce during the development of the Phoenician colony.

2. BALANCE WEIGHTS FROM THE ISLAND OF MOTYA

A total of sixteen weights have been found in Motya during the 2010-2018 seasons of excavations. Of these, two lead weights found in Area B³ and other two pebble weights from the Kothon area⁴ have previously been published. Among the other fourteen weights (tab. 1), two are made of lead, one of clay and the others of stone.

The lead weights (fig. 1: MD.10.159 and fig. 2: MC.11.384) were made by mold casting technique. The first weight shows a round shape of small dimensions (diameter: 3.4 cm; thickness: 2.6 cm), with a flat base and a small hole on the upper surface; the second one, of very small dimensions (1.1×1.1 cm), has a cubical shape and no traces of decorations and incisions.

The clay weight (fig. 3: MC.17.154) is a fragmentary object with a plano-convex section and a through hole of oval shape and 1.3 cm in diameter, modeled and drilled by hand.

The stone weights have been made using local sources, they show different shapes and can be divided into worked stones or unworked pebbles. Worked stone weights have been sculptured and/or polished, except for two that also show traces of drilling.

¹ Nigro 2014a; 2016; Nigro - Spagnoli 2017.

² Nigro 2016; 2018; 2020; 2022.

³ Gallo 2018.

⁴ Nigro 2014b, 58-59, fig. 64.

Worked stone weights are seven and they present a large variety of shapes: MT.10.238 (fig. 3) has a spherical shape, with a slightly polished surface; MC.11.381 (fig. 3) is made of a medium-sized stone of subtriangular shape with a loaf-shaped section. The stone presents few sculpturing traces; MM.17.111 (fig. 2) shows a subrectangular shape with an irregular section, with few working traces on the sides; MM.17.134 (fig. 2) has a drop-like shape with a flattened section and a very polished surface; MM.18.82 (fig. 2) shows a peculiar shape of a pointed cylinder with an elliptic section and traces of a handle on the upper end.

Unworked pebbles are very common as weights since antiquity in the Near East.⁵ On the island of Motya, all the unworked weights are composed of local stone pebbles and can be both dark or light in color, oval or ovoidal shape and rounded or loaf-shaped section. One of them, MC.13.31 (fig. 2), also shows several incisions on one surface, probably due to its usage.

Weight	Shape	Material	Measures (cm)	Grams (g.)	Ratio	Unit (g.)
MD.10.159	Spherical	Lead	3.4×2.6	210.1	1/3	630.0
MC.11.384	Cubical	Lead	1.1×1.1	10.7	1 2	10.7 5.35
MC.17.154	Fragmentary	Clay	7.4×5.5×2.8	90.8	-	11.33 (?)
MT.10.238	Spherical	Stone	3.3×2.8	39.6	3.5	11.31
MC.11.381	Worked stone (Subtriangular)	Stone	10.8×12.1×5.6	1118.5	120	9.32
MC.13.22	Unworked pebble	Stone	6.5×2.8×2.0	57.0	10	5.7
MC.13.31	Unworked pebble	Stone	4.6×3.3×2.5	51.4	5	10.28
MC.13.32	Unworked pebble	Stone	4.5×3.3×2.3	55.6	9.5	5.7
MC.13.111	Unworked pebble	Stone	3.7×3.0×2.7	39.3	3.5	11.22
MM.17.111	Worked stone (Subrectangular)	Stone	8.65×6.55×5.05	461.3	60	7.68
MM.17.82	Worked stone	Stone	10.20×6.8×3.2	324.3	60	5.40
MM.17.134	Worked stone (Drop-like)	Stone	7.4×4.95×2.3	125.0	15	8.33
MM.18.82	Worked stone (Pointed cylinder)	Stone	8.3×4.3×3.3	156.0	12 20	13.0 7.8
MD.18.247	Fragmentary	Stone	6.5×4.7×2.1	50.2	-	8.36 (?)

Tab. 1 - Balance weights found in the island of Motya during the 2010-2018 excavation seasons.

⁵ Ascalone - Peyronel 2006.

3. DISCUSSION

Balance weights of Motya prove that the units of measure used in the Phoenician colony were very variegated and they come from all over the Eastern Mediterranean.

Three specimens seem to refer to Greek measuring systems. The first one is the lead weight MD.10.159 (fig. 1), 210.1 g, which can be interpreted as one-third of a Greek/epigenetic mina⁶ (630,0 g). This measure has been already found in other two lead weights from the Area B of Motya during the 2011 excavation season (MB.11.325 and MB.11.326).⁷ The other two are unworked pebbles MC.13.22 and MC.13.32 (fig. 1), respectively of 57.0 g and 55.6 g, that can be explained as 10 units of Chalcidian drachma (5,7 g). This unit of weight was also attested in Motya, inside a votive deposit in the Kothon Area (MC.02.108) corresponding to five units of the Chalcidian drachma,⁸ and in Area F (MF.06.26).⁹ Both MC.13.22 and MC.13.32 have been found inside the Kothon pool:¹⁰ MC.13.32 was with another unworked pebble weight MC.13.31 (fig. 2) in front of hole C.4567,¹¹ from which the freshwater flowed into the sacred pool¹². These two pebbles are characterized by very peculiar colors: MC.13.31 is black and MC.13.32 is white, opposite colors that have been previously associated to the cult of the divine couple Baal and Astarte in Motya.¹³

All the three “Greek” weights (MD.10.159; MC.13.22 and MC.13.32) can be dated to Motya VIA-B periods (550-470 BC)¹⁴ and seem to confirm a certain persistence of the Chalcidian and Euboean/Attic systems in Motya during a period in which the rest of Sicily was witnessing the diffusion of the Doric monetary system.¹⁵

The other weights may refer to Near Eastern weight systems. The clay weight MC.17.154 (fig. 3) is fragmentary, preserved probably by two third of its total, from its current weight (90.8 g) can be estimated an original weight of around 121 g: this reconstruction claims it could represent 10 units of the Judaic shekel of 11.33 g, despite this kind of material is not well attested in the Southern Levant during the 8th-6th centuries BC.¹⁶

Stone weights MT.10.238 and MC.13.111 (fig. 3), belonging to Motya IVB-VB periods (750-550 BC), show a mass of respectively 39.6 g and 39.3 g, corresponding to 3.5 units of Judaic shekel of 11.33 g.¹⁷

⁶ Kushner-Stein 2002.

⁷ Gallo 2018.

⁸ Ascalone 2004.

⁹ Nigro ed. 2011, tab. XIV.

¹⁰ Nigro 2007, 2009; 2022; Nigro - Spagnoli 2012.

¹¹ Nigro 2016, 342.

¹² Nigro 2014b, 56-57, figs. 58-60.

¹³ Nigro - Spagnoli 2012, 32; Spagnoli 2013, 157-158; 2019. Originally (Nigro 2014b, 59), MC.13.32 was interpreted to 7 units of 7.9 g shekel. However, this unit has been attested slightly lighter in Motya (not more than 7.8 g), while the attribution to the Chalcidian drachma seems more suitable for both of them, condiering also these two weights have been found together,

¹⁴ Nigro 2022.

¹⁵ Consolo Langher 1964; Ascalone 2004.

¹⁶ Kletter 1998.

¹⁷ Kletter 1998; Hendin 2007.

Lead weight MC.11.384 (fig. 2), measure 10.7 g and it has been found in a filling belonging to Motya IV-V periods (8th-6th centuries BC),¹⁸ antecedent to the destruction of 550 BC. It is the only lead weight not associable with a Greek mina from Motya, but it can be interpreted as one unit of Arwad/Arado shekel,¹⁹ associated with the Persian hemistater of 5.35 g.²⁰ MC.11.384 is connected with one of the three weights found at el Cerro del Villar, corresponding to 5.33 g, which, according to M.E. Aubet,²¹ did not compare with the classical Phoenician system, but rather found comparisons with the Persian hemistater.

Stone weights MC.13.31 and MM.17.134 (fig. 2), respectively of 51.4 g and 125.0 g, can be interpreted as units of Tyre shekel: the first weight as 5 units of 10.28 g and the second one as 15 units of 8.33 g. The weight system of Tyre is usually attested by two groups of units, both already evidenced in the city since the 8th century BC: the unit of 8.33/8.36 g, connected with the Babylonian mina, and a second one around 10.28 g.²² These weights can be dated to the Persian Period and they probably started to be used on the island right before or with the Phoenician shekel (attested also in Motya, see below) until they have been substituted by Greek weights. Weight MD.18.247, despite its fragmentary state of preservation, can be also associated, based on the given weight, to Tyre shekel of 8.33 g.

Stone weights MM.17.111 and MM.18.82 (fig. 2) show respectively a measure of 461.3 g and 156.0 g, interpreted as one mina (60 units) and 20 units of the Phoenician shekel of 7.68/7.8 g.²³ The Phoenician units are brought into the Western Mediterranean around the 9th-8th centuries BC through commercial routes starting from the East and Cyprus²⁴ to the Iberian Peninsula, based on the Spanish comparisons found in Huelva and Cerro del Villar.²⁵ The origins of Phoenician units are dated back to the III millennium BC²⁶ but it started to appear in the Levantine coasts during the 10th century BC: following R. Kletter,²⁷ Phoenician weights are attested in a group of limestone weights in the site of Horvat Rosh Zayit, in the Lower Galilee, dated between the middle of 10th century BC and the first quarter of 9th century BC.

Other stone weights, MC.11.381 and MM.17.82, can be interpreted as Near Eastern units. MC.11.381 (fig. 3) weights 1118.5 g and it corresponds to two minas (120 units) of Ugaritic shekels (9.32 g).²⁸ In Motya, this weight can date back to the period before the destruction of 550 BC. MM.17.82, with its weight of 324.3 g, corresponds to one mina of Persian shekel (5.40 g), as it has been found in a late context (F.7311), connected with the 4th century BC Building MM1.²⁹ Chalcidian units are presented in Motya slightly bigger³⁰

¹⁸ Nigro 2022.

¹⁹ Betlyon 1980, 77-92.

²⁰ Elayi - Elayi 1997.

²¹ Aubet 2002.

²² Elayi - Elayi 1997.

²³ Hendin 2007.

²⁴ Qedar 1979; Kletter 1994; Hendin 2007.

²⁵ Aubet 2002; González de Canales Cerisola - Serrano Pichardo - Llopart Gómez 2004.

²⁶ Goldman 1956; Dunand 1958; Holland 1975; Archi 1987; Ascalone - Peyronel 2006.

²⁷ Kletter 1994.

²⁸ Powell 1979; Parise 1989; Pulak 2000; Ascalone - Peyronel 2006.

²⁹ Nigro 2020.

and this reason, as also the finding context, brings us to interpret this weight more as a Persian unit than a Greek one.

4. CONCLUSION

The island of Motya represents an exemplary study case because it shows the coexistence of Greek and Phoenician systems that prove the numerous commercial relations of this island, as an important crossroads in the Mediterranean, and its complexity compared to the rest of Sicily (fig. 4). The adoption of “mixed” weight systems is typical of economically dynamic societies in a central position within very extensive trading networks, for example as attested in the Aegean area already in the most ancient Bronze Age.³¹

Most of the weights from Motya are related to the Phoenician motherland and in particular to the city of Tyre from which the colony of Motya originates.³² The weight units found in this group are very indicative, composed of the classical Phoenician shekel (between 7.68 and 7.8 grams) and the units from Tyre, attested both in the type of 8.33/8.36 g and the type of 10.28 grams: these finds further prove the strong connection with the colony.³³

The weights found in Motya can be distributed to different historical periods (tab. 2), testing the different periods of the island’s colonization. The first phase is related to Motya IV-V periods (8th-6th centuries, before the destruction of 550 BC), in which there are attested weights from Tyre, the Phoenician and Levantine regions. Egyptian weights are not attested, but they are not to be excluded given the presence of the Ugaritic shekel. The second phase dates to the 5th - early 4th century BC, when a more significant use of Greek weight systems is attested on the island. The weights of Persian units can be dated a little later, in the middle of the 4th century.

PERIODS	CHRONOLOGY	WEIGHTS
MOTYA IVA ₂	800-750 BC	South-Levantine units: MT.10.238 and MC.13.111 Syrian units: MC.11.381 Phoenician units: MC.13.31, MM.17.134, MM.17.111, MM.18.82 and MC.11.384
MOTYA IVB	750-675 BC	
MOTYA VA	675-625 BC	
MOTYA VB	625-550 BC	
Destruction		
MOTYA VIA	550-510 BC	Greek weights: MD.10.159, MC.13.22 and MC.13.32
Destruction		
MOTYA VIB	510-470 BC	Persian units: MM.17.82
MOTYA VIIA	470-425 BC	
MOTYA VIIB-C	425-397/6 BC	
Destruction		

Tab. 2 - Temporally distribution of the balance weights found in Motya during the 2010-2018 excavation seasons.

³⁰ Ascalone 2004.

³¹ Alberti 2009, 16.

³² Nigro 2012.

³³ Nigro 2022.

The study of weights from Motya is fundamental, also given the scarcity of attestations of pre-coinage weight measurements in the rest of Sicily.

The Phoenician shekel is attested at Motya, starting from around the 8th century BC, during the same period as in the Iberian Peninsula, while in the rest of Sicily there are evidences of Aegean weights³⁴ Starting from the 7th century BC the Euboean-Attic and Chalcidian units are also attested, as evidenced by the examples of Himera, Siracusa and Gela³⁵ or in the colonies of Naxos and Zancle.³⁶ The Eastern and Greek systems coexisted in Sicily until the 5th century BC, when both weight systems will be replaced by the monetary system of the Doric cities³⁷ and then by the “litra” system. Although, the colony of Motya seemed to follow a different path, adopting almost completely the eastern systems that allowed to improve the commercial relations with the rest of the Mediterranean Sea, and starting to use the Greek units just afterward, but not the systems that the rest of Sicily was following.³⁸ The presence of Persian weights indicates that the Phoenician colony was still keeping strong connections with the Eastern Mediterranean also in the final part of its existence.

In conclusion, studying a specific category such as weights can give an important contribution to understanding the evolution and the progress of an important site as it is the island of Motya.

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³⁴ Tanasi 2020, 174-175, tab. 2.

³⁵ Cutroni Tusa 1963; Orlandini 1965-1967; Anzalone 2009; Campana - Santelli 2010.

³⁶ Mattingly 1943.

³⁷ Consolo Langher 1964; Parise 1979.

³⁸ Ascalone 2004.

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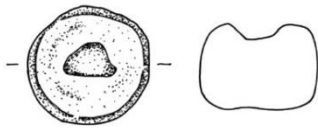
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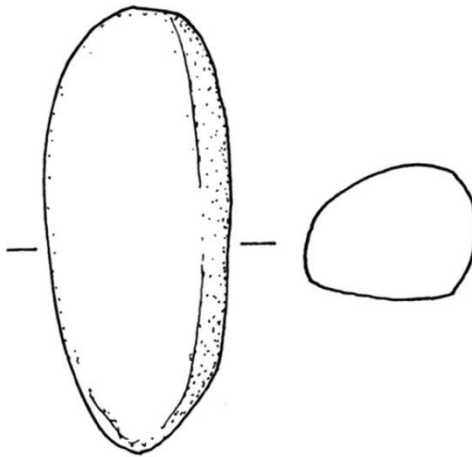
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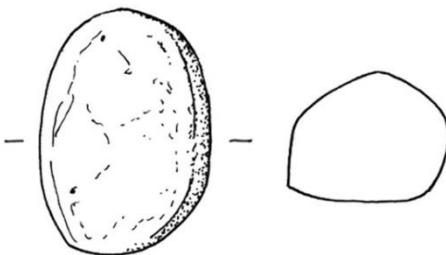
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MD.10.159



MC.13.22



MC.13.32 (1:3)



Fig. 1 - Weights from Motya (found during the 2010-2018 excavation seasons), corresponding to Greek units.

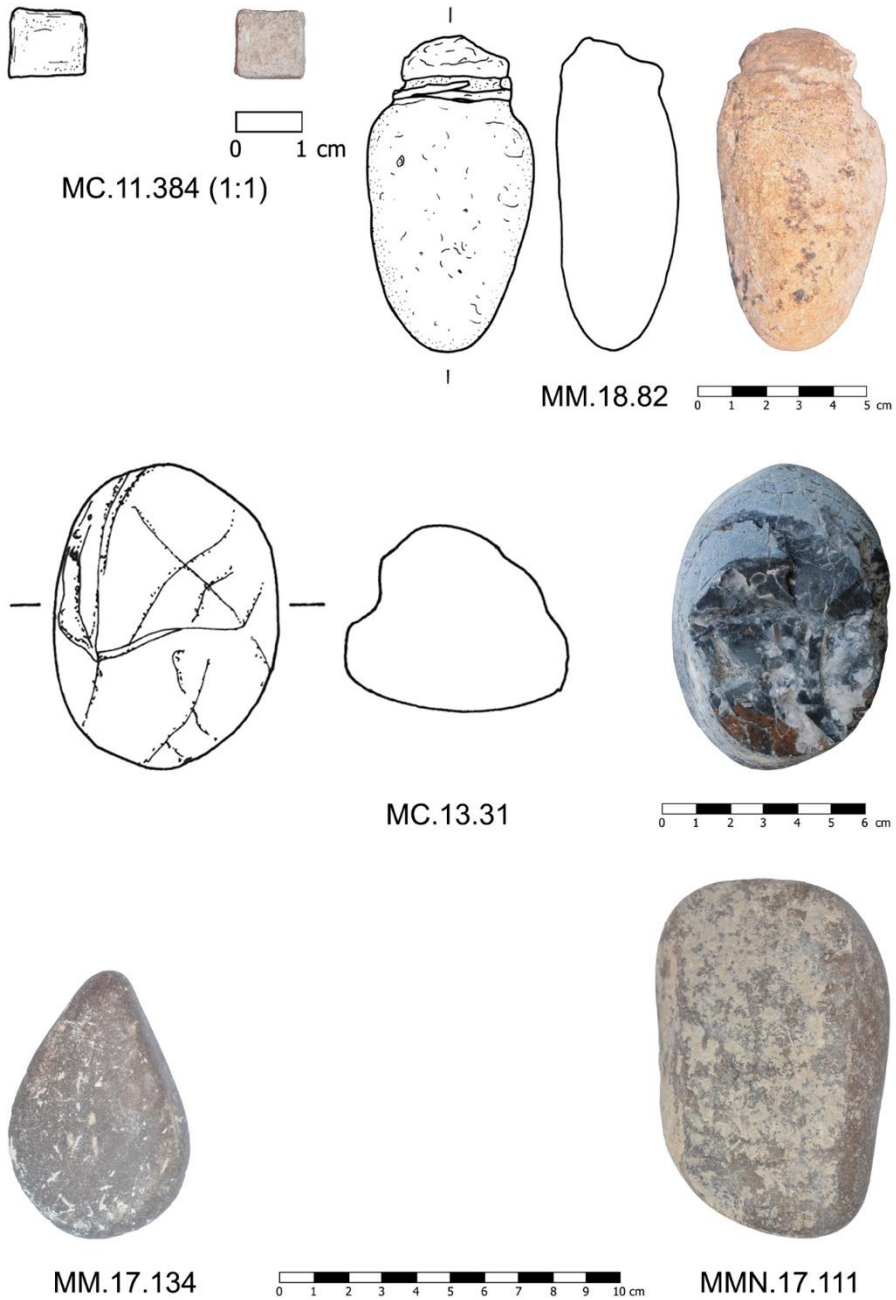
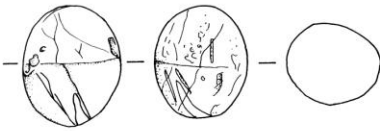


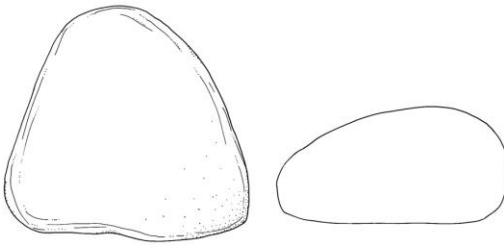
Fig. 2 - Weights from Motya (found during the 2010-2018 excavation seasons), corresponding to Phoenician units.



MT.10.238



MC.13.111



MC.11.381



MC.17.154

Fig. 3 - Weights from Motya (found during the 2010-2018 excavation seasons), corresponding to Eastern units.

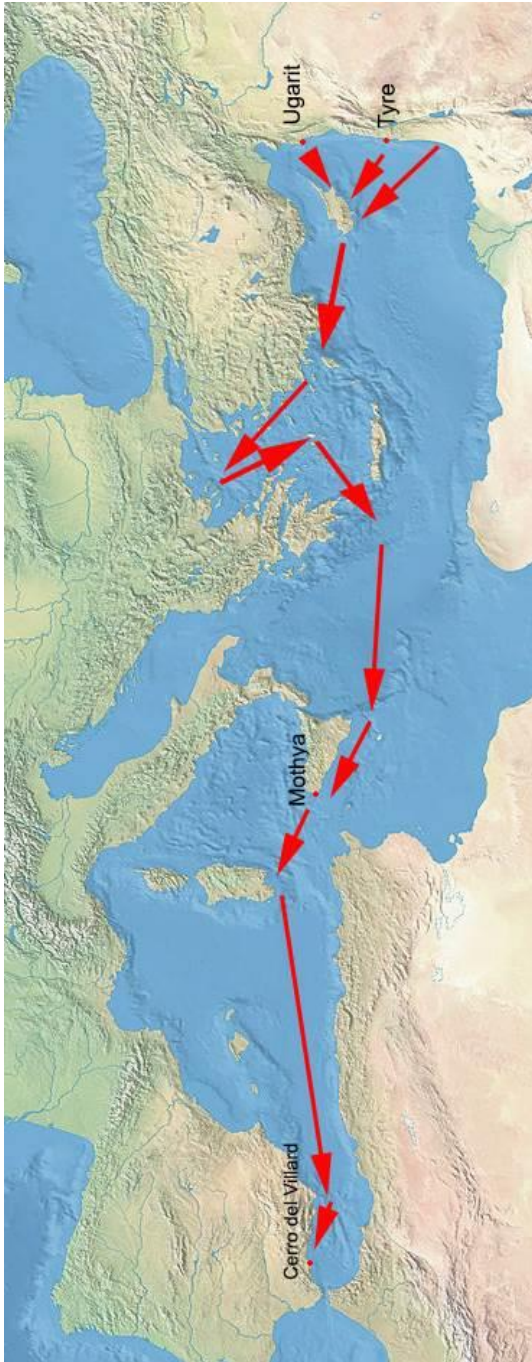


Fig. 4 - Commercial routes testified in the Phoenician colony of Motya through the study of its weights.