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# A SECTOR OF IRON METALLURGY IN UTICA FROM THE LAST QUARTER OF THE 9TH AND THE BEGINNING OF THE 8TH CENTURY BCE

IMED BEN JERBANIA\*

*Abstract:* New Tunisian excavations in the northern tip of Utica's ancient promontory have revealed adobe structures and an area containing waste from iron working. Due to the significant presence of varied production of ceramic material – locally handmade, and of Phoenician, Greek, Sardinian, and Italian origin from the early Iron Age, as well as Tartessian – besides iron slags and *tuyères*, it is undeniable that we are dealing with an area intended both for habitation and iron production that dates to the last quarter of the 9th century BCE and the beginning of the following century. This new discovery suggests Utica as a multicultural meeting place aimed at an economic project related to metallurgy.

*Keywords:* Utica; Iron; Ceramic; Phoenician.

## 1. INTRODUCTION

Iron is one of the essential elements that played a particular role in the transformations of the Eastern economic system at the dawn of the first millennium. Its adoption in certain Near Eastern areas as well as in Cyprus coincides chronologically with the collapse of the empires at the end of the Bronze Age and seems to be a consequence of the ensuing changes.<sup>1</sup> Initially regarded as a rare and valued commodity, during the Iron Age IIA (1000-800 BCE) this product became a ubiquitous and useful material that replaced bronze and stimulated the desire to control metal supply sources, leading to far-reaching effects on trade.<sup>2</sup> Its introduction into the West via maritime trade represents a major technological innovation that triggered economic changes through fields like agriculture, construction, and craftsmanship, as well as social transformations related to its use in prestige objects and symbols of power for the dominant local groups.<sup>3</sup> This is an observa-

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1 Sherratt 2000, p. 82; Veldhuijzen 2012, p. 238.

2 Sherratt – Sherratt 1993, pp. 361-362. According to A.M. Snodgrass (1980, pp. 336-337), the development of iron metallurgy technology follows three well-known sequences or stages. The first sequence (stage 1) marks the appearance of what the author calls “utilitarian iron use”; here, ornamental or luxury products hold high value. In stages 2 and 3, such products first became an addition, then a substitute for bronze due to its wide availability and massive diffusion. Once the technology for its reduction was mastered on a regional scale, its devaluation, according to A.J. Nijboer (2018, pp. 61-81), became inevitable. The abundance of iron ore and the relatively simple steps in its entire operational chain, from extraction to the finished products, and in contrast to the complex process of working with bronze, largely explains the gradual adoption of iron: cfr. most recently Pacciarelli – Quondam 2020, p. 28. Although there is considerable evidence of iron objects, particularly in tombs, in Cyprus and the Levant at the end of the Bronze Age and the beginning of the Iron Age, evidence of iron metallurgy in these areas is rare and scattered. The earliest evidence reported in the Near East is found at Tell Hammeh (Jordan) and Tel Beth-Shemesh (Israel) in contexts dated to 900 BCE: cfr. Veldhuijzen – Rehren 2007, pp. 189-201.

3 In a recent volume on iron metallurgy in the West during the first millennium, several studies addressed the socio-economic changes associated with the adoption of this new technology in local and regional contexts: cfr. Belarte – Rovira – Sanmartí 2020. The traditional thesis, which is based on diffusionist assumptions, considers iron metallurgy as a technique of Eastern origin that was introduced by the Phoenicians into the West, or at least it appears in this area contemporaneously with Phoenician expansion. Recent research, however, offers a new interpretation based on data from indigenous sites: this is the case in Sardinia, where direct

tion that can be made thanks to the new documentation provided by the Phoenician – or Phoenician-influenced – indigenous sites of the Iberian Peninsula, and to a lesser extent, Sardinia. These sites, such as Morro de Mezquitilla, Toscanos, La Fonteta, Alcorrín, Adra, and the Cronicario area (Sant'Antioco), offer interesting contexts for studying the process of iron adoption from the 8th century BCE as well as its economic and commercial implications at a local, regional, and Mediterranean scale.<sup>4</sup> This first shows that iron was one of the most sought-after metals by the Phoenicians to meet the increasing demand in the East, primarily from the Assyrian military and territorial empire. It also reflects the crucial role that this metal must have played in the process of change triggered by the arrival of migrants, merchants, and Eastern craftsmen in the Western lands, which led to a wave of intensive interactions, the nature and forms of which varied according to local conditions.

The Maghreb in general and in Tunisia in particular, is characterized by the scarcity of data concerning iron production and the presence of iron objects in protohistoric contexts, whether in settlements or tombs.<sup>5</sup> Only a few indigenous sites, such as Althiburos, or Phoenician sites such as Carthage have provided evidence in recent years of ironworking from the 9th and 8th centuries BCE.<sup>6</sup> In the case of Utica, our knowledge on this subject was, until recently, limited to a few iron objects found in tombs.<sup>7</sup> It was only from the 2000s onwards that excavations began to uncover evidence of iron metallurgy through the discovery of fragments of slag, *tuyères*, and furnace walls.<sup>8</sup>

In the following pages, we will discuss the recent discovery of an area dedicated to this activity. We begin with an overview of its topographical, architectural, and urban configuration. Indeed, it should be emphasized from the outset that the traces and corresponding structures related to this activity are associated with other structures that are linked to a settlement. These complexes, functioning synchronically, form an essential component of the urban plan of the first Phoenician core, on par with other monuments. Moreover, they provide a crucial context for dating the introduction of this technology into the Phoenician environment. From there, we will turn to the study of the materials recovered from this site. In conclusion, we will attempt to demonstrate how this discovery represents a new milestone in the study of Phoenician metallurgy and its role in the new socio-economic dynamics at Utica.

## 2. EXCAVATION IN THE RESIDENTIAL AND METALLURGICAL ACTIVITY SECTOR AT UTICA<sup>9</sup>

Our knowledge of Utica during the Phoenician and Punic periods has made significant progress in recent years thanks to new excavations conducted in the northern part of the ancient promontory, near the line of

evidence of iron metallurgy is attested at Nuragic sites during the period marking the end of the Bronze Age, preceding the arrival of the Phoenicians: cfr. most recently Lo Schiavo – Milletti 2020, pp. 73-94.

4 For studies related to these sites, see: Keesmann – Hellermann 1989; Schubart 1999 for Morro Mezquitilla; Keesmann – Niemeyer 1989 for Toscanos; Renzi – Rovira 2009 for La Fonteta; Aguayo de Hoyos *et al.* 1989 for Adra; Marzoli *et al.* 2014 for Alcorrín; Pompianu 2010 for the Cronicario area.

5 For the current state of research on iron production in the Maghreb, see Ramon – Sanmartí 2020, pp. 17-26.

6 Iron objects and slag have been attested at Althiburos in contexts from the 9th and 8th centuries BCE: Tekki 2016, pp. 391-410. For Carthage, see for example the latest data on large-scale iron production in the Bir Massouda sector: Kaufman *et al.* 2016, pp. 33-50.

7 Let us recall here the knife found in tomb 18 and the dagger from tomb 13, both dated to the late 6th century BCE: Cintas 1954, pp. 113, 116.

8 Preliminary studies have been conducted on this material from the earlier excavations of F. Chelbi and T. Redissi: cfr. Ben Jerbania – Redissi 2014, pp. 177-204; Ben Jerbania 2020, pp. 31-54.

9 The excavation in this sector began in 2017 by a Tunisian team composed of Kaouther Jendoubi, Walid Khalfalli, Faouzi Abidi, Heithem Abidi, and Nesrine Maddahi. The inventory and study of the ceramic material are being carried out by Kaouther Jendoubi and myself.

the ancient shoreline. Special attention has been given to its earliest archaeological layers in order to refine the chronology, recognize the initial topography, and understand the urban characteristics of the Phoenician *emporion*.<sup>10</sup> The evidence provided by these excavations is supported by new radiocarbon dating, which places Utica within the first Phoenician horizon of the central and western Mediterranean. The main characteristics of this horizon, in terms of its settlement model and processes as well as material culture, have already been defined through recent research conducted on other indigenous and Phoenician sites in the West.<sup>11</sup> Utica, however, has proven to be a very interesting site today due to the abundance of its material culture and, most notably, the association in its earliest archaeological context of locally-made hand-crafted pottery with Levantine, Greek Middle Geometric II, Nuragic, and early Iron Age Italian imports.<sup>12</sup> This association reflects the ethnic and cultural diversity that is a sign of Phoenician expansion during the second half of the 9th century BCE and the early part of the following century, as evidenced by the earliest sites discovered at Huelva, Sant'Imbenia, and La Rebanadilla.<sup>13</sup> This site is also important due to the data it has provided on the area's evolution and its urban changes via the work carried out in the temple, the urban area itself, and the Punic wall.<sup>14</sup> Although these monuments provide insight into urban architecture and construction techniques, other components that could be considered characteristic of the "Phoenician landscapes" of the West remain unknown for the time being.<sup>15</sup> Thus, no evidence seems to indicate with certainty the existence of an archaic fortification or sanctuary known as a "tophet". The earliest tombs of the site's initial phase are also missing. These may have been removed during subsequent levelling operations, especially when it was merely a *champ d'urnes*,<sup>16</sup> or else permanently covered by sediment layers resulting from alluvial filling, assuming they were located near the ancient beach.<sup>17</sup>

10 See in this regard López Castro *et al.* 2016, pp. 68-89; 2020, pp. 55-80; Ben Jerbania 2020, pp. 31-54.

11 For the radiocarbon dating of Utica, see López Castro *et al.* 2016, pp. 81-84.

12 The abundance and variety of this material have been highlighted in several recent works that emphasize the multicultural character of the early Phoenician phase at Utica: Ben Jerbania 2017, pp. 177-198; 2020, pp. 31-54; Ben Jerbania 2024. See also in the same direction López Castro *et al.* 2020, pp. 55-80.

13 Several studies are dedicated to the analysis of these important contexts that reflect the mix between local and foreign elements. Since it is difficult to cite all of them, we refer, among others, to: González de Canales Cerisola – Serrano Pichardo – Llompart Gómez 2004 for Huelva; Sánchez Sánchez-Moreno *et al.* 2018, pp. 305-323 for La Rebanadilla. See also in the same vein Botto 2018b, pp. 13-35. Regarding Sant'Imbenia, cfr. Oggiano 2000, pp. 235-258; Rendeli 2018, pp. 191-204. This association of ceramic forms from different productions provides a date ranging between the last decades of the 9th century and the first decades of the following century as the earliest horizon for Phoenician expansion: cfr. most recently Botto 2020, p. 162.

14 For the area of the temples excavated by the Tunisian Spanish team: see most recently Ben Jerbania *et al.* 2021, pp. 61-90; the same team uncovered a Phoenician and Punic urban area in the ancient promontory's northern zone: cfr. Ben Jerbania *et al.* 2020, pp. 369-380. As for the Punic Wall, it has been the subject of excavations, and the study is currently being prepared as part of the Tunisian-English project.

15 The diversity of the urban phenomenon from one Phoenician settlement to another in the West allows for the discussion of "Phoenician landscapes" rather than a single "Phoenician landscape": cfr. in this regard Oggiano 2009, p. 420.

16 The levelling of the ground is a practice widely employed in Utica, especially during the Roman period, in order to construct public squares and monuments, which led to the elimination of much of the Punic city. Thus, considering this phenomenon, it seems that the earliest hypogea – which were most likely shallow pits, like those in the Phoenician necropolis of Cortijo de San Isidro in the Bay of Malaga or those in Tyre al-Bass – did not survive. It also seems that in the Bir Massouda area at Carthage, traces of the earliest burials have been identified as pozzi intended to hold urns containing cremated bones: Chelbi – Maraoui Telmini – Docter 2006, pp. 222-224.

17 In recent research on Utica, we have paid particular attention to the study of the alluvial filling phenomenon not only on the ancient promontory but also throughout the entire former bay of Utica: cfr. for example, Pleuger *et al.* 2019, pp. 263-278. The topographical configuration of a Phoenician site such as Tyre al-Bass shows that the Iron Age II (900-600 BCE) necropolis is located on the beach, at the forefront of the coast, facing the former island where the Phoenician city of Tyre once stood: Aubet Semmler – Telliso Carreño 2014-2015, p. 119.

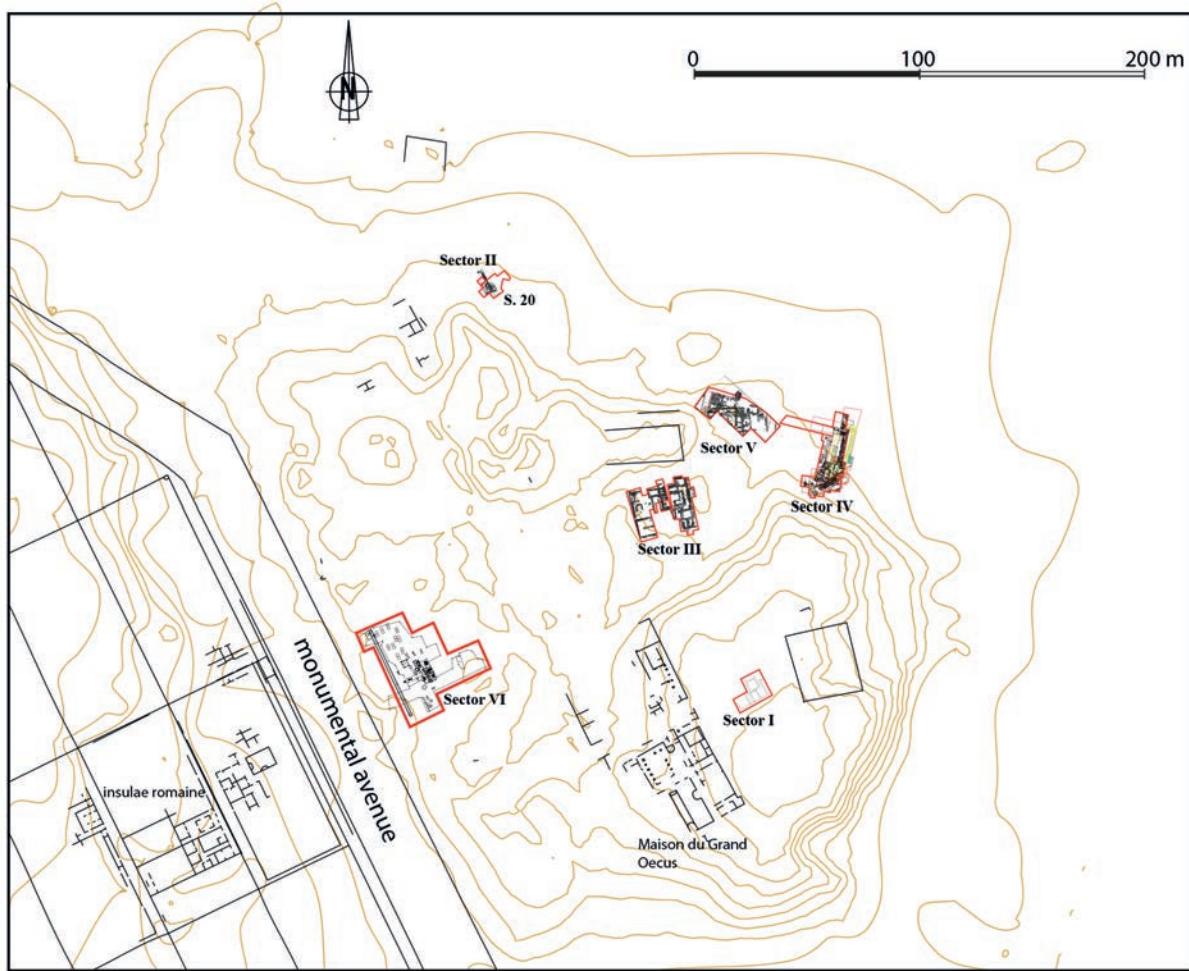


Fig. 1. Location of the excavation areas in the northern part of the ancient promontory of Utica (plan adapted from the base Utica plan by Lézine and from the excavation area plans of the Tunisian-French and Tunisian-Spanish missions).

One of the main sectors of Utica's first core had domestic and artisanal functions (Fig. 1, sector III and Fig. 2), located to the north of the archaic necropolis that lies beneath the Roman forum (Fig. 1, sector VI). Due to its location, it seems to constitute the southern periphery of this core, which contains in its northwest part the oldest Phoenician remains, namely a well and a set of rubble walls (Fig. 1, sector II).<sup>18</sup> To the north and east, respectively, are the urban area with its ancient adobe walls (Fig. 1, sector V) and the temple (Fig. 1, sector IV),<sup>19</sup> followed by the traces of an early Phoenician settlement occupying the promontory's large hill (Fig. 1, sector I).<sup>20</sup> This sector has already been the subject of previous excavations conducted by F. Chelbi and T. Redissi. These excavations uncovered a set of rubble walls which cut through and sometimes rest on older structures which were built with mud bricks. A significant amount of ceramic material, iron slag, and

18 López Castro *et al.* 2016, pp. 68-89.

19 Ben Jerbania *et al.* 2021, pp. 61-90.

20 For the traces of this archaic settlement on the hill overlooking the ancient promontory, cfr. Ben Jerbania 2020, pp. 38-40.

*tuyère* fragments was discovered there. This material, which we consulted and studied, dates back to the site's archaic phase.<sup>21</sup>

Given the significance of this discovery, which provides the most compelling evidence of the presence of a domestic area and ironworking activity, we began a new extended excavation in 2017 in the land adjacent to this previous sondage. This excavation was preceded by a georadar survey to identify this sector's layout and assess its archaeological potential. The results confirm the presence of several walls oriented north-northeast/south-southwest, which are indeed the continuation of the rubble walls that had already appeared in the Redissi sondage and belong to a large late Republican building, which, at the current stage of our research, we interpret as a peculiar temple without a podium.<sup>22</sup> First and foremost, however, as a topographical remark, we emphasize that no Punic period layers were identified during this excavation. The construction of the late Republican monument, followed by the successive levelling of the land for stone retrieval, would have removed all structures from this period, which explains the emergence of Phoenician structures on the surface, sometimes on the same side as the Roman foundations.<sup>23</sup> Secondly, we draw attention to the natural substrate's hilly nature, which led to the levelling of the space from the first phase of Phoenician occupation, and has been dated to the last quarter of the 9th century BCE. This phase includes two contiguous and concurrent complexes: the first consists of earth architecture suggesting a Phoenician settlement, while the second corresponds to an area dedicated to artisanal activities which were performed by the first Utica residents of this settlement.

### 2.1. Domestic Arrangements

These structures, which were discovered during the first excavation campaign of 2017, are located to the south of the adjacent area used for ironworking and waste disposal (Figs. 2.a, 3). They consist of two walls without stone foundations, which are directly placed on a fill that is made up of various layers of earth and clay spread evenly at the same time in order to level out the natural ground's irregularities (Fig. 4). The first



Fig. 2. a : Domestic area; b: Ironworking and iron slag dumping area (photo by Imed Ben Jerbania).

21 For the publications related to this ceramic material, as well as to those structures which were revealed by T. Redissi's excavation, cfr. Ben Jerbania – Redissi 2014, pp. 177-204; Ben Jerbania 2020, pp. 32-37.

22 The results of the georadar survey and the excavation carried out in this late Republican building have been partially published: cfr. Ben Jerbania *et al.* 2019, pp. 71-76. A complete study is currently being prepared.

23 At the current stage of the excavation, the only traces of the Punic phase correspond to the remains of two cisterns that are pierced by the walls of the late Republican building.

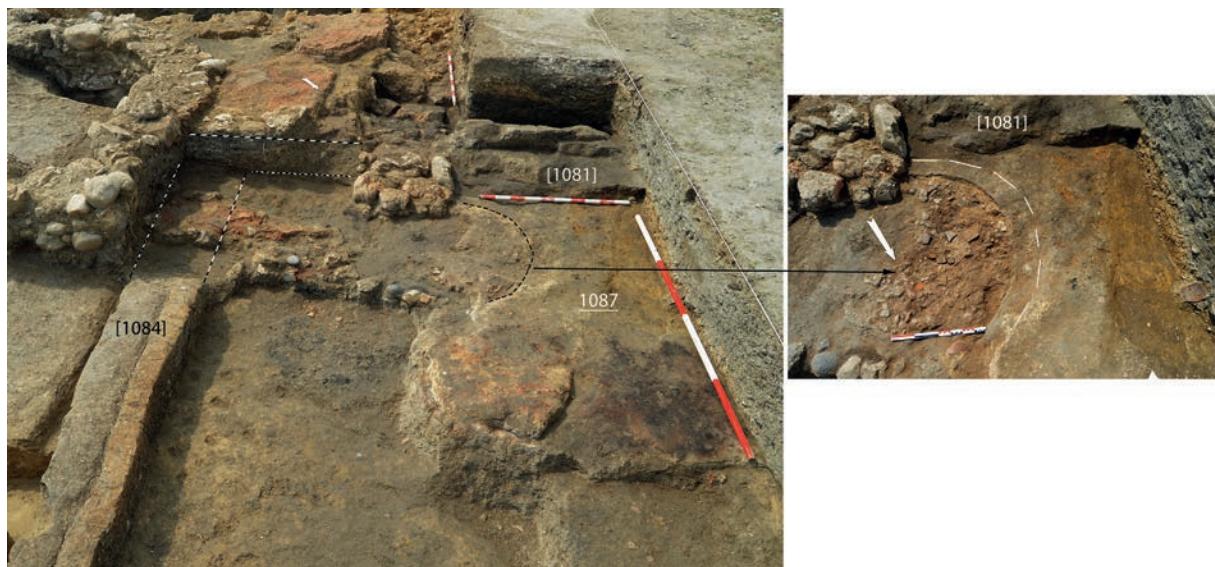


Fig. 3. Mudbrick walls, floors and the remain of a domestic bread oven (photo by Imed Ben Jerbania).

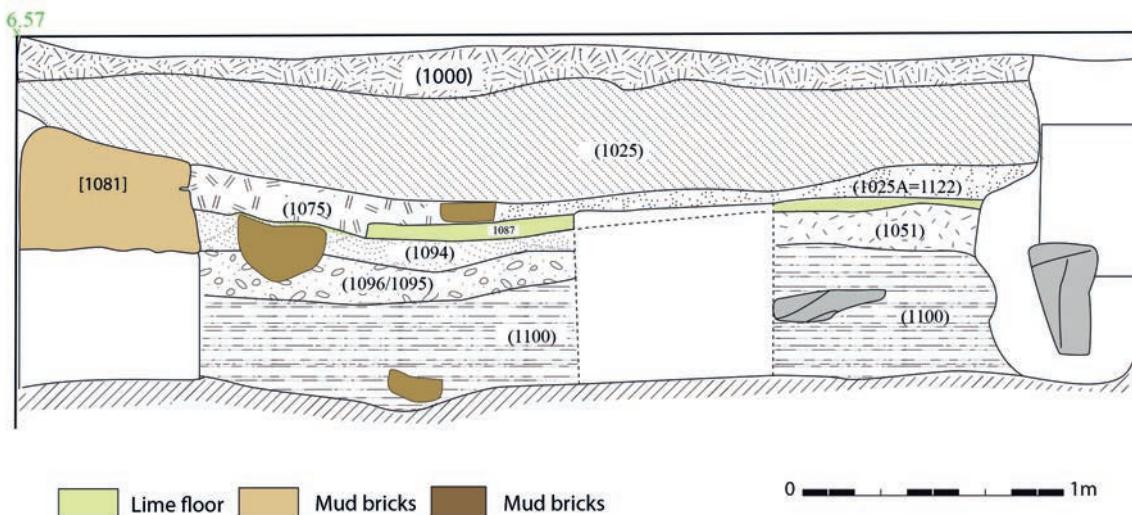


Fig. 4. North-South section of the domestic area (drawing by Kaouther Jendoubi and Imed Ben Jerbania).

wall, which was made using the adobe technique, is oriented northeast/southwest (1081) (Fig. 3). Although it is interrupted by a masonry wall from a later phase, traces of the bricks in its extension towards the east indicate its continuity, forming a right angle with the second wall (1084). The latter is constructed from solid earth with a high clay content and is oriented north-northeast/south-southwest. It appears to be a perimeter wall, with a width of 0.45 m and a preserved length of 3 m.

A lime floor (1087), which was unfortunately cut in the eastern part, is clearly associated with the first wall. A circular oven, 0.80 m in diameter and probably intended for baking bread, appears through its clay border, where the wall should have been mounted, and its pebble base bears traces of fire, indicating that it was set in a depression within the floor (Fig. 3). This type of base appears to have been used to retain heat. To make it less exposed, the oven was placed at the base of the first adobe wall.

In any case, this setup seems to correspond to a room – most likely a kitchen – or a type of courtyard of a house, the northern and eastern limits of which are undefined due to the extensive alterations the area underwent in subsequent periods. The dating of its construction, which has been placed to around the last quarter of the 9th century or the early years of the following century, is confirmed by the ceramic material, which will be discussed later. It has been found in the layers of the ground fill as well as the preparation of the lime floor.

This area's domestic nature is further evidenced by the adobe constructions which were identified in a previous excavation that was carried out by former site managers. The targeted cleaning we conducted allowed us to highlight two parallel walls made of adobe bricks, placed directly on a thin layer of fill that separated them from the natural substrate<sup>24</sup>. The bricks are joined with a clay mortar, or occasionally a sandy one. Three sizes have been identified: 52 cm x ? x 11 cm, 32 cm x ? x 18 cm, and 28 cm x ? x 11 cm. The first dimension resembles the Phoenician cubit. These two walls form a right angle with a third wall, also made of adobe, which seems to define the western side of a rectangular room. Access to this room was from the north, where traces of a lime floor, covered with a brown wash, serve as a threshold. This floor rests on a layer of greenish clay spread over the natural ground, which seems to have been used to prevent the seeping of moisture. The shape of this structure and the construction technique adopted resemble the early buildings at Morro de Mezquitilla in Spain, where the adobe walls lack stone foundations and the lime floors are coated with red or yellow coverings.<sup>25</sup>

## 2.2. *The Iron Working and Dumping Area and Its Constructive Elements*

The excavation of this area revealed that ironworking was the most significant economic activity practiced by its first inhabitants during the initial phase of occupation at the site. Indeed, in parallel with these adobe constructions, an adjacent area was designated for the disposal of waste generated by ironworking (Fig. 2.b). Initially, the excavation uncovered a thick black layer extending across the entire northern part of the trench, cut through by the foundations of the late Republican building (Fig. 5). This layer contained several fragments of *tuyères*, debris from clay furnaces, and iron and occasionally bronze slag. It was difficult to distinguish the various compacted layers within this black mass of waste from this activity, but it was still possible to observe that, in the early layers directly on the natural ground, the quantity of slag, *tuyère*, and furnace debris appeared to be more abundant. In addition to this material, these layers also yielded a significant amount of faunal remains and several ceramic fragments belonging to various forms known from local, Levantine, Greek geometric, and Sardinian repertoires. This assemblage, which will be analysed below, primarily serves to date this activity to the last quarter of the 9th century and the early years of the following century. Secondly, it demonstrates that we are dealing with a deposit dominated by functional forms, such as drinking cups and cooking vessels, which can only reflect the activities of the residents of the nearby houses. This therefore confirms the contemporaneity of these domestic structures and the metallurgical area, which, due to its extent and the large quantity of material it produced, attests to the presence of ironworking in Utica during the early phase of Phoenician settlement.

In order to investigate this work area, we extended the excavation towards the east. Our efforts were rewarded with the discovery of hearths. Our observations are somewhat limited, however, due to the extent of the destruction caused by the construction of the late Republican building, which prevented us from establishing a clear connection between the few preserved elements. Additionally, these elements were unfortunately cut on the northern side by previous excavations in this sector. As a result, ironworking has only been identified over a narrow area, primarily through the presence of cavities delineated by a brick edge,

24 For these adobe structures revealed by the previous sondages conducted in this sector, cfr. Ben Jerbania 2020, pp. 34-35, fig. 4.

25 Schubart 1986, pp. 63-65.



Fig. 5. Iron slag dumping (photo by Imed Ben Jerbania).



Fig. 6. Ironworking area (photo by Imed Ben Jerbania).

upon which the furnace walls should have been mounted (Fig. 6). At the bottom of these cavities, which have a diameter not exceeding 0.50 m, we found residues of ore and iron slag.

Simultaneously, a compact and homogeneous reddish layer composed of clay mixed with white gravel was used to level the surface and prepare a floor made of the same material. This severely damaged floor, bearing a layer of ash marking the corresponding occupation level, is clearly linked to the furnaces (Fig. 6). We also noted the presence of several fragments of clay on this floor which resulted from the collapse of the walls. Indeed, this collapse is marked in the area south of the furnaces by fallen adobe bricks, which belonged to walls that were cut by the foundation of the Roman building (Fig. 6). All this suggests that this workspace was carefully arranged and was likely separated from the other areas by adobe partitions.

### 3. THE MATERIAL RECORD: IRONWORKING ELEMENTS AND CERAMIC

#### 3.1. Slag, *Tuyères*, and Other Objects

The residues from this metallurgical activity, primarily from the work zone's nearby waste disposal area are chiefly composed of *tuyères* and iron slag, which are found in very large quantities, thus indicating the intensity of ironworking during the early phase of Phoenician settlement at this site. In fact, several hundred kilograms of slag, most of which is ferrous, were collected from the dark layers. A preliminary analysis of some specimens, using a multidisciplinary protocol that includes X-ray fluorescence (XRF), X-ray diffraction (XRD), scanning electron microscopy (SEM), and optical microscopy (OM) through energy dispersive X-ray fluorescence (ED-XRF), shows that the analysed slag is the result of an activity associated with ironworking's reduction process.<sup>26</sup>

The samples of slag collected provide evidence of an important phase in the ironworking process at Utica during the early first millennium BCE. Their examination reveals the presence of several types (Fig. 7), among which we first note the type referred to as "scorie à calotte" or "flat-convex slag".<sup>27</sup> These slags, also known as forge slags, are easily recognizable by their oval, flat, or concave shape, and are characterized by undulations of vitreous silicon and a rounded underside. In some specimens measuring 11 cm in length and 4 cm in height, the centre is porous and swollen, with traces of rust, and the edges are jagged. Inside the small

<sup>26</sup> The results of the ongoing analyses on the iron slag and *tuyères* from this area will be the subject of an upcoming publication. This procedure is being carried out by a team from the University of Sassari, led by A. Brunetti.

<sup>27</sup> The remarks presented here result from a preliminary examination of the slag carried out by Daniela Mastino from the University of Sassari, who participated in the 2018 excavation; she is greatly appreciated.

alveoli, which are approximately 0.2 cm in size, there are traces of terracotta and charcoal, while the edges exhibit the phenomenon of vitrification of quartz mixed with clay and iron. This type of slag shows traces of casting on the upper surface, indicating it was formed in a pasty state.

There are also amorphous or shapeless slags, black and porous, weighing between 83 and 85 grams and measuring between 1 and 5 cm. These slags are rich in surface alterations of a dark red colour as well as traces of highly oxidized copper. Among the other types of slag collected, there is one formed inside the furnace due to rapid cooling; it has a length of between 3 and 5 cm and a heterogeneous, vacuolar, and irregular appearance. Another form of slag encountered is the “*forma di goccia*” (drop-shaped slag); these amorphous slags bear traces of terracotta, minerals, vitrification, and droplets of casting on the surface. Many of them are black, porous, and very lightweight, with a honeycomb structure. Their weight varies from 10 to 20 grams.

As for the *tuyères*, most of them are rectangular in shape, with two longitudinal channels perforated with a circular cross-section, each having a diameter that does not exceed 1 cm (Fig. 8). They are moulded from coarse clay with silica inclusions and other visible tempering agents. Based on more recent parallels, particularly those reported in Carthage, each *tuyère* would have been connected to two bellows to ensure continuous ventilation of the hearth.<sup>28</sup>

This material record finds several parallels in the Phoenician contexts of the West during the 8th and 7th centuries BCE. Indeed, at Carthage – from the metallurgical horizon of Bir Massouda, which began in the second half of the 8th century BCE and reached its production peak between 650-500 BCE – rectangular *tuyères* with double perforated channels have been found, along with a considerable amount of slag. The analysis of this assemblage indicates forging work involving semi-finished and finished products.<sup>29</sup> At other points on the site, the presence of similar objects has been noted, which are clearly associated with metallurgical activity.<sup>30</sup> We find the same type of *tuyères* at many Greek, Phoenician, and indigenous sites in the central and western Mediterranean, although it is not always possible to determine whether their presence in the hearths is the result of forging or iron ore reduction. At Pithecusa, the *tuyères* exhibit the same rectangular shape with two perforated channels.<sup>31</sup> Research conducted on the Phoenician settlements of Morro de Mezquitilla and Toscanos has shown that this type of *tuyère* appeared alongside iron slag and other



Fig. 7. Slag from Utica (photo by Imed Ben Jerbania).

28 Lancel 1982, pp. 228-240; Thuillier 1982, pp. 249-260, figs. 321, 327.

29 Kaufman *et al.* 2016, pp. 37-38, figs. 4-5.

30 In the excavations of Septimus Severus Street, F. Rakob (1989, pp. 155-208) identified *tuyères* and slag that are part of archaic material dumped for the development of the coastal area during the Magonid period. Not far from this point, similar material can be found in the 7th-century BCE refuse layers identified at Ibn Chabāat: Niemeyer 2001, p. 91.

31 Docter – Niemeyer 1994, fig. 2.a.



Fig. 8. Tuyères from Utica (photo by Imed Ben Jerbania).



Fig. 9. Crucible from Utica (photo by Imed Ben Jerbania).

combustion structures, all of which result from post-reduction activity.<sup>32</sup> Among the many types of *tuyères* counted by M. Renzi at La Fonteta, those classified as “*toberas prismáticas*” resemble the Utican examples. This author also demonstrated that the number of these objects varies from one phase to another. Although they are present from the first phase (760-720 BCE), *tuyères* become more numerous during the second period (720-670 BCE), indicating an intensification of metallurgical activity at the site.<sup>33</sup> It is in the same archaic horizon of the 8th and 7th centuries BCE that *tuyères* of the same type that have been found at other sites such as Castillo de Doña Blanca,<sup>34</sup> Málaga,<sup>35</sup> and San Caleta in Ibiza<sup>36</sup> belong.

Among the other objects unearthed from the iron waste area are the moulded ceramic bowls with perforated walls (Fig. 9). This type of object, referred to as crucibles, is frequently found in Western contexts associated with metalworking, particularly silver cupellation. Similar examples to those from Utica have been found in the metallurgical centres of San Bartolomé de Almonté (Huelva) and are considered, based on their shape, to be objects related to metallurgical activities.<sup>37</sup> This connection seems further confirmed at Mesa de Setefilla, thanks to the presence in phase VIII of excavation 3 of bottoms belonging to this type of vessel, which are associated with *tuyères*.<sup>38</sup> Based on the data from these two Iberian sites, J. F. Murillo linked the crucible of his type C2 to metalworking activities.<sup>39</sup> The recent discovery of a 7th-century BCE silver metallurgy workshop at Cabezo Pequeño del Estaño (Guardamar, Alicante) supports this idea, as crucibles have been found alongside other metallurgical tools, such as perforated discs and stone mortars.<sup>40</sup> In Sardinia, these forms have been found in the Nuragic village of S’Arcu ‘e is Forros (Villagrande Strisaili), which is considered one of the most important metallurgical centres of ancient Sardinia.<sup>41</sup> The variety of forms pre-

32 For Morro de Mezquitilla, cfr. Schubart 1986, pl. VI. For Toscanos: cfr. Keesmann – Niemeyer 1989, p. 101, fig. 3; Niemeyer 2001, pp. 89-90, fig. 5.a-b. Cfr. also, Rovira Hortalá 2001, pp. 154-155.

33 Renzi 2007, pp. 171-172, tab. 1: from phase I, 66 *tuyère* fragments are found distributed across seven sondages; this number increases during phase II to 331 fragments. It is from period III (670-635 BCE) that a significant decline in *tuyères* is recorded.

34 Ruiz Mata 1989, pp. 209-243.

35 Gran-Aymerich 1991.

36 Ramon 1991, pp. 177-196.

37 Ruiz Mata – Fernández Jurado 1986, p. 188, pl. XLVII, pp. 631-637.

38 Aubet Semmler *et al.* 1983, p. 198, fig. 38.

39 Murillo Redondo 1994, p. 310, fig. 5.53.

40 Prados Martínez – García Menárguez – Jiménez-Vialás 2018, pp. 89-90, fig. 12.

41 The metallurgical character of this village supports the possible function of this object as a crucible without definitively excluding its initial interpretation as a torch holder: Secci 2017, pp. 539-540, fig. 3. For more information on the metallurgical importance of S’Arcu ‘e is Forros, cfr. Fadda 2013, pp. 197-234.

sented by this type often complicates the interpretation of its functional use, however. Thus, other functions related to cheese production or the inhalation of aromatic substances have been suggested for similar objects found in Huelva and Carthage.<sup>42</sup> In any case, it is important to emphasize that from Utica to Huelva, these objects appear during the same archaic chronological horizon in settings of interaction between different ethnic groups and cultures, primarily in connection with various metallurgical activities.

### 3.2. *Ceramics and Chronology*

This ceramic corresponds to the first phase of occupation attested in this sector, which is both domestic and artisanal. It comes from the contemporary layers deposited on the natural soil, whether those serving as a foundation for the construction of the floors and adobe walls of the living area, or the black-coloured layers of the adjoining iron discard area. It allows us to date the period of operation of this space and, therefore, provides a chronological reference point for the introduction of iron metallurgy in Utica.

It is important to first note that some sherds from these different layers, which are associated with domestic installations and ironworking, are joined together, providing further evidence of the contemporaneity of these areas and the same facies for their contents. In this facies, there is an interesting association of locally handmade forms and Levantine, Greek, Tartessian, and Sardinian imports. As of the current inventory of material from the 2017-2018 excavations, out of a total of 837 fragments (minimum number of individuals), local handmade pottery or Phoenician imitation represents 58.07%, Phoenician pottery accounts for 18.16%, Sardinian pottery comprises 15.05%, and Greek pottery 2.51%. It is not the intention here to address this material in its entirety, as neither the space allocated for this article nor the current state of our research allows for it; we will therefore limit ourselves at this stage to providing a brief overview of the production and various types of ceramic material characteristic of this first phase.

#### 3.2.1. *Libyan Pottery*

Handmade pottery dominates with both open and closed forms, with or without decoration. The open forms are primarily represented by dishes, the types of which vary according to the shape of the rim, the profile of the wall, and their dimensions. The undecorated examples, which are often smoothed and sometimes burnished, belong to the relatively deep dishes with a simple rim. The first type, of large dimensions, features a convex wall (CAT.1, Fig. 10.1), while the second has a narrower rim and a more rectilinear wall (CAT.2, Fig. 10.2). These forms are common in the Iberian Peninsula, not only in indigenous sites, especially in the Malaga region, but also in Phoenician contexts, such as at Morro de Mezquitilla.<sup>43</sup> In contrast, at Carthage similar examples are regarded as Phoenician imitations.<sup>44</sup> It must be acknowledged that we know almost nothing about the pre-Phoenician local phase of Utica and Carthage with which to determine the origin of the forms and their internal evolution. Only the site of Althiburos could potentially provide information in this regard. The inventory of this Numidian site does not seem to contain forms that we can clearly associate with our Utica examples, however. Thus, without completely dismissing the Libyan origin of this form, it is worth highlighting the resemblance of the convex-walled dish with a simple rim (CAT. 1, Fig. 10.1) to the Tyrian type 10 dishes, as classified by Bikai.<sup>45</sup>

<sup>42</sup> González de Canales Cerisola – Serrano Pichardo – Llompart Gómez 2004, p. 118. The examples from Carthage come from a context in the first half of the 7th century BCE from Ibn Chabaat Street: Mansel 2011, p. 370, fig. 8.5-7.

<sup>43</sup> Puch Monge 2017, p. 172, shapes fig. 3.4.1b with a straight profile and fig. 3.4.2b with a convex profile. These shapes are also documented in inland sites that are well connected with the settlements on the southern Andalusian coast.

<sup>44</sup> Mansel 2007, p. 438, fig. 231.

<sup>45</sup> Bikai 1978, p. 24.

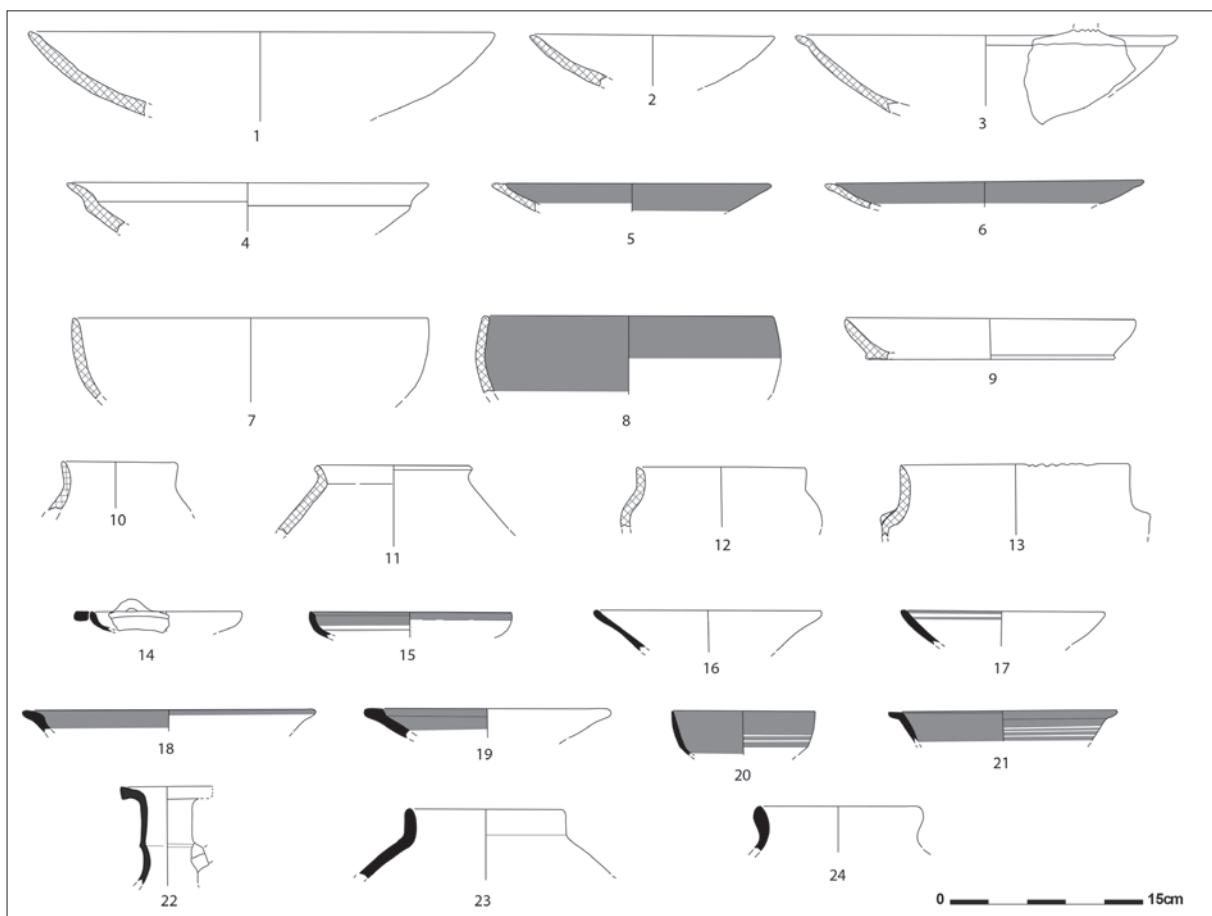


Fig. 10 1-13, Handmade pottery; 14-24 Phoenician pottery (drawing by Imed Ben Jerbania).

Other dishes, without decoration but with a surface that has been carefully smoothed, have a distinctly defined edge. The first example features a slightly convex horizontal edge, projecting outward, with the junction to the wall marked by a clear concave break. These morphological features resemble Phoenician plates of Bikai type 7.<sup>46</sup> But the main characteristic of this dish is the presence on the lip of an accessory element that seems more like a handle than a nipple (CAT. 3, Fig. 10.3). The second indigenous example features an outwardly inclined edge, separated from the wall by a marked ridge, that is reminiscent of later examples from the Recent Numidian period 1 of Althiburos (CAT. 4, Fig. 10.4).<sup>47</sup> But the most characteristic plates of the Utica handmade type have a straight profile, finished with a thickened edge on the inside (CAT. 5, Fig. 10.5) or a simple flat-topped edge (CAT. 6, Fig. 10.6). Most are of good technical quality, with a relatively fine fabric and a surface either finely smoothed and polished or entirely or partially coated with a red slip. The presence of this slip reinforces the idea that these are Phoenician imitations, primarily of Tyrian plates of Bikai type 7.

Bowls also constitute an important component of the handmade tableware; some undecorated examples have a continuous, slightly curved profile, and are finished with a simple, indistinct edge (CAT. 7, Fig.

46 Núñez Calvo 2017, p. 23, fig. 7.Ig, 7.Ih for the dishes from Huelva.

47 Sanmartí – Ramon – Maraoui Telmini 2016, p. 93, fig. 3.24.

10.7). Their parallels are found at Althiburos from the Early Numidian period 1.<sup>48</sup> Other bowls are considered, based on their shape and the presence of a red slip applied to the inner face as well as the upper part of the outer wall, as a perfect imitation of Phoenician hemispherical bowls (CAT. 8, Fig. 10.8).<sup>49</sup>

Finally, regarding open forms, we will mention the dishes commonly referred to as “*tajine*”, which are primarily intended for baking bread (CAT. 9, Fig. 10.9). Based on new documentation, this form appears not only at indigenous sites such as Althiburos,<sup>50</sup> but also in Phoenician contexts such as Carthage and Sulcis.<sup>51</sup> As for closed forms, they are associated with domestic activities or food storage. They are primarily represented in this area through the following types: sinuously profiled jars (CAT. 10, Fig. 10.10), jars with an oblique edge (CAT. 11, Fig. 10.11), and vases with a vertical edge and globular body (CAT. 12 and CAT. 13, Fig. 10.12-13). The first two are predominantly found at Althiburos,<sup>52</sup> but they are also present in Phoenician contexts, such as at Carthage.<sup>53</sup> Regarding the third type, it is worth noting that some high-quality variants with a polished surface and a cream-colored slip are distinguished by decorative knobs placed on the shoulder (CAT. 13, Fig. 10.13). Vases with the same profile, but without accessories, are present at Carthage among forms identified as cooking pots.<sup>54</sup>

- CAT. 1: Simple rim of a large handmade plate; paste dark grey 10YR 4/1, pink 5YR 7/4 surface roughly smoothed on the inside and outside. Rim diameter 36.6 cm (inv. UT17.III.1096.21, domestic area).
- CAT. 2: Simple rim of a handmade plate; paste dark grey 10YR 4/1, pink 5YR 7/4 surface better smoothed on the outside than on the inside. Rim diameter 19.2 cm (inv. UT17.III.1096.14, domestic area).
- CAT. 3: Handmade plate with rim projecting outward and possible handle (?), placed on the rim; paste dark grey 7.5YR 4/1, reddish yellow 5YR 7/6 smoothed surface. Rim diameter 30 cm (inv. UT17.III.1100.2-14, domestic area).
- CAT. 4: Handmade plate with pronounced keel under the rim; paste grey 7.5YR 5/1, reddish yellow 5YR 6/6 polished surface inside and outside with traces of white slip. Rim diameter 28.4 cm (inv. UT17.III.1096.18, domestic area).
- CAT. 5: Handmade plate with rectilinear profile and thickened rim on the inside; paste pale brown 10YR 5/4, slip of red 2.5UY 4/8 on the inside and outside of the vessel. Rim diameter 22 cm (inv. UT17.III.1095.2, domestic area).
- CAT. 6: Handmade plate with rectilinear profile and simple rim with flat top; paste dark grey 10YR 4/1, smoothed surface with reddish brown slip 5YR 4/4 on the inside. Rim diameter 26 cm (inv. UT18.III.1138.1, iron discard area).
- CAT. 7: Handmade bowl with vertical rim; paste red 10YR 8/6, reddish yellow 7.5YR 6/6 surface. Rim diameter 28 cm (inv. UT17.III.1100.1, domestic area).

48 Sanmartí – Ramon – Maraoui Telmini 2016, p. 94, fig. 3.28.

49 A comparison could be made with the hemispherical bowl with the same decorative arrangement from tomb 121 at Khaldé: Saidah 1966, p. 71, n. 27. This context is situated in the late phase of the Iron Age IIA, contemporaneous especially with stratum V at Tyre and the al-Bass III horizon: Núñez Calvo 2014, p. 23, note 54; 2018b, pp. 137-138.

50 In this local site, these dishes appear as early as the First Ancient Numidian period: Sanmartí – Ramon – Maraoui Telmini 2016, p. 90, fig. 3.11-13.

51 For Carthage, cfr. Mansel 2011, p. 375, fig. 2.11-12. For Sulcis: Guirguis 2019, p. 118, fig. 11.6.

52 Sanmartí – Ramon – Maraoui Telmini 2016, pp. 89-90, fig. 3.6-3.9 for the vessels with a sinuous profile, and fig. 3.10 for the vessels with an oblique rim.

53 Mansel 2005, pp. 263-265, fig. 2.9-8 for the vessels with a flaring rim.

54 Mansel 2011, p. 358, fig. 4.8.

CAT. 8: Handmade bowl with hemispherical profile; coarse yellowish paste 10YR 8/6, reddish yellow 5YR 7/8 surface smoothed inside and outside. Rim diameter 22.8 cm (inv. UT18.III.1120.10, iron discard area).

CAT. 9: Handmade tagine with flared rim; paste yellowish brown 10YR 5/4, surface smoothed inside and outside with very pale brown 10YR 7/3. Rim diameter 19.4 cm (inv. UT18.III.1120.8, iron discard area).

CAT. 10: Vase rim with sinuous profile; paste dark grey 10YR 4/1, pink 5YR 7/4 to whitish surface. Rim diameter 10 cm (inv. UT17.1094.1, domestic area).

CAT. 11: Short oblique rim of a globular pot; paste brown 10YR 5/3, smoothed surface of the same color. Rim diameter 12.3 cm (inv. UT17.III.1100.5, domestic area).

CAT. 12: Vertical rim of a handmade vase; paste dark grey 7.5YR 4/1 to grey 5YR 5/1, lustrous surface with cream slip 10YR 7/4. Rim diameter 13.1 cm (inv. UT18.III.1138.6, iron discard area).

CAT. 13: Vertical rim of a handmade vase with nipple on the shoulder; paste light yellowish brown 10YR 6/4, yellow 10YR 7/6 surface. Rim diameter 18 cm (inv. UT19.1154.6, iron discard area).

### 3.2.2. Phoenician Pottery

When we turn to Phoenician ceramics, we observe primarily that all the vessels from these levels of the first phase are Levantine imports. This is a finding similar to that already made with the material from Huelva.<sup>55</sup> Among the most well-represented open forms are the plates: first, there are those that we can classify into Bikai type 13, which is recurrent in the 14th-8th century strata of Tyre and shows a clear decline from the Vth stratum of Tyre.<sup>56</sup> These plates are of fine production: well-fired, with a smoothed surface and sometimes decorated with a red slip under the edge on the inside and concentric circles on the internal bottom (CAT. 14 and CAT. 15, Fig. 10.14-15).<sup>57</sup> In Sarepta, these plates are listed in types X-27 and X-28, featuring a *bichrome* decoration on the interior or a red colour on the edge. In the West, parallels are found in Huelva and La Rebanadilla.<sup>58</sup>

Other plates belong to Bikai types 8 and 9. The second type is distinguished by its decoration of red bands under the edge (CAT. 17, Fig. 10.17). In the Phoenician metropolis, it is attested from stratum XIII.2, with its abundance noted in strata VI-V.<sup>59</sup> In contrast, type 8 (CAT. 16, Fig. 10.16) is present from stratum XIII.2 to stratum I, peaking during stratum IV.<sup>60</sup> Regarding the last two examples of Utica plates (CAT. 18 and CAT. 19, Fig. 10.18-19), they are characterized by a straight profile and an internally thickened edge with a quadrangular section and a flat or slightly convex top. Due to these morphological features, they are classified as Bikai type 7.<sup>61</sup>

The bowls all belong to the typical Fine Ware class of the Levantine Iron Age. The first specimen has a curved profile with a hemispherical tendency, featuring a slight ridge that marks the start of the vertical edge (CAT. 20, Fig. 10.20). The red slip covers the interior of the vessel, while on its exterior it only occupies

55 Botto 2018b, p. 15.

56 Bikai 1978, p. 25, tab. 3.a.

57 According to J.F. Núñez Calvo (2017, p. 12), these decorative and physical characteristics are elements inspired by metalwork productions.

58 For Huelva: González de Canales Cerisola – Serrano Pichardo – Llompart Gómez 2004, pl. III.14-22 from the Méndez Núñez ST/12 Las Monjas Sq. area; González de Canales Cerisola *et al.* 2017, p. 9, pl. II.8-14 from area 3 Concepción. For La Rebanadilla, cfr. Sánchez Sánchez-Moreno *et al.* 2011, p. 196.

59 Bikai 1978, p. 24, tab. 3.a.

60 Bikai 1978, p. 23-24, tab. 3.a.

61 Bikai 1978, p. 23. For the morphological and decorative characteristics of this type: Núñez Calvo 2017, pp. 13-15.

the upper part of the wall above the ridge, where a decoration of incised or reserved slip lines sometimes appears.<sup>62</sup> Similar forms classified under type FW 8 are attested in the closed context of the Utica well, dated to the last quarter of the 9th century BCE.<sup>63</sup> In Huelva, these forms are logically incorporated into types FW 4 and 8 Bikai.<sup>64</sup> It should be noted here that type FW 8 encompasses heterogeneous forms, and its decline from stratum V is followed by an increase in attestations of type FW 4 starting from stratum IV<sup>65</sup> An early stage in this type of bowl's morphological evolution can be seen at Horbat Rosh Zayt, where some examples from stratum IIa have a disc-shaped base and red slip decoration.<sup>66</sup>

The second type of Fine Ware bowl (CAT. 21, Fig. 10.21) belongs to the FW 5 Bikai shape, the first evidence of which is observed in stratum V at Tyre, while its peak is recorded in the subsequent stratum.<sup>67</sup>

The closed forms of Levantine production are represented here by a fragment of a jug with a neck-ridge squared-off rim, Bikai type 8 (CAT. 22, Fig. 10.22), which appears at Tyre from stratum XIII.1, reaching its peak in strata IX-IV.<sup>68</sup> In Cyprus, this type is considered a marker of the Salamis horizon (850-750 BCE);<sup>69</sup> it is found in tomb Salamis 1, which is associated with Attic Middle Geometric II and Sub-Protogeometric III *skyphoi*, and that has been dated to the end of the 9th century BCE and the first half of the following century.<sup>70</sup> In the Tyre al-Bass area, these vessels belong to phase E of period III, contemporary with the end of this Cypriot horizon.<sup>71</sup> As for its western attestations, they are documented in Huelva both in the Plaza de las Monjas 12/calle de Méndez Núñez 7-13 sector and in the 3 Concepción Street area,<sup>72</sup> and also in the necropolis of San Isidro de La Rebanadilla, via an example with a slightly developed rim, as well as at Gadès.<sup>73</sup>

Finally, regarding transport containers, they are generally in the minority among the amphoric categories identified at Utica, except during this first phase, when they were more prominently represented behind the Phoenician-Sardinian amphorae.<sup>74</sup> They are characterized by the heterogeneity of the rim shape and appear to roughly correspond to Bikai type 9 which is primarily noted in strata XIII-VI and date from 1070/1050 BCE to 800 BCE.<sup>75</sup> The first fragment with a vertical rim (CAT. 23, Fig. 10.23) seems to have parallels at Sarepta, which is classified under type S.J.12B and peaks between 950 and 850/825 BCE, as well as at Kommos in Crete, where a similar rim is categorized by P. Bikai as type 9.<sup>76</sup> At Tell Keisan, similar

62 It is worth noting that this decorative feature is also characteristic of forms of type FW 6: Bikai 1978, p. 28; Núñez Calvo 2018b, p. 134.

63 López Castro *et al.* 2016, fig. 6.11-12.

64 González de Canales Cerisola *et al.* 2017, p. 11, pl. III.3-8. In Bikai's publication, forms FW 4 and 8 exhibit similar rims and body profiles: Bikai 1978, p. 29, pls. XIX.2-8, XXXI.12.

65 Bikai 1978, p. 27, tab. 4.a.

66 Gal – Alexandre 2000, p. 37, fig. III.90, 22, 24.

67 Bikai 1978, p. 28, tab. 4.a.

68 For this type, cfr. Bikai 1978, pp. 37-38, tab. 6.a.

69 Bikai 1987, pp. 18-20, nn. 190-208.

70 For this material: Coldstream 1963. F.J. Núñez Calvo (2008a, fig. 7.22) attributes this tomb to the chronological sequence corresponding to the Tyre strata V-IV.

71 Núñez Calvo 2008b, p. 49, fig. 4.

72 González de Canales Cerisola – Serrano Pichardo – Llompart Gómez 2004, p. 61, pls. 14-21; González de Canales Cerisola *et al.* 2017, p. 17, pl. VI.4-13.

73 For La Rebanadilla: Juzgado Navarro – Sánchez-Sánchez Moreno – Galindo San José 2016, pp. 110-111, fig. 5. For Gadès: Gener Basallote *et al.* 2012, p. 150, fig. 7.h, 7.j, p. 155, fig. 8; Torres Ortiz *et al.* 2014, pp. 58-59, fig. 5.

74 For more information on the Levantine amphorae from Utica and their parallels in the East and West, cfr. Ben Jerbania 2023.

75 Bikai 1978, pp. 45-46.

76 For Sarepta: Anderson 1988, type SJ. 12B, pl. 33.2; for Kommos: Bikai 2000, p. 310, fig. 4.63/14.

amphorae are mainly found in levels 6-7, spanning the period from 900 to 800 BCE.<sup>77</sup> The second rim (CAT. 24, Fig. 10.24) is analogous to certain forms from Huelva, which are still classified as Bikai type 9.<sup>78</sup>

CAT. 14: Rim of a plate of Bikai type 13; paste reddish yellow 5YR 6/6, surface of the same color. Rim diameter 12 cm (inv. UT19.III.1256.2, iron discard area).

CAT. 15: Rim of a plate of Bikai type 13; paste yellowish red 5YR 5/8, surface with red slip 10R 5/8 on the rim inside and concentric circle decoration of the same color on the internal base. Rim diameter 16 cm (inv. UT19.III.1262.1, iron discard area).

CAT. 16: Plate of Bikai type 8; paste very pale brown 10YR 7/3, surface of the same color 10YR 7/4. Rim diameter 18 cm (inv. UT19.III.1262.3, iron discard area).

CAT. 17: Plate of Bikai type 9; paste red 10R 5/8, surface with red slip 2.5YR 4/8 fillet decoration on the inside rim. Rim diameter 16 cm (inv. UT19.III.1256.3, iron discard area).

CAT. 18: Rim of a plate of Bikai type 7; paste reddish yellow 5YR 6/6, surface smoothed with red slip on the inside and on the external face of the rim lip. Rim diameter 22.8 cm (inv. UT19.1262.1, iron discard area).

CAT. 19: Rim of a plate of Bikai type 7; paste reddish yellow 7.5YR 6/6, internal surface with red slip 2.5YR 4/6 and externally smoothed in light brown 7.5YR 6/4. Rim diameter 19 cm (inv. UT19.1159.1, iron discard area).

CAT. 20: Rim of a Fine Ware bowl of Bikai type 8; paste light yellowish brown 10YR 6/4, surface with red slip 2.5YR 4/8 on the inside and on the upper part of the external wall. The lower part is smoothed in light brown 7.5YR 6/4. Rim diameter 11.2 cm (inv. UT19.III.1254.8, iron discard area).

CAT. 21: Rim of a Fine Ware bowl of Bikai type 5; paste red 2.5YR 5/8, surface with red slip 10R 5/8 and incised line decoration. Rim diameter 18 cm (inv. UT19.1254.1, iron discard area).

CAT. 22: Neck and rim of a jug of Bikai type 8; paste light yellowish brown 10YR 6/4, surface of the same color. Rim diameter 7.2 cm (inv. UT19.1250.1, iron discard area).

CAT. 23: Rim of a Levantine amphora of Bikai type 9/S.J.12B Sarepta; paste reddish yellow 5YR 7/8, surface of the same color. Rim diameter 12.6 cm (inv. UT17.III.1094.26, domestic area).

CAT. 24: Rim of an amphora of Bikai type 9; paste dark grey 7.5YR 4/1, surface red 2.5YR 4/8. Rim diameter 13 cm (inv. UT19.III.1217.2, domestic area).

### 3.2.3. Greek Geometric Pottery

In this local context and in association with the previous material, a small quantity of Greek Geometric pottery is present. It is mainly represented by the *skyphos*, a vessel that quintessentially embodies the Greek way of consuming wine from the beginning of the Middle Geometric period.<sup>79</sup> The Utica examples from the iron discard area fit within the decorative style and shapes of the Middle Geometric II and Sub-Proto-geometric III horizons. Two fragments of *skyphoi* with pendent half-circles, which are typically attributed to Euboean production, belong to the second horizon. The first fragment features a high, concave rim with a pronounced carination at the junction with the hemispherical body (CAT. 25, Fig. 11.25); the exterior of the rim, the interior of the body, and the decoration of semi-circles are all dark in colour. Despite its fragmentary condition and the absence of the external bottom, this fragment seems to belong to a *skyphos* of Kearsley type 5.<sup>80</sup> Like our Utica fragment, the one from Sant'Imbenia presents a relatively high concave

77 Briand – Humbert 1980, pls. 48.2, 50.6-7.

78 González de Canales Cerisola – Serrano Pichardo – Llompart Gómez 2004, pl. XIII: especially 15 and 20.

79 Coldstream 2008, p. 18.

80 Kearsley 1989, p. 99, fig. 39.

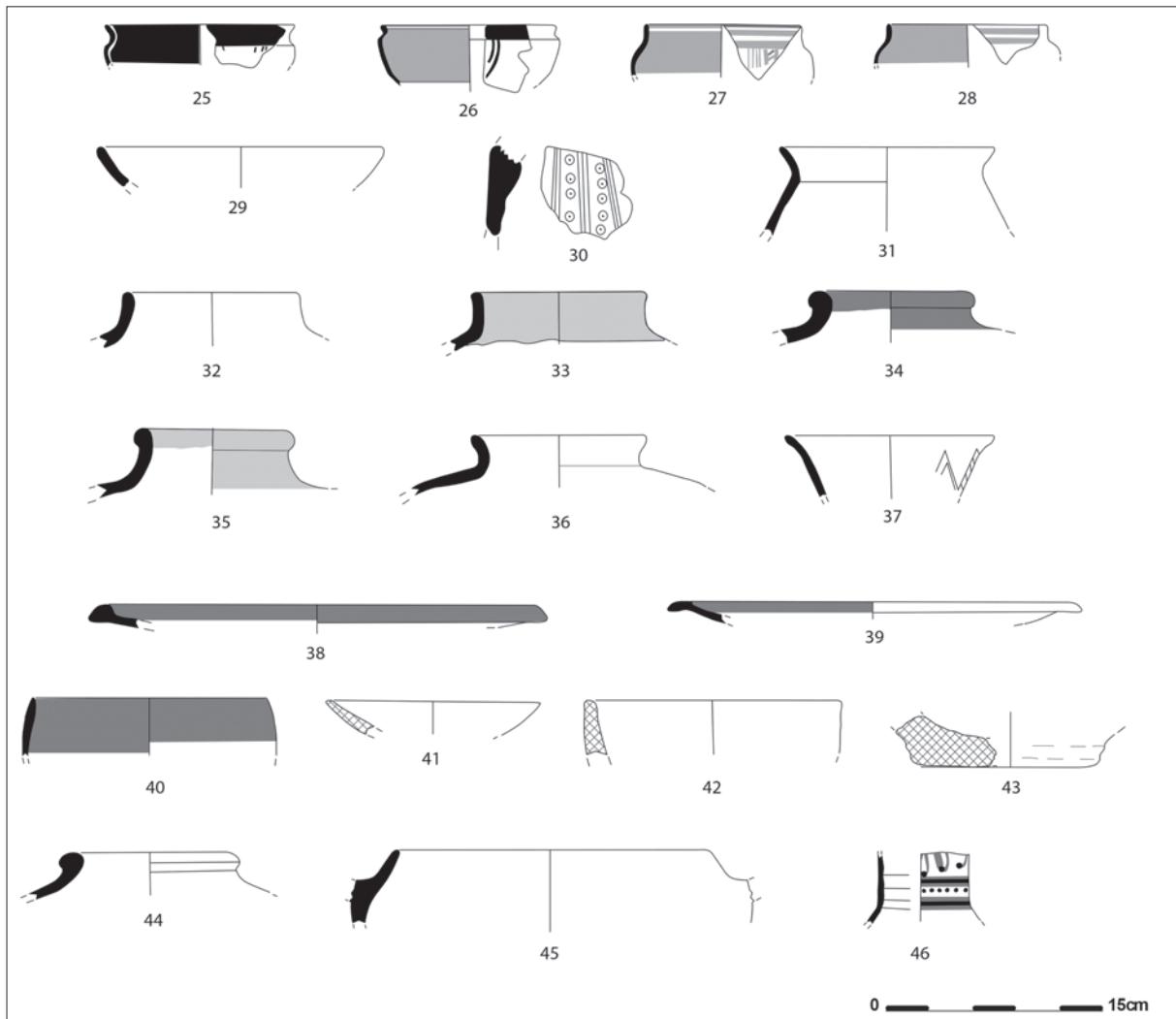


Fig. 11. 25-28 Greek *skyphoi*; 29-36 Sardinian pottery ; 37 Tartessian Pottery; 38-46 ceramic assemblage 1122 (drawing by Imed Ben Jerbania).

rim and appears in a context connected with metal.<sup>81</sup> The second fragment is also distinguished by a shallow body, a thickened lip, and a short, curved rim that is clearly separated from the shoulder by a pronounced carination (CAT. 26, Fig. 11.26). The combination of all these morphological elements is characteristic of Kearsley type 5<sup>82</sup>

The two other fragments (CAT. 27 and CAT. 28, Fig. 11.27-28) belong to the tradition of the Middle Geometric II period. They feature a short, vertical lip with a decoration of horizontal bands and a globular body of medium or small size. In Eretria, this type of *skyphos*, which is common during the Middle Geometric II period, is inspired in terms of its profile by the forms found in Attic productions.<sup>83</sup> Its globular

81 Ridgway 1998. See also the recent study of Greek Geometric material from Sardinia: Bernardini – Rendeli 2020, pp. 329-330.

82 Kearsley 1989, p. 97, fig. 38.

83 Verdan – Kenzelmann Pfyffer – Léderrey 2008, p. 73, pl. 88.SK 2-SK 3.

body tends to fade during the Late Geometric period, and its short lip restricts the application of diverse decorative motifs, which often limit the choices to bands or glazed lines<sup>84</sup> However, the fragment (CAT. 27, Fig. 11.27) stands out due to the appearance of a hook motif, outlined by vertical lines, on what remains of its decorative panel.

CAT. 25: *Skyphos* with pendent semi-circles of Kearsley type 5 and Euboean production; paste red 10R 5/6, compact, internal surface and rim black in colour. Reserved fillet on the lip inside. Beginning of pendent semi-circles on the shoulder. Rim diameter 11.3 cm (inv. UT18.III.1138.14, iron discard area).

CAT. 26: Euboean *skyphos* with pendent semi-circles; paste reddish yellow 5YR 6/6, fine and compact, rim and internal surface painted in dark reddish grey 5YR 4/2, with two pendent semi-circles on the body and reserved fillet on the inside of the rim. Rim diameter 12 cm (inv. UT18.III.1138.15, iron discard area).

CAT. 27: Rim of a *skyphos*; paste red 2.5YR 5/6, compact, external surface decorated with bands and hooks of the same colour. Rim diameter 10.6 cm (inv. UT18.1139.1, iron discard area).

CAT. 28: Rim of a *skyphos*; paste red 2.5YR 5/8, external surface pink 7.5YR 7/4 with decoration of red bands 2.5YR 5/6 on the rim; internal surface of the same colour. Rim diameter 11 cm (inv. UT18.1138.14, iron discard area).

### 3.2.4. Sardinian Pottery

We have found an important assemblage of Sardinian material consisting of various forms related to the consumption, preparation, storage, and transport of goods. This constitutes a true Sardinian set that accompanies the island's transport amphorae. Among the examples attested in these Utica levels is the *scodella* with a simple rim, intended for the consumption of solid and liquid foods (CAT. 29, Fig. 11.29).<sup>85</sup> This type of vessel, which is recurrent in central-southern Sardinia, is currently absent from Phoenician contexts in the western Mediterranean.

The askoides jugs related to table service are represented by fragments of bodies or handles adorned with incised lines and stamped circles (CAT. 30, Fig. 11.30). This form, which is typical of Nuragic Sardinia at the end of the Bronze Age and the beginning of the Iron Age, with origins dating back to the Late Bronze Age (12th-11th centuries BCE), is widely distributed both in the West and in the East. This distribution confirms the success it enjoyed among its users.<sup>86</sup>

The ceramic used for preparation includes the olla with a diverging rim (CAT. 31, Fig. 11.31), which is commonly found not only in the Nuragic contexts of the early Iron Age 2A (EIA 2A) but also in the island's Phoenician levels, dating to the second half of the 9th century BCE and the beginning of the following century.<sup>87</sup>

84 Verdan – Kenzelmann Pfyffer – Léderrey 2008, p. 74.

85 Campus – Leonelli 2000, scod.15-17 ?

86 For parallels to this fragment of a Utican jug handle, see Campus – Leonelli 2000, p. 652, pl. 374.13-18. These Sardinian jugs are attested at Huelva (González de Canales Cerisola – Serrano Pichardo – Llompart Gómez 2004, p. 101, pls. 21.4 and 60.4), El Carambolo (Torres Ortiz 2004, p. 46, fig. 1), Calle Cánovas del Castillo in Cádiz (Córdoba – Ruiz Mata 2005, pp. 1300, 1303, 1310, fig. 20), and later in the Eastern Mediterranean, where they are documented in tomb 2 of Khaliale Tekke in Crete: Vagnetti 1989, pp. 356-359.

87 This type of olla with divergent rims corresponds to the forms listed in N. Ialongo's catalog: see Ialongo 2010, pp. 140, 145, particularly olla 603 of the OrSva 6 type from phase 7 of Iron Age 2A. For the documentation of these cooking pots at Nuragic and Phoenician sites, see also Ialongo 2017, pp. 190-192.

Among the other Sardinian vessels are the *vasi a collo*, which were primarily reserved for the storage of food (CAT. 32 and CAT. 33, Fig. 11.32-33).<sup>88</sup> These vessels were widely distributed in Nuragic Sardinia from the Late Bronze Age through the Early Iron Age. During the latter period, handles with reverse elbows (*gomito rovescio*) were applied to the body at its maximum diameter.<sup>89</sup> *Vasi a collo* with high, vertical rims, like these Utica examples, are documented in the Late Bronze Age and Early Iron Age levels of the Nuragic village of Sa Sedda'e Sos Caros.<sup>90</sup> It is noteworthy that some of our examples are sometimes covered with a decoration reminiscent of red slip (CAT. 33, Fig. 11.33), which also characterizes the Saint'Imbenia type amphorae. Outside of Utica,<sup>91</sup> the site of Huelva in the far west has yielded several fragments of this type, some of which are similar to those from Utica. In the East, this vessel type appears at Kommos in Crete as well as in Cyprus.<sup>92</sup>

As far as the amphorae are concerned, it is not necessary to revisit the discussion we have already developed in other works regarding the Phoenician-Sardinian amphorae from Utica.<sup>93</sup> We will merely highlight the fact that this category is well represented in the early Utica levels, both in the metalworking sector and in other contexts corresponding to the same chronological horizon.<sup>94</sup> Next, we attribute the first two fragments (CAT. 34 and CAT. 35, Fig. 11.34-35), with thickened rims and a type of treatment on the outer and inner rim surfaces resembling red slip, to the family of amphorae with necks recently identified from the Sant'Imbenia material.<sup>95</sup> It should be noted, however, that the neck on the first fragment is underdeveloped and seems to belong to type L3a of Calle Cánoves del Castillo,<sup>96</sup> while the second fragment, with a more developed neck, fits into type L3b.<sup>97</sup> The third fragment, which lacks decoration (CAT. 36, Fig. 11.36), is nevertheless characterized by its simple, indistinct rim, which has the same thickness as the neck and is similar to type L3d from Calle Cánoves del Castillo.<sup>98</sup>

CAT. 29: Simple rim of a bowl; strong brown paste 7.5YR 5/6 to dark grey 7.5YR 4/1, surface light brown 7.5YR 6/3. Rim diameter 20 cm (inv. UT17.III.1100.17, domestic area).

CAT. 30: Fragment of a handle from an *askos*-type jug; very dark grey paste 7.5YR 3/1, surface of the same color 5YR 3/1. (inv. UT18.III.1120.6, iron discard area).

CAT. 31: Divergent rim of a Sardinian olla; dark grey paste 7.5YR 4/1, surface brown 10YR 4/3. Rim diameter 15 cm (inv. UT18.III.1169.3, iron discard area).

CAT. 32: Rim of a necked vessel; reddish-yellow paste 5YR 6/4, surface red 2.5YR 5/8. Rim diameter 12 cm (inv. UT17.III.1096.5, domestic area).

CAT. 33: Rim of a necked vessel; dark grey paste 10YR 4/1, surface with red slip 10R 5/8. Rim diameter 12 cm (inv. UT17.III.1096.3, domestic area).

88 Fundoni 2009, p. 15; Botto 2011, p. 41.

89 Campus – Leonelli 2006, p. 388. Cfr. likewise Ben Jerbania 2017, p. 188.

90 Salis 2006, p. 101, fig. 10.

91 González de Canales Cerisola – Serrano Pichardo – Llompart Gómez 2004, p. 104, pl. XXI.15-29.

92 For these attestations, see Fundoni 2013, p. 200.

93 Ben Jerbania 2017, pp. 192-193; 2023.

94 See the setting provided by the study of the material from the well of the last quarter of the 9th century BCE excavated by the Tunisian-Spanish team: López Castro *et al.* 2016. For the sectors excavated by the Tunisian team: Ben Jerbania 2023.

95 De Rosa – Garau – Rendeli 2018, p. 51, fig. 4.

96 Córdoba – Ruiz Mata 2005, p. 1297, fig. 13.

97 Córdoba – Ruiz Mata 2005, p. 1297, fig. 14.1-2.

98 Córdoba – Ruiz Mata 2005, p. 1297, fig. 14.4.

CAT. 34: Rim of a Phoenician-Sardinian amphora with slightly developed neck; compact paste grey 2.5YR 5/1, surface with traces of reddish-brown slip 2.5YR 5/4 on the exterior and interior of the rim. Rim diameter 11.4 cm (inv. UT18.III.1120.4, iron discard area).

CAT. 35: Rim of a Phoenician-Sardinian amphora with developed neck; compact paste with grey core 2.5YR 5/1 and reddish-yellow surface 5YR 6/6, external surface with traces of light reddish-brown slip 2.5YR 6/4 on the exterior and interior of the rim. Rim diameter 11 cm (inv. UT18.III.1120.2, iron discard area).

CAT. 36: Simple rim not distinct from the neck of a Phoenician-Sardinian amphora; grey paste 5YR 5/1 to light red 2.5YR 6/8, surface red 10R 5/8. Rim diameter 12.3 cm (inv. UT17.III.1096.1, domestic area).

### 3.2.5. The Tartessian Ceramics

Tartessian ceramics are represented by a casserole rim (*cazuela*) bearing an incised decoration on the external wall consisting of patterns of hachured triangles, referred to as “*triangolo grabado*” (CAT. 37, Fig. 11.37). This decoration is well attested in the Lower Guadalquivir region;<sup>99</sup> indeed, recent excavations at El Carrambolo have revealed a significant number of such objects in levels dated to the late 9th century BCE and the early part of the following century.<sup>100</sup> In addition to the Iberian Peninsula, this unmistakably Tartessian decoration appears at Lixus and Carthage on vases similar to the one from Utica.<sup>101</sup>

CAT. 37: Rim of Tartessian pot; dark greyish paste 10YR 4/2, very dark grey surface 7,5YR 3/1. Diam. rim 14.6 cm (inv. UT17.III.1100.20, domestic area).

At the end of this analysis, it is appropriate to address the question of the chronology of this ceramic material, which results from stratigraphic excavation, taking into account the intrinsic nature of its sequential organization as characterized by the diversity of imports. This allows us to establish a relative chronology and correlations with Mediterranean chronological sequences and frameworks. From this perspective, we believe that, based on the evolution of metropolitan Phoenician material, this ceramic assemblage could belong to the phase at the end of the Middle Iron Age and the beginning of the Late Iron Age, and essentially corresponds to strata VI-V at Tyre.<sup>102</sup> Indeed, the final stage of the Middle Iron Age is typologically characterized by the gradual disappearance of the forms from the Early Iron Age and the emergence of new forms, as is the case with FW 8.<sup>103</sup> Meanwhile, in terms of decoration, the red slip becomes more consolidated and is applied both to the interior and the upper external part of the vessels.<sup>104</sup> It is therefore significant that this assemblage includes older forms, such as the Bikai-type 13 dishes, in association with other types present during this metropolitan sequence (strata VI-V), such as the neck-ridge jugs Bikai type 8 and the dishes Bikai 8/9. It is worth recalling that these Bikai-type 13 dishes, which are recurrent in the older Tyrian strata, experienced a noticeable decline in strata VIII-VII, followed by a resurgence in stratum VI, which

99 Casado Ariza 2011, p. 100, fig. 2.

100 Casado Ariza 2011, pp. 97-98.

101 For Lixus: Alvarez Garcia *et al.* 2001, pp. 80-81. For Carthage: Mansel 2005, p. 263, fig. 2.2: the author noted that other locally-produced vessels of this shape are found at this site, but without decoration. See also the fragments belonging to the same type of vessel and bearing the same “engraved triangle” decoration which have been found in Carthaginian contexts dated between 725 and 675 BCE: Mansel 2007, p. 441, fig. 233.2722-2723.

102 Núñez Calvo 2018b, p. 165.

103 Núñez Calvo 2018b, p. 150.

104 Núñez Calvo 2018b, p. 150.

may coincide with their appearance at Utica and in the West.<sup>105</sup> This type of dish is absent in level I-3 of Kition, whose oldest material, which is analogous to that of Utica (FW 8, neck-ridge jug type 8), may date to the late 9th century BCE.<sup>106</sup> On the other hand, it is also possible to place this assemblage in the final period of Tyre al-Bass II and the first half of al-Bass III. In this regard, it is worth noting that according to J.F. Núñez Calvo, although this transition between the two periods is not very clear at Tyre (strata VI-V), it is better represented by substratum D-2 at Sarepta and especially by Tomb T155 at al-Bass, where, as at Utica, we find dishes of Bikai types 7 and 8.<sup>107</sup> Furthermore, we can consider that the material from this early Utican sequence appears to be contemporary with Tomb 1 at Salamis, particularly in its second stage, which corresponds to stratum V at Tyre.<sup>108</sup>

In the West, a clear correlation could be established between this assemblage and the second stage of Huelva, whose lower limit dates back to 770 BCE<sup>109</sup>, the phases IV-III of La Rebanadilla,<sup>110</sup> and possibly phase IV of Carambolo, which yielded Phoenician material associated with Middle Geometric II Greek pottery.<sup>111</sup> It is to this latter Greek sequence and to the Euboean sequence of Sub-Protogeometric III that the Greek *skyphoi* from the Utica assemblage belong. As for the Sardinian material, it fits into the sequence of the early Iron Age 2A (850-800/775 BCE) that has been recently defined by N. Ialongo.<sup>112</sup>

In any case, the absence in this material of the characteristic forms of the ceramic style of the central and western Mediterranean, such as narrow-rimmed dishes or *oinochoai* with a tondo, constitutes a significant chronological marker that allows us to set the lower date of this assemblage to the beginning of the 8th century BCE.

Indeed, it is only from the second sequence, which is observable through the abandonment levels of domestic structures, that locally or western-produced red-slip material begins to appear, always in association with handmade forms and Levantine, Sardinian, and Greek imports. At this stage of our work, it is sufficient to mention as evidence the ceramic assemblage from the layer directly covering the lime-plastered floor associated with the domestic space's adobe walls. This assemblage (US 1122, Fig. 4) contains plates of western tradition with narrow rims and red slip: the first features a straight wall without an external separation from the direct rim, which is thickened and convex at the top (CAT. 38, Fig. 11.38). This dish model exists at Carthage among the material from the earliest sequence at Bir Massouda, which was recently studied by J.F. Núñez Calvo.<sup>113</sup>

This author relates this model to the plates of Cánovas del Castillo.<sup>114</sup> Nevertheless, it seems plausible to suggest that Utica may have constituted one of the earliest locations for experimenting with the production of this type of plate, whose form gradually diverges from the models of the motherland. The second example features a horizontal edge, tapered and with a convex summit, belonging to a more advanced stage

105 Bikai 1978, tab. 3.a.

106 Bikai 2005, pp. 234-236.

107 Núñez Calvo 2018a, p. 330; 2018b, p. 155.

108 For the analysis of this material from tomb 1 at Salamis and the analogy between its recent forms and Tyre stratum V, see Núñez Calvo 2018b, p. 162.

109 Cfr. in this regard, see González de Canales Cerisola *et al.* 2017, p. 43.

110 For the material from La Rebanadilla, which includes the Phoenician forms of plates of Bikai types 13, 7, and 8/9, as well as a Greek ceramic from the Middle Geometric II, see Sánchez Sánchez-Moreno *et al.* 2012, p. 75, and more recently Botto 2018b, p. 23, fig. 8.

111 Escacena Carrasco – Fernández Flores – Rodríguez Azogue 2007, pp. 19-20, fig. 4.

112 Ialongo 2017.

113 Núñez Calvo 2014, fig. 5.1-2, from the BM04/4460 level. According to this author, this sequence from Bir Massouda coincides with Tyre stratum IV, Sarepta stratum D-1, and the end of Tyre al-Bass III and the beginning of al-Bass IV: Núñez Calvo 2014, pp. 34-35.

114 Núñez Calvo 2017, p. 27.

than that of the previous example (CAT. 39, Fig. 11.39). It has several parallels in western sites, particularly in Sulcis.<sup>115</sup> In addition to the plates, we encounter a fragment of a hemispherical bowl with an inward-curving rim and a red-slip decoration covering the interior and upper external part of the vessel (CAT. 40, Fig. 11.40). It is classified within type Bikai FW4a, which is found in stratum IV at Tyre, and continues through the subsequent strata.<sup>116</sup> It also corresponds to form CV 1 from Tyre al-Bass, with a very similar example in terms of shape and decorative arrangement found in tomb 3/5, marking the end of period III.<sup>117</sup> In Sarepta, this type of bowl belongs to form F.2A, which first appears in stratum D-1 and later reaches its peak in stratum C1.<sup>118</sup> As for the Libyan handmade pottery, it is represented by a simple-rimmed dish of the same shape as those attested in the previous phase (CAT. 41, Fig. 11.41), a *tajine* rim (CAT. 42, Fig. 11.42), and a solid foot of a closed shape (CAT. 43, Fig. 11.43).

Like the first sequence, this context from the abandonment phase is also characterized by the presence of Sardinian and Greek imported materials. The first category initially includes the thickened rim of a Phoenician-Sardinian amphora with a slightly elongated neck (CAT. 44, Fig. 11.44), followed by the fragment of a *scodellone* with an inward-curving rim and an applied handle at the maximum diameter (CAT. 45, Fig. 11.45). The latter vessel appears in Nuragic contexts of Final Bronze 3, such as in the sanctuary of Monte Saint Antonio<sup>119</sup> and the village of S'Urbale Teti.<sup>120</sup> Regarding Greek imports, we note the presence of a fragment of a jug's neck, decorated with points bordered on both sides by black bands, dated to the Late Geometric I period (CAT. 46, Fig. 11.46).

For all these reasons, it is possible to consider that the *terminus ante quem* provided by the ceramic material from the layer placed on the floor of the domestic space could date to the beginning of the second quarter of the 8th century BCE. Thus, from a chronological perspective, the phase of activity in this sector, at least based on the current state of the excavation, seems to be situated in the last quarter of the 9th century BCE and the beginning of the following century.

CAT. 38: Dish with straight rim, thickened with convex upper part; red paste 10R5/8, surface with red slip 10R 4/8. Diameter of rim 32 cm (inv. UT.18.III.1122.1).

CAT. 39: Plate with narrow rim; red paste 2.5YR5/8, surface with red slip 10R 5/8 on interior rim and outer wall smoothed pink 7.5YR 7/4. Diameter of rim 29 cm (inv. UT18.III.1122.2).

CAT. 40: Inside rim of a hemispherical bowl; fine compact paste light red 2.5YR 6/6, surface with red slip 10R 5/6 on the interior and on the upper half of the wall. Diameter of rim 16.4 cm (inv. UT18.III.1122.5).

CAT. 41: Handmade dish with simple rim; coarse paste brown 10YR 5/3, smoothed surface pale brown 10YR 6/3. Diameter of rim 14.3 (inv. UT18.III.1122.10).

CAT. 42: Handmade tagine rim; coarse brown 7.5YR 5/4, surface roughly smoothed light brown 7.5YR 6/4. Diameter of rim 34 cm (inv. UT18.III.1122.11).

CAT. 43: Large foot of modelled vase (inv. UT18.III.1122.9).

CAT. 44: Rim of a Phoenician-Sardinian amphora; paste red 2.5YR5/8, surface light red 10R 6/8. Diam. rim 12.6 cm (inv. UT18.III.1122.3).

115 Guirguis 2019, fig. 11.2.

116 Bikai 1978, p. 28.

117 For this bowl from Tyre al-Bass: see more recently Núñez Calvo 2018b, pp. 136-138, fig. 12.d. The end of period III is dated to the first quarter of the 8th century BCE: Núñez Calvo 2014, p. 305.

118 Anderson 1988, pp. 164-165.

119 Ialongo 2010, pp. 110, 114, MSA 379-382.

120 Fadda – Puddu – Salis 2020, p. 522, fig. 2.9-13.

CAT. 45: Sardinian *scodelloni* rim; very dark grey paste 7.5YR3/1, dark greyish brown surface 10YR4/2. Diam. rim 22 cm (inv. UT18.III.1122.7).

CAT. 46: Neck of Greek jug from Late Geometric I; compact paste fine pale yellow 2,5Y 8/3, surface of same colour with altered decoration of black dots delimited on both sides by fillets, the whole is surmounted by thick lines linked and terminated by black dots (inv. UT.18.III.1122.1).

#### 4. CONCLUSIONS

The new excavation in the domestic and artisanal sector provides new insights into the chronology and dynamics of Phoenician settlement in Utica and its close connection with the phenomenon of metal seeking, which was a central aspect of the ideology behind the early Phoenician expeditions in the Mediterranean.<sup>121</sup> It demonstrates how this dynamic fits within the broader trend of eastern expansion into the West, which led the newcomers – comprising merchants, migrants, and artisans – to settle near or among the indigenous populations. In this regard, it must be acknowledged that Utica represented a strategic point for the Phoenicians, located halfway along the long-distance route from Tyre to Huelva in a gulf called *Sinus Uticensis*, which offered excellent conditions for sheltering ships and establishing a port. Moreover, its proximity to the mouth of the Oued Medjerda, which provides a relatively navigable passage to access the hinterland and productive resources, as well as the presence of a Libyan community, which is only currently attested by the presence of modelled pottery from the deepest layers, are all key elements in understanding the creation of an *emporion* at Utica by the Phoenicians.<sup>122</sup>

At this stage of the initial Phoenician presence in the West, which was aimed at establishing stable foundations and has been situated archaeologically and through radiocarbon dating from the mid-9th century BCE, iron, as both an object and a metallurgical practice, experienced an increasing diffusion and adoption.<sup>123</sup> Studies of local or regional cases conducted on Iberian, Nuragic, or Italian peninsula sites have addressed the phenomenon of the transition from bronze to iron metallurgy, which occurred within a framework of social and economic changes as well as contact with other Mediterranean communities.<sup>124</sup> These studies have

121 The acquisition of metals, particularly silver, is one of the most important reasons that led the Phoenician cities, with Tyre at the forefront, to undertake a large-scale trade and colonization project in the West. In this regard, a direct connection has been established between the Phoenician presence in the southern Iberian Peninsula and the exploitation of mining sources, which archaeological data confirm as being ancient, thus lending credence to the ancient texts: Aubet Semmler 2009. Although few in number, these texts did not hesitate to provide indications of the importance of metals for this Phoenician initiative in the Western lands and the Atlantic. Referring to Tyre, Ezekiel mentions the significant trade in metals such as silver, iron, and lead: Ezekiel 27.12.

122 Through its mechanisms, which have already been analyzed and developed by archaeologists and historians of antiquity, this Greek term *emporion* perfectly translates the situation we observe on the ground at Utica. For more details on this term and its historical implications, see Bresson – Rouillard 1993; Gailledrat – Dietler – Plana-Mallart 2018.

123 The discussion on the date of the first Phoenician presence in the West has led to divergent positions based on irreconcilable datings ranging from the 10th to the 8th centuries BCE. In this debate, the material from Huelva constitutes a key point that has generated considerable interest chronologically. Without delving into the details of this controversy, it is worth briefly noting that, in contrast to the high date of the 10th century proposed for the Huelva assemblage by some authors (Mederos Martín 2006, pp. 167-188), there is a tendency to lower this chronology to the end of the following century: see especially Botto 2005, pp. 579-628; Núñez Calvo 2018b, pp. 168-174. M. Torres Ortiz (2008, pp. 135-147), for his part, suggested an intermediate date between the late 10th and early 9th centuries BCE for the beginning of Phoenician presence in the West. According to A. Gilboa (2013, pp. 311-342), however, the available data both from Palestine and the Atlantic area suggest that the beginning of this process can be placed around the second half of the 9th century BCE. In any case, it seems clear that the new situation revealed by excavations at Utica and La Rebanadilla, as characterized by the presence of Greek Middle Geometric II material associated with Phoenician and also Sardinian pottery, supports the idea of an initial phase of Phoenician activity beginning in the decades preceding the end of the 9th century BCE.

124 See in this regard the latest work by Belarte – Rovira – Sanmartí 2020, which includes studies on various Mediterranean regions and societies that experienced these transformations, which were related to the process of the transition from the Bronze Age to the Iron Age.

demonstrated how complex it is to reconstruct this process and define its key stages based on often incomplete archaeological data. Indeed, the example of Sardinia shows that despite the premature state of our knowledge on certain aspects related to this topic, concrete indications from Nuragic sites at the end of the Bronze Age reveal the presence of iron artefacts, both as prestige items and as tools, as well as the early introduction of iron technology even before the arrival of the Phoenicians.<sup>125</sup> Regardless, this presence of iron, as significant as it may be, remained marginal and would not see true consolidation until the second half of the 8th century BCE, which represents a moment of strengthened Phoenician presence on the island and integration into the “colonial” network, as evidenced especially by the data from Sulcis.<sup>126</sup> In the Iberian Peninsula, although the use of iron seems to predate the Phoenician presence, actual evidence of its production in a local context only dates back to the early Iron Age.<sup>127</sup> Indeed, the artefacts assigned to the phase of exploration and settlement (11th-9th centuries BCE) are relatively few compared to those from the following period and are part of the dynamic exchange between Phoenicians and locals, which contributed to the emergence of a social elite.<sup>128</sup> As for the practice of iron metallurgy through the processes of reduction and post-reduction, it is clearly attested in local sites such as Acinipo and Los Castillejos de Alcorrín (Manilva, Málaga) from the end of the 9th century BCE and the beginning of the following century;<sup>129</sup> this emergence coincides with the stable settlement of the Phoenicians in this region as well as the neighbouring area of the Bay of Malaga. The evidence of the intensification of this iron production process is more visible in Phoenician settlements during the second half of the 8th century and the early 7th century BCE, however. More or less recent excavations at La Fonteta, a significant Phoenician port at the mouth of the Segura River, perfectly reflect the importance of metal production and trade in the economy of this settlement during the archaic period.<sup>130</sup>

As for Utica, it is clear that the examination of these new contexts of metallurgical activity contributes to a better understanding of the overall view of the production and adoption of iron in the West. In this regard, the data from excavations conducted so far at the site demonstrate the unique role that ironworking occupies from the last quarter of the 9th century BCE, a period that corresponds to the initial phase of Phoenician presence in Utica and in several other settlements in the central and western Mediterranean. How, then, can we characterize the introduction of this new technology into the local environment, and under what circumstances did this production process take place?

First, it is important to emphasize the Phoenician character of this area dedicated to settlement and ironworking. Indeed, the earliest structures uncovered in this sector are built directly on the natural ground, which clearly suggests their establishment during the last quarter of the 9th century BCE, on land that was presumably unusable by the Libyan community. At the time of the Phoenician arrival, the Libyans, in our view, likely occupied the heights of the promontory not far from the sea, in the site's immediate vicinity. This position would have certainly been chosen for reasons of security as well as to control access to productive resources and agricultural land. The presence of the Libyan element on the site itself and in this sector is

125 Lo Schiavo – Milletti 2020.

126 Lo Schiavo – Milletti 2020, p. 88. For the discovery in Sulcis of a set of iron slag, metal fragments, and *tuyères*, which have been interpreted as a refuse context dated to the 8th century and the first half of the 7th century BCE: see Pompijau 2010.

127 This intensification in the adoption of iron as both an object and a technology took place primarily from the 8th century BCE. In this regard, the site of La Fonteta provides the best evidence for the existence of production workshops: see Renzi 2013; Vives-Ferrández Sánchez – Mata Parreño 2020, p. 147; Vives-Ferrández Sánchez 2021, pp. 411-412.

128 Rovira Hortala 2001, p. 149; Suárez Padilla – Renzi 2020, pp. 176-177; Nijboer 2021, p. 316. In this same regard, B. Kaufman *et al.* (2016, p. 36) have argued that the Tartessian elite or the leaders of the tribes in the Andalusian region were able to develop their social status through the acquisition of finished Phoenician products in exchange for silver and iron.

129 Suárez Padilla – Renzi 2020, p. 177.

130 These excavations uncovered several structures designed for the extraction of metal (copper, iron, and lead): Renzi 2013, pp. 121-124.

primarily evident through the local handmade pottery, which is found in abundance in the earliest contexts. Thus, the Libyans represent the most significant element in terms of numbers, and the Phoenicians likely benefited from their consent in establishing an *emporion*.

The Phoenician nature of this sector is clearly evident in the construction techniques adopted, which are common to the earliest Phoenician settlements in the West. These include walls primarily built with mudbrick, without stone foundations, and resting directly on the natural ground. The walls often form right angles and belong to buildings with a rectangular plan. As for the circulation floors, some are made of clay, while others contain a significant proportion of limestone. This Eastern approach to construction techniques is one of the main reasons that allow us to identify sites where these methods were used during the initial phase of occupation to develop urban architecture, marking them as Phoenician sites. Such a finding is, for example, perfectly illustrated at La Rebanadilla, where the Phoenician architectural and urban model took root as early as phase III, which is dated to the late 9th to early 8th century BCE. Here, residential and religious buildings were constructed with adobe walls, which in a very few cases had stone foundations.<sup>131</sup> Their plans feature rectangular rooms arranged around a central space, which has been interpreted as a courtyard, following an Eastern model. It is also important to mention the case of Sulcis, the only Phoenician colony in Sardinia, which belongs to an early chronological horizon characterized by buildings with rectangular plans and walls constructed from mudbrick.<sup>132</sup> In addition to these construction techniques, we can also attribute the low furnaces discovered in Utica's metallurgical area to models already known in the Phoenician settlements of Andalusia. A notable example is the ironworking facilities at Morro de Mezquitilla, which appear as early as the mid-8th century BCE and consist of several furnaces situated a few meters apart. Those that are well preserved have a circular shape and clay walls.<sup>133</sup> It is evident that these architectural techniques and the expertise attested in several Phoenician settlements in the central and western Mediterranean stem from a common foundation. In this regard, A. Delgado argues that, through the replication of the model from their place of origin, the Phoenician communities of the West strengthened their collective identity in order to distinguish themselves from the local populations.<sup>134</sup>

In our opinion, the metallurgical activity as well as the urban developments are expressions of the permanent Phoenician presence and the new internal dynamics stimulated by the process of contact with the Libyans. This process certainly began earlier, during the phase of reconnaissance or visitation. Unfortunately, we still know very little about this phase as well as the indigenous substratum in terms of territorial occupation, social organization, and economic resources, making it difficult to assess the depth of the transformations triggered by the encounter with the Phoenicians. We do, however, have concrete evidence of fruitful collaboration and successful ethnic and cultural interaction aimed at economic goals. In this regard, the diversity of ceramic productions in this metallurgical area demonstrates that Utica, at this initial stage, was a meeting place and a point of attraction for the local community as well as other external groups (notably the Sardinians), thanks to the opportunities provided by the Phoenician presence in terms of exchange and economic production, with iron occupying a central role. In this sense, it is legitimate to consider, first and foremost, that the predominance of locally handmade pottery is a sign of Libyan collaboration in terms of labour in ironworking. This collaboration helped strengthen ties with the Phoenicians and other key participants, ensuring a gradual transfer of technology. It is in this context that we can understand, in our view, the presence of iron slag in Althiburos during the 9th century BCE, according to radiocarbon dating, not as something independent of the Phoenician presence,

131 Arancibia Román *et al.* 2011, p. 130; Sánchez Sánchez-Moreno *et al.* 2012, p. 82; 2018, p. 306.

132 See most recently Bernardini 2020, p. 135; Botto 2021, p. 265.

133 Schubart 1999; Rovira Hortala 2001, p. 154; Renzi 2013, pp. 68-70.

134 Delgado 2017, p. 190.

as has sometimes been suggested.<sup>135</sup> This collaboration between Phoenicians and Libyans, who were living in symbiosis within Utica's *emporion*, also represents a fundamental aspect of the dynamics of the "colonial" encounter. This idea becomes even more significant when we connect the context of ironworking to that of the well found a few meters to the northeast by the Tunisian-Spanish team. Indeed, the ceramic and faunal assemblage from this well, which has also been dated to the last quarter of the 9th century BCE, corresponds to the remains of collective banquets in which the participation of the Libyan element is evidenced by the abundant quantity of locally-handmade pottery.<sup>136</sup> This type of banquet reinforced the bonds between the communities and served both to develop and protect Phoenician trade.

This economic dynamic related to iron metallurgy, which was primarily driven by the Phoenicians, also had the capacity to attract other partners by offering them the opportunity to become involved in Phoenician trade. This includes the Sardinians, whose presence in Utica is strongly supported by the appearance of their pottery in the earliest levels. An examination of this inventory demonstrates how the amphorae intended for the export of wine are accompanied by a full set of drinking and eating vessels. This analysis also emphasizes, through the appearance of these amphorae in the Phoenician context at Utica, which slightly precedes that of Sant'Imbenia, the Phoenicians' role as catalysts in this dynamic of exchange in which the Sardinians participated. Thus, Sant'Imbenia does not appear to have been the sole source of these amphorae. In this regard, we have already pointed out that the diversity of the fabric found on these containers at Utica supports the idea of other Sardinian centres being involved.<sup>137</sup> In addition to the villages of Su Cungiau 'e Funtà and S'Urachi-Su Padrigheddu, we specifically consider – as a hypothesis – other centres along the eastern coast between Posada and Orosei which should have been active in trade with the Phoenicians.<sup>138</sup> These two coastal sites had both a strategic position for trade with the Tyrrhenian coast and a hinterland rich in mineral resources.<sup>139</sup> A previous survey showed that a Sardinian amphora used for the transport of copper which was found between Posada and Siniscola appears to be older than those produced in the workshops of Sant'Imbenia.<sup>140</sup> On the other hand, it is not impossible to suggest that, through these sites involved in trade with the Tyrrhenian coast, Villanovan material arrived in small quantities at Utica.

In any case, this diversity of ceramic material reflects the involvement of several individuals from different nationalities in the iron metallurgy activity. Beyond its insights into the diversity of trade networks into which Utica was integrated early on, it highlights the multicultural character of this initial phase during which Sardinian and Euboean functional artefacts arrived as part of a commercial dynamic managed by the Phoenicians. But the most original aspect of all this is that Utica offers one of the earliest clear testimonies of the close connection between this material and iron reduction in the central and western Mediterranean. The preliminary analysis of slag and *tuyères* on one hand, and the absence of iron instruments and tools in this sector on the other, shows that we are dealing with a process of reduction that ensures a significant surplus in iron production which was primarily destined for export to meet the growing demand from the East. This, in our view, constitutes one of the major objectives of the Tyre "colonial" activity, centred on the acquisition of metals through the involvement of all the key players, particularly the locals, via trade to encourage production for export.<sup>141</sup> These protagonists were certainly attracted by the profits this commercial

135 Ramon – Sanmartí 2020, pp. 21-22.

136 López Castro *et al.* 2016.

137 Ben Jerbania 2017, p. 192; 2023.

138 Bernardini 2020, p. 136; Botto 2021, p. 259.

139 Bernardini 2020, p. 136.

140 Sanciu 2010, pp. 1-7.

141 This is the idea we also encounter in the study by Kaufman *et al.* (2016, p. 36) on metallurgical activity at Carthage, where the authors develop the model of Phoenician economic policy regarding iron metallurgy: «Early Phoenician colonial activities were

activity generated, but also by other opportunities provided by the Phoenician element, especially in terms of technology transfer, which contributed to the growth of power and wealth within the local Libyan elite. This ironworking sector constituted a space for the exchange of know-how among these different groups in the Utican context of the last quarter of the 9th century BCE, which is considered earlier than that of Sant'Imbenia and predates the situation at Sulcis by 50 years. Thus, the involvement of the Sardinians in this activity and trade is evident in Utica, as it generated both profit and technology transfer for them. It is not surprising, in this sense, to assume that certain quantities of high-quality iron ore from Sardinia arrived at Utica in Phoenician-Sardinian amphorae. This partially explains the abundance of these forms in the earliest levels of the site and confirms the importance of this mercantile cooperation between these various nationalities in the metal trade through which Sardinian products passed to Utica and the Iberian Peninsula.

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centrally planned around a strategy of grafting Tyrian economic demand onto previously established trade networks, in what can be called a cooperative mercantile economic system that encouraged surplus production for export. For example, the Tyrians were able to negotiate commercial relationships with local tribes to access the mineral wealth of the Iberian Peninsula. In the 10th and 9th centuries BC, so-called “Orientalizing” influences in the Central and Western Mediterranean are usually referred to as “protocolonization” or “precolonization” initiated by Phoenician merchants plying foreign waters searching for mineral resources to exploit».

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