

# 17 | Tied to Two Empires: The Material Evidence of the Islamic Conquest of Sicily

JOANITA VROOM

## Introduction

Around 700, two dominant political, economic and religious powers were operating in the Mediterranean: the Byzantine Empire along its northern shores and the Muslim Caliphate on its southern coasts. Some scholars tend to draw a clear Byzantine–Islamic frontier between both empires as political and economic entities in the Mediterranean in the period after the Arab expansion in the seventh century, whereas others maintain there were much less clearly defined transition areas between the two economic and cultural worlds. They use the concept of ‘frontier societies’ or ‘borderlands’ for these intermediate zones where various groups and cultures met, interacted and sometimes collided.<sup>1</sup> All evidence suggests that during the early Middle Ages larger Mediterranean islands, such as Cyprus, Crete and Sicily, played such intermediate roles as connective hubs between empires.<sup>2</sup>

In this paper I set out to explore the problem of to what extent the interaction networks, economic connections and exchange systems of the two superpowers in these borderlands of the central and eastern parts of the Mediterranean can be documented by archaeology. In a broader sense, this exploration should shed light on the long-debated question of what happened with cultural and economic networks in the Mediterranean after the Arab expansion at the expense of the Byzantine Empire?<sup>3</sup> This will provide important context for the political and communal relations between subjects of these great Mediterranean empires as power dynamics shifted, allowing us to see to what extent communities were in communication with each other, or, by contrast, were economically separated.

<sup>1</sup> Cf. Sarah Davis-Secord, *Where Three Worlds Met. Sicily in the Early Medieval Mediterranean* (Ithaca/London: Cornell University Press, 2017), 7 and notes 13–14 with further literature.

<sup>2</sup> See e.g. Luca Zavagno, “Islands in the Stream”: Toward a New History of the Large Islands of the Byzantine Mediterranean in the Early Middle Ages ca. 600–ca. 800, *Mediterranean Historical Review* 33 (2018), 149–77.

<sup>3</sup> See the essays in David Abulafia and Nora Berend (eds.), *Medieval Frontiers: Concepts and Practices* (Aldershot: Ashgate, 2002); Michael McCormick, *Origins of the European Economy: Communications and Commerce, A.D. 300–900* (Cambridge: Cambridge University Press, 2001); Hugh Kennedy, *The Byzantine and Early Islamic East* (Aldershot: Variorum, 2006).

Here, I will argue that a more detailed study of the material culture found in borderland regions (such as the large Mediterranean islands) will greatly enhance our understanding of the local/regional, the inter-regional and the long-distance contacts and exchange patterns of commodities in this period. To date, detailed archaeological knowledge of the material culture of these borderlands or ‘peripheries’ between the Byzantine Empire and Islamic Caliphates has still not been systematically looked at. This holds perhaps especially true for the study of finds from that quintessential large Mediterranean island which functioned as borderland, Sicily, because it is such a large and significant island in the interface between Byzantine and Islamic worlds. Sicily’s material culture from before, during and after the Islamic conquest (827–964 CE) remains little known. As is often the case, it is essential to revisit the archaeological basics (which have not yet been well interpreted or researched in detail) and to establish what can be done based on eighth- to eleventh-century material culture which archaeologists have actually found in well-dated but not yet well-investigated contexts on this island, and to determine the character of these finds. In fact, much can be done - based on archaeological assemblages, which have already been recovered in past excavations and are now ‘lying around’ waiting to be interpreted to provide a more complete and entirely new interpretation of the situation.

Connections and communications could follow from physical contact, realised through human exchange via conquest, which left traces in the material culture (including the circulation of commercial goods in locally made and imported amphorae).<sup>4</sup> Indeed, what can the changing material evidence tell us about local communities that produced, used and transported these objects. Such ties of economic dependency may reflect the military-political competition of two empires in Sicily with the gradual spread of Islamic rule over the island.

Within the central themes of this volume, it is my aim to present here in a responsible way an overview of the distribution of Byzantine and early Islamic ceramics, mainly amphorae, found on Sicily and dating from between the seventh/eighth and eleventh centuries. The study will range from pottery finds recovered at sites on the island which were still part of the Byzantine Empire to wares excavated at settlements under Muslim control. This approach in a geo-political context explains my title ‘Tied to Two

<sup>4</sup> See also the contribution of Stefanie Schmidt which appears as chapter 6 in this volume for a similar material-culture approach but via the physical movement of messengers in Islamic Egypt.

Empires', as I will focus on the shifting economic and commercial ties of Sicily to both realms. I think that amphorae (i.e. ceramic containers for the transport of bulk goods) from various periods found in different parts of the island provide an especially fruitful starting point to shed light on the exchange networks in this borderland before, during and immediately after the Arab takeover.

## A Short Historical Overview

Sicily occupied a strategic position as a nodal point in the central Mediterranean at the crossroads of important trade routes. Its location has been described as a 'nexus' of East–West communications and a 'stepping-stone' within North–South lanes.<sup>5</sup> Its most vibrant medieval ports were Trapani (in the West), Palermo (in the North–West), Messina (in the North–East) and Syracuse (in the East).<sup>6</sup> In addition, Mazara del Vallo, Agrigento and Sciacca were active on its southern shores during Muslim rule.

In the sixth century, under Byzantine Emperor Justinian I (r. 527–65), Sicily was again joined to the eastern Roman Empire or Byzantine Empire. Justinian's general Belisarius used the island as a base to conquer the rest of Italy. Syracuse even functioned as the capital of the Byzantine Empire for a short period during the seventh century, when the Emperor Constans II (r. 641–68) decided to move his court in 663 and 668 to the most western territories of his realm.

In 698, however, the Umayyad conquest of North Africa (Ifriqiya) put the Umayyads in control of the harbour of Carthage, located close to Sicily. This allowed them to build shipyards and a permanent base from which to launch more sustained attacks on the island. Still, it took over a century for the Muslims to conquer Byzantine Sicily. Byzantine Syracuse held out for a long time but fell in 878 as is shown in a miniature in the late twelfth-century Greek manuscript known as the *Madrid Skylitzes*.<sup>7</sup> By this time, the Muslim forces were empowered with a busy and active fleet, which helped them to annex Sicily and its prized agrarian output from the Byzantine Empire. Taormina fell in 902, and the last Byzantine outpost in eastern Sicily was taken in 965.<sup>8</sup>

<sup>5</sup> Davis-Secord, *Where Three Worlds Met*, 17–24.

<sup>6</sup> In this paper I use present-day Italian names for ports and urban settlements in Sicily.

<sup>7</sup> The miniature 'The Arab Conquest of Syracuse (in 878)' is taken from Joannis Scylitzae, *Synopsis Historiarum*, Codex Matritensis Graecus Vitr. 26-2, fol. 100v, National Library, Madrid.

<sup>8</sup> William Granara, *Narrating Muslim Sicily. War and Peace in the Medieval Mediterranean World* (London/New York/Oxford/New Delhi/Sydney: I. B. Tauris, 2019), 14.

Sicily was ruled successively by the Aghlabid dynasty (831–909) from the city of Qayrawān and the Fatimid Caliphate (909–48) from Raqqāda and al-Maḥdiyya (all in Tunisia). After that, an autonomous and semi-independent dynasty of Muslim governors, the Kalibs, was established on the island between 948 and 1044. Palermo, in north-western Sicily, became the seat of the government of Muslim Sicily around the mid ninth century, when in 831 the city surrendered to the commander of the Aghlabid army after a year-long siege.<sup>9</sup>

In the *Book of Curiosities* (completed in Fatimid Cairo in the eleventh century and copied ca. 1200), one can distinguish an Islamic map of Sicily with the fortified city of Palermo represented as a circular enclosure in red, broken by eleven gates, and located next to a V-shaped indentation depicting its harbour.<sup>10</sup> In addition, a later medieval Islamic map attributed to al-Idrīsī (d. 1165), the Muslim geographer and cartographer living in Palermo at the court of the Norman King Roger II (r. 1095–1154), showed Sicily with its more or less distinctive triangular shape within the Mediterranean, between the toe of Calabria and the island of Sardinia.<sup>11</sup> Around twenty-five coastal towns (including Palermo) can be seen as rosettes on this last map.

This documentary evidence can be further enhanced by recent archaeological contributions, which reflect the nature of the economic connections of the two empires (the Byzantine and Muslim) to different parts of Sicily.<sup>12</sup>

<sup>9</sup> Granara, *Narrating Muslim Sicily*, 10; Fabiola Ardizzone, Elena Pezzini and Viva Sacco, 'Aghlabid Palermo: Written Sources and Archaeological Evidence', in *The Aghlabids and Their Neighbours*, eds. Claire D. Anderson, Corisande Fenwick and Mariam Rosser-Owen (Leiden/Boston: Brill, 2018), 362.

<sup>10</sup> Bodleian Library, University of Oxford, MS Arab. c. 90, fols. 32v–33r, copied ca. twelfth century; see also Yossef Rapoport and Emilie Savage-Smith, *Lost Maps of the Caliphs. Drawing the World in Eleventh-Century Cairo* (Chicago/London: The University of Chicago Press, 2018), 158–59, fig. 6.1; Anneliese Nef, 'Croissance urbaine et modalités d'habitat dans la Palerme islamique: Retour sur les acteurs et les facteurs', in *From Polis to Madina. La trasformazione delle città siciliane tra Tardoantico e Alto Medioevo*, eds. Lucia Arcifa and Mariarita Sgarlata (Bari: Edipuglia, 2020), fig. 1.

<sup>11</sup> Bodleian Library, University of Oxford, MS Pococke 375, fols. 187v–188r, copied 1553; see also Rapoport and Savage-Smith, *Lost Maps of the Caliphs*, 174–75, fig. 6.7.

<sup>12</sup> For my paper, I am relying on the excellent pottery research of some of my Italian colleagues and I would like to thank in particular Lucia Arcifa, Fabiola Ardizzone, Giuseppe Cacciaguerra, Viva Sacco and Emanuele Vaccaro. For a recent summary of their research, see also *From Polis to Madina. La trasformazione delle città siciliane tra Tardoantico e Alto Medioevo*, eds. Lucia Arcifa and Mariarita Sgarlata (Bari: Edipuglia, 2020).

## An Archaeological Model of Sicily

Figure 17.1 shows an interpretative model of the island on the eve of the Islamic conquest, which was published in 2013 by the Italian archaeologist Emanuele Vaccaro in an article with the title ‘Sicily in the Eighth and Ninth Centuries AD: A Case of Persisting Economic Complexity?’ in *Al-Masaq*.<sup>13</sup> Based on new archaeological data, he suggested that the amphora trade continued on the island with some intensity in the eighth century through two different systems of exchange in two main areas: one in western Sicily, which was clearly related to the circulation of commodities within the southern Tyrrhenian Sea, and another one on the eastern coast, taking advantage of the East–West maritime route linking this part of Sicily directly with the Byzantine Empire in the East.<sup>14</sup>

According to Vaccaro, the amphora finds in western Sicily belong to types common in Calabria or the Bay of Naples, where seventh- and eighth-century workshops have so far been identified, for example at Misenum and at Ischia.<sup>15</sup> As shown on the map in Figure 17.2, the circulation of these amphora types linked a series of sites in the southern Tyrrhenian Sea, where the Church of Rome had substantial landholdings. Vaccaro imagined a privileged southern Tyrrhenian trade circuit for wine transport, connecting some major church institutions.<sup>16</sup>

Although I find it interesting, I am not entirely convinced by Vaccaro’s archaeological model. I do like his division of two different exchange systems of Byzantine amphorae (concurrently) existing in eighth- and ninth-century Sicily, but I am afraid that he made a few wrong identifications of amphorae recovered on and around the island leading to a misunderstanding of the underlying commercial activities it was involved in. The amphorae found on the small Aegadian islet of Marettimo (shown in Figure 17.1 at the top-left, marked in blue) were indeed imports from Tyrrhenian workshops,<sup>17</sup> but the amphorae found on the more southern

<sup>13</sup> Emanuele Vaccaro, ‘Sicily in the Eighth and Ninth Centuries AD: A Case of Persisting Economic Complexity?’ *Al-Masaq* (2013): fig. 11.

<sup>14</sup> Vaccaro, ‘Sicily in the Eighth and Ninth Centuries AD’, 57–58.

<sup>15</sup> Vaccaro, ‘Sicily in the Eighth and Ninth Centuries AD’, 59; Gianfranco De Rossi, ‘Indicatori archeologici della produzione e diffusione del vino della Baia di Napoli in età altomedievale’, in *Paesaggi e insediamenti rurali in Italia meridionale fra Tardo Antico e Altomedioevo*, eds. Giuliano Volpe and Maria Turchiano (Bari: Edipuglia, 2004), 541–50.

<sup>16</sup> Vaccaro, ‘Sicily in the Eighth and Ninth Centuries AD’, 61.

<sup>17</sup> For Tyrrhenian amphora finds on the island of Marettimo, see Fabiola Ardizzone, ‘Nuove ipotesi a partire dalla rilettura dei dati archeologici: La Sicilia orientale’, in *La Sicile de Byzance à*

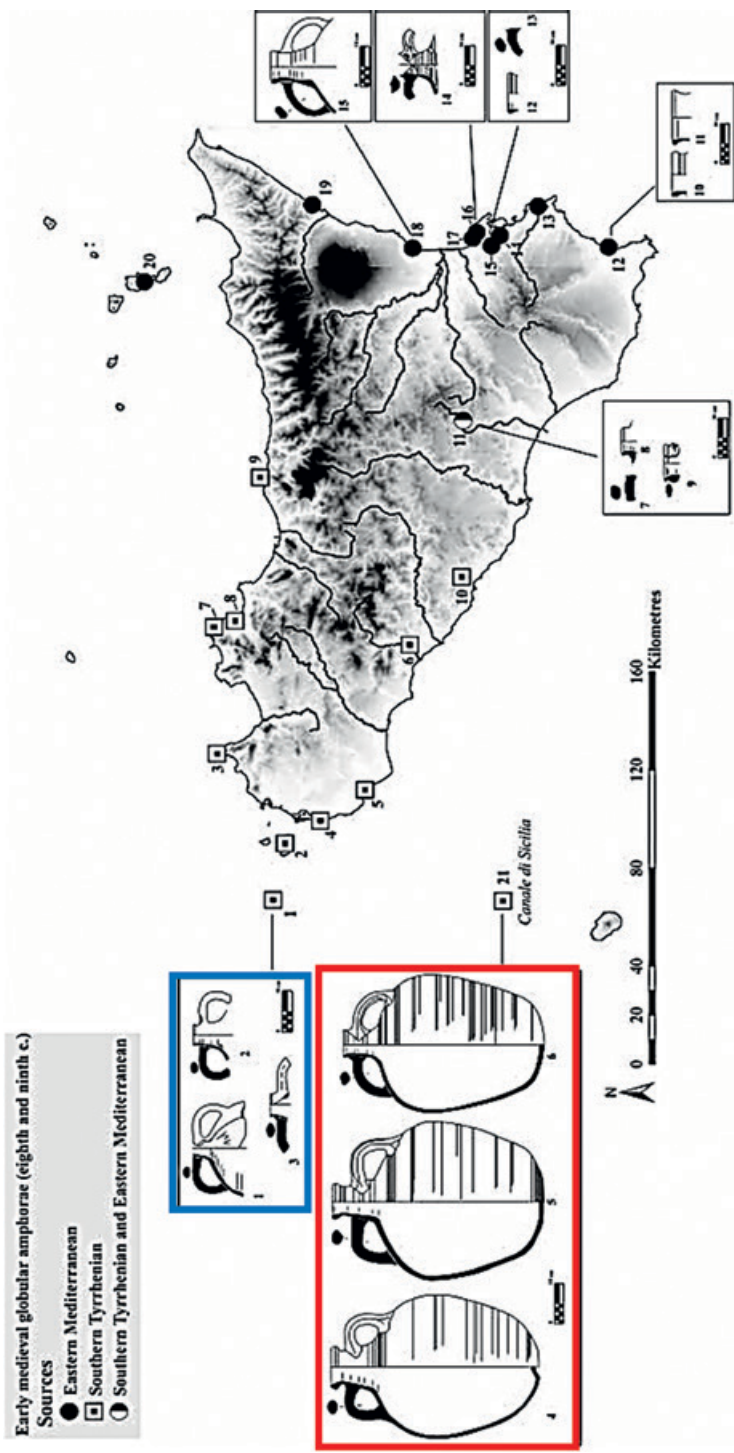


Figure 17.1 Map of Sicily (after Vaccaro, 'Sicily in the Eighth and Ninth Centuries AD', fig. 11).

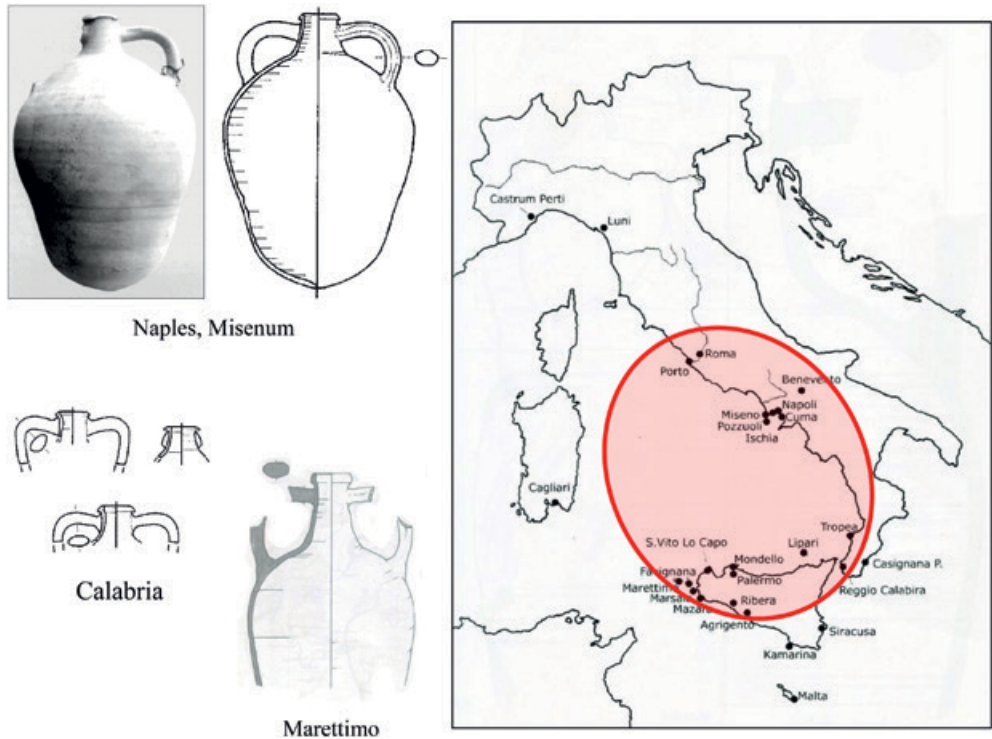


Figure 17.2 Map of Italy with Tyrrhenian amphorae (map after Ardizzone, 'Nuove ipotesi', fig. 8; images after Ardizzone, 'Nuove ipotesi', fig. 9; De Rossi, 'Indicatori archeologici', 541–50).

island of Canale di Sicilia (shown in Figure 17.1 at the bottom-left, marked in red) are not.<sup>18</sup>

In fact, these last containers were not Tyrrhenian at all but rather imports of Byzantine-style amphorae produced at workshops in Umayyad Egypt or Tunisia. These containers are known as 'Late Roman amphorae 2/13' (often shortened to LRA 2/13) when originating from workshops in Cyprus and the Aegean, or (in the case of their Egyptian imitations) as 'Egloff 167' amphorae.<sup>19</sup> These last ones were produced in Umayyad Egypt during the late seventh and eighth centuries, probably at monastic communities in the western Nile Delta, because these vessels have the typical brown Nile fabric

*l'Islam*, eds. Anneliese Nef and Vivien Prigent (Paris: De Boccard, 2010), fig. 9; Fabiola Ardizzone, *Anfore in Sicilia (VII–XII sec. d. C.)* (Terra di Vento: Torri del Vento, 2012), fig. 7, no. 57.

<sup>18</sup> See also Ardizzone, 'Nuove ipotesi'.

<sup>19</sup> Paul Reynolds, 'From Vandal Africa to Arab Ifriqiya: Tracing Ceramic and Economic Trends through the Fifth to the Eleventh Centuries', in *North Africa under Byzantium and Early Islam*, eds. Susan T. Stevens and Jonathan P. Conant (Washington, D.C.: Dumbarton Oaks Research Library and Collection, 2016), fig. 8.7d.

from Kūm Abū Billū (Terenuthis). To date, examples of these Egyptian ‘Egloff 167’ amphorae have been found at Kellia, St Macarios Monastery, Old Baramus, Marea, Bawit, Naqlūn, the Tantura A shipwreck at Dor, as well as in Umayyad deposits at Fuṣṭāṭ and Beirut.<sup>20</sup>

We should keep in mind that the island of Pantelleria (near to where these amphorae were found) had already been captured by Umayyad forces around 700, so we may expect to start to notice a North African exchange system in south-western Sicily by then. Indeed, there was a battle not far off Mazara del Vallo in 827. Small islands (such as Pantelleria or Canale di Sicilia) often functioned as gateways to and from the mainland, as well as connective hubs at the crossroads of different regional economies, as is shown by the material evidence which will be discussed next.

Furthermore, in my opinion, it is possible to go one step further than Vaccaro’s model. Rather than seeing two exchange systems operating within the Byzantine commercial sphere, the material evidence allows a reconstruction of multiple regional boundaries reflecting trade networks with both empires that follow the Muslim conquest of the island in subsequent centuries.

## The Material Culture of the Islamic Conquest

Based on the amphorae finds, it is possible to provide a schematic representation of the various phases of the Islamic conquest of Sicily. In fact, it seems that the material culture followed the waves of Muslim expansion and reflected the Muslim–Byzantine border (shown on the maps in Figures 17.3–17.6 with a red line).<sup>21</sup>

In the eighth and early ninth centuries, at the beginning of the Islamic conquest of the island, the production and circulation of amphorae coincided with the reorganisation of the exchange networks in the Mediterranean. As we have seen, north-western Sicily imported amphorae from

<sup>20</sup> E.g. Roland-Pierre Gayraud and Jean-Christophe Trégliā, ‘Amphores, céramiques culinaires et céramiques communes omeyyades d’un niveau d’incendie à Fustat-Istabl ‘Antar (Le Caire, Égypte)’, *LRCW 4: Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean. Archaeology and Archaeometry*, eds. Natalia Poulou-Papadimitriou, Eleni Nodarou and Vassilis Kilikoglou (Oxford: Archaeopress, 2014), fig. 3.1; Paul Reynolds, ‘Amphorae in Beirut from the Umayyads to the Crusaders: A Guide to Trends in Local and Imported Products’, *Archeologia Medievale* 45 (2018), fig. 4, no 5, fig. 5d–e, fig. 7 (right) and fig. 8a (this example seems even to have been found in an early Abbasid context) and fig. 9a.

<sup>21</sup> See also Lucia Arcifa, ‘Contentitori da trasporto nella Sicilia bizantina (VIII–X secolo): Produzioni e circolazione’, *Archeologia Medievale* 45 (2018): 123–48.



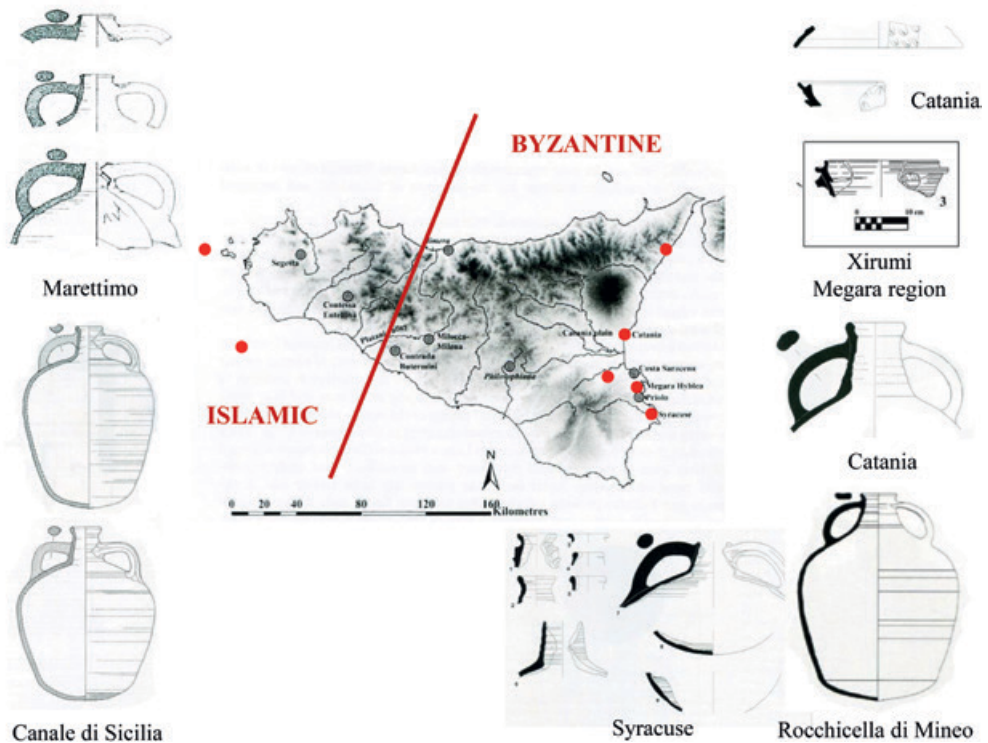


Figure 17.3 Map of Sicily, eighth-early ninth century (map after Vaccaro, 'Sicily in the Eighth and Ninth Centuries AD', fig. 3; images after Ardizzone, 'Nuove ipotesi', fig. 7; Arcifa, 'Nuove ipotesi', fig. 10C-E; Cacciaguerra, 'Città mercati', fig. 5).

production sites along the Tyrrhenian coast (Fig. 17.3, top-left amphorae: Marettimo), but the south-western coast also received Byzantine-style imitations from Umayyad Egypt or North Africa (Fig. 17.3, bottom-left amphorae: Canale di Sicilia).<sup>22</sup> Most Byzantine sites in eastern Sicily, however, show in eighth-century contexts a significant presence of lead-glazed chafing dishes and LRA 2/13 amphorae from different workshops in the Aegean and the eastern Mediterranean (Fig. 17.3, right: Catania; Xirumi, Megara region; Syracuse; Rocchicella di Mineo).<sup>23</sup> Syracuse, in particular,

<sup>22</sup> Ardizzone, 'Nuove ipotesi', fig. 7; Ardizzone, *Anfore in Sicilia*, fig. 5 (Marettimo) and figs. 8–10 (Canale di Sicilia).

<sup>23</sup> Lucia Arcifa, 'Nuove ipotesi a partire dalla rilettura dei dati archeologici: La Sicilia orientale', in *La Sicile de Byzance à l'Islam*, eds. Anneliese Nef and Vivien Prigent (Paris: De Boccard, 2010), fig. 10c-e (from Catania); Arcifa, 'Contenitori da trasporto'; Giuseppe Cacciaguerra, 'Città mercati in transizione nel Mediterraneo altomedievale: Contenitori da trasporto, merci e scambias a Siracusa tra l'età bizantina e islamica', *Archeologia Medievale* 45 (2018): 149–73; Rosalba Amato, Concetta Ciurcina and Angela Maria Manenti, 'I dati di età bizantina ed altomedievale

was still a fundamental crossroad for the eastern Mediterranean/Aegean wine trade, the import of garum (fermented fish sauce) from Spain or North Africa, and the export of wheat to, for instance, Constantinople.<sup>24</sup>

In the next phase of the Islamic conquest of the island, when western and central Sicily became more politically and economically connected to North Africa during the Aghlabid period, amphorae still continued to be imported from Byzantium to eastern Sicily while a new local production of amphorae developed in western Sicily as well. Actually, Byzantine sites on the eastern part of the island continued to show a strong connection with areas of Byzantine culture in the ninth century (Fig. 17.4, right: Taormina; Syracuse). These included not only imports of lead-glazed vessels (such as chafing dishes) and of amphorae from the Byzantine territories (e.g. from the Aegean and western Turkey)<sup>25</sup> but also the manufacture of new local and regional amphorae inspired by Byzantine shapes.<sup>26</sup>

Indeed, petrographic descriptions of the Byzantine finds showed not only imported globular amphorae, with six micaceous fabrics (from the Aegean and Turkey) dated to the second half of the ninth century, but also local/regional products with five fabrics (including lava basalt inclusions) dated to the first half of the ninth century (Fig. 17.4, bottom-right).<sup>27</sup> These last ones were, for instance, made at Rocchicella di Mineo, south-west of Catania, which is

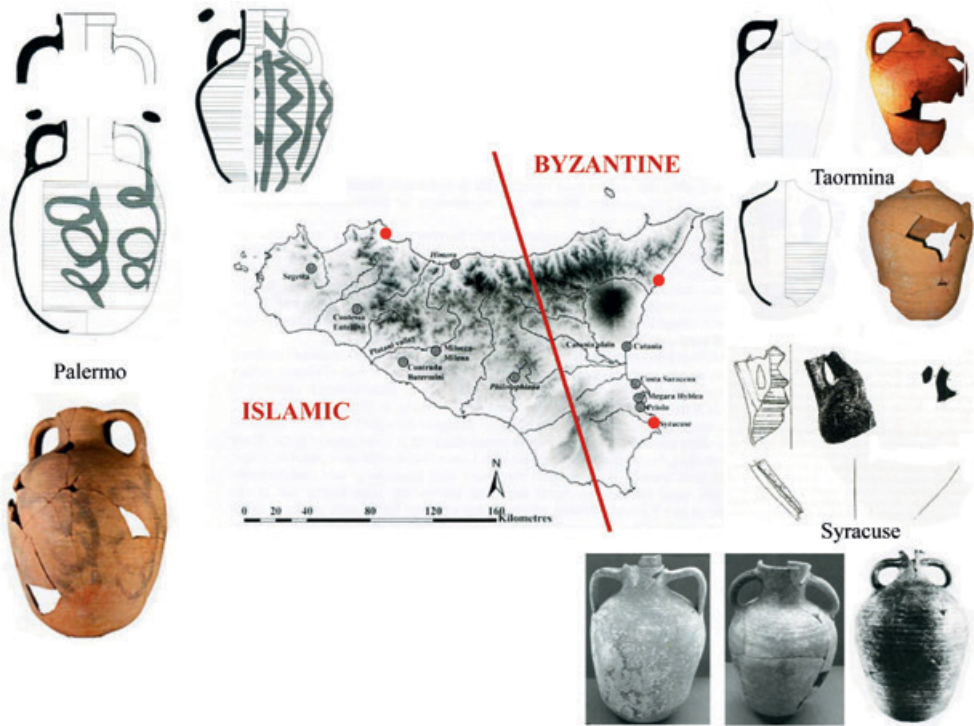
da recherche di archeologia urbana in Ortigia (Siracusa)', in *From Polis to Madina. La trasformazione delle città siciliane tra Tardoantico e Alto Medioevo*, eds. Lucia Arcifa and Mariarita Sgarlata (Bari: Edipuglia, 2020), 92–93, figs. 9–11; for Byzantine glazed chafing dishes, cf. Joanita Vroom, *Byzantine to Modern Pottery in the Aegean. An Introduction and Field Guide*. Second and Revised Edition (Turnhout: Brepols Publishers, 2014), 72–73; and for their use, Joanita Vroom, 'Dishing up History: Early Medieval Ceramic Finds from the Triconch Palace in Butrint', *Mélanges de l'École française de Rome – Moyen Âge* 120 (2008): 293–97.

<sup>24</sup> Cacciaguerra, 'Città mercati'.

<sup>25</sup> Arcifa, 'Contenitori da trasporto'; Cacciaguerra, 'Città mercati', figs. 2 and 13, nos. 1 and 4; Giuseppe Cacciaguerra, 'Cultura materiale e commerci in Sicilia fra Bizantini e Arabi (VIII–meta X secolo): Nuovi dati sulle ceramiche fini e le anfore dai contesti altomedievali di Siracusa', in VII Congresso nazionale di archeologia medievale, Vol. 2 eds. Paul Arthur and Marco LeoImperiale (Florence: All'Insegna del Giglio, 2015), fig. 3, nos. 6–8; Viva Sacco, 'Produzione e circolazione delle anfore palermitane tra la fine del IX e il XII secolo', *Archeologia Medievale* 45(2018), figs. 4–5.

<sup>26</sup> Arcifa, 'Contenitori da trasporto', 123–48; Cacciaguerra, 'Città mercati', fig. 13; Sacco, 'Produzione e circolazione'.

<sup>27</sup> Lucia Arcifa and Laura Maniscalco (eds.), *Dopo l'Antico. Ricerche di archeologia medievale* (Palermo: Regione Siciliana, Assessorato regionale dei beni culturali, Dipartimento regionale dei beni culturali, 2016); Roberta Longo, 'Le produzioni ceramiche di Rocchicella in età bizantina', in *Dopo l'Antico. Ricerche di archeologia medievale*, eds. Lucia Arcifa and Laura Maniscalco; Lucia Arcifa, 'Rocchicella di Mineo: Il sito tra età proto bizantina e età tematica', in *Dopo l'Antico. Ricerche di archeologia medievale*, eds. Lucia Arcifa and Laura Maniscalco (Palermo: Regione Siciliana, Assessorato regionale dei beni culturali, Dipartimento regionale dei beni culturali, 2016), 29–66, plates VI–XI; Arcifa, 'Contenitori da trasporto', figs. 5–6.



**Figure 17.4** Map of Sicily, ninth century (map after Vaccaro, 'Sicily in the Eighth and Ninth Centuries AD', fig. 3; images after Arcifa, 'Contenitori da trasporto', fig. 7; Cacciaguerra, 'Città mercati', figs. 2 and 13, nos. 1 and 4; Cacciaguerra, 'Cultura materiale e commerce', fig. 3, nos. 6–8; Sacco, 'Produzione e circolazione', figs. 4–5).

situated on a spur of basalt in the valley of the Margi river. Recently, pit kilns for pottery production were recovered at this place.<sup>28</sup> Fragments of these local/regional amphorae from eastern Sicily (fabric 3),<sup>29</sup> with their characteristic central deeply grooved handles, have so far been found in eastern Sicily (e.g. at Syracuse, Morgantina, Centuripe), in Calabria, Apulia (Otranto), northern Italy (Torcello) and Albania (Butrint),<sup>30</sup> as well as in an early medieval stratigraphic sequence at the town of Mdina on the island of Malta.<sup>31</sup>

<sup>28</sup> Arcifa, 'Rocchicella', figs. 8–9.

<sup>29</sup> Arcifa, 'Nuove ipotesi', fig. 12; Arcifa, 'Contenitori da trasporto', fig. 6, nos. 5–7 (first half of the ninth century).

<sup>30</sup> Lucia Arcifa, 'Nuovi dati riguardanti la ceramica di età islamica nella Sicilia orientale', *Mélanges de l'École française de Rome – Moyen Âge* 116 (2004), fig. 2 and table IIa; Cacciaguerra, 'Città mercati', 168–69 and fig. 20; for an example from Butrint (Joanita Vroom, personal observation).

<sup>31</sup> Brunella Bruno and Nathaniel Cutajar, 'Malta between the Ninth and Tenth Century – Two Early Medieval Contexts', *Archeologia Medievale* 45 (2018), fig. 2, which was found together with chafing dishes and Glazed White Ware II from Constantinople (figs. 3–4 and tav. 3); for Glazed White Ware II, cf. Vroom, *Byzantine to Modern Pottery*, 74–77.

At Taormina, re-occupied layers at a Hellenistic-Roman *domus* (Villa San Pancrazio) similarly generated both imported smaller-sized amphorae from the eastern Aegean (e.g. from Lipsi, Samos, Kos or the western coast of Turkey) and local products with lava basalt fabrics (from workshops in the Mount Etna region), which can be dated to the second half of the ninth century.<sup>32</sup> Furthermore, various excavations in the ancient city of Syracuse yielded small-sized local/regional products of the same period (maybe from Rocchicella di Mineo) as well as imported Byzantine amphorae from the eastern Aegean or perhaps from Otranto in Apulia.<sup>33</sup>

Conversely, in western Sicily, a new production of amphorae with painted decoration styles started to develop in ninth-century Palermo (Fig. 17.4, left: Palermo). This local production of painted amphorae first seems to have been fairly standardised but later products became more diverse over time: we may notice vessels with a cylindrical neck and with a band rim or triangular rim (Fig. 17.4, top-left).<sup>34</sup> The amphorae were either painted with vertical straight and wavy lines or with continuous loops (in Italian known as *a cappi*; see Fig. 17.4, left).<sup>35</sup> These containers (measuring ca. 15.0 litres) were in shape and in decoration style related to local/regional painted Byzantine-style amphora produced in southern Italy (Calabria, Apulia), although it has been suggested that their motifs were perhaps inspired by painted Byzantine and early Islamic amphorae from the Near East (Pella, Jordan).<sup>36</sup> They started to circulate in Sicily during the first half of the ninth century, but there is no evidence yet that these containers circulated much outside of Sicily.

<sup>32</sup> Arcifa, 'Contentitori da trasporto', fig. 7, nos. 1–2 (imported amphorae) and nos. 3–4 (local/regional products).

<sup>33</sup> Cacciaguerra, 'Città mercati', fig. 2, no. 6 and figs. 13 and 17; for similar-looking finds in the Adriatic and Mediterranean, see Joanita Vroom, 'The Byzantine Web: Pottery and Connectivity between the Southern Adriatic and the Eastern Mediterranean', in *Adriatico altomedievale (VI–XI secolo): Scambi, porti, produzioni* (Studi e Ricerche 4), eds. Sauro Gelichi and Claudio Negrelli (Venice: Edizioni Ca' Foscari, 2017), 292–96, figs. 4–7; Joanita Vroom, 'From One Coast to Another: Early Medieval Ceramics in the Southern Adriatic Region', in *From One Sea to Another. Trading Places in the European and Mediterranean Early Middle Ages, Proceedings of the International Conference Comacchio, 27th–29th March 2009*, eds. Sauro Gelichi and Richard Hodges (Turnhout: Brepols Publishers, 2012), fig. 17.

<sup>34</sup> Sacco, 'Produzione e circolazione', figs. 4–5 (her 'gruppo g6'); see also Ardizzone, Pezzini and Sacco, 'Aghlabid Palermo', fig. 18.3, nos. 1–2.

<sup>35</sup> Arcifa, 'Nuove ipotesi', fig. 17 with examples from Taormina, Monte Casesia and Enna; Arcifa, 'Contentitori da trasporto', fig. 9 with examples from Enna, Taormina, Bronte and Palermo (ninth–early tenth century); Ardizzone, Pezzini and Sacco, 'Aghlabid Palermo', fig. 18.3, no. 4; Sacco, 'Produzione e circolazione', figs. 4–5 (her 'tipo 10.1' and 'tipo 6.2a').

<sup>36</sup> See e.g. Arcifa, 'Contentitori da trasporto', figs. 10–11; Lucia Arcifa and Alessandra Bagnera, 'Palermo in the Ninth and Early Tenth Century: Ceramics as Archaeological Markers of Cultural Dynamics', in *The Aghlabids and Their Neighbours*, eds. Claire D. Anderson, Corisande Fenwick and Mariam Rosser-Owen (Leiden: Brill, 2018), 388–92 and fig. 19.4.

The production of these new kinds of amphorae started around 831, when Palermo surrendered to the commander-in-chief of the Aghlabid forces after a year-long siege. It eventually became the seat of power in Muslim Sicily around the mid ninth century. Palermo was primarily chosen as the new capital for military reasons based on its excellent geographical situation: it was not only located in a relatively safe part of Sicily and easily accessible from Islamic North Africa but was also equipped with a significant port and impressive fortifications around the old city centre (that eventually became known as 'Madīnat Balarm').<sup>37</sup> Most examples of the newly developed local ceramic production series came from excavations in the outskirts of the city, next to the harbour inlet, for example, at Gancia (the Church of Santa Maria degli Angeli) and at Castello San Pietro; both areas with late ninth- to early tenth-century phases, among which are the presence of ninth-century Islamic tombs in cemeteries.<sup>38</sup>

Unlike the previous two phases described, a significant change is observed starting from the late ninth century and in particular from the second quarter of the tenth century. This happened with the foundation of the Fatimid (palatine) city and its dynasty's consolidation of power at Palermo and in western Sicily. Urban growth stimulated a major increase in pottery production, as testified by the large variety in the repertoire of painted amphora types with domed bases (see Fig. 17.5, left: Palermo). It signalled the take-off of new Islamic local and regional amphorae, which ranged in volume capacity between 2.5 and 18.0 litres. They have been recovered in various shipwrecks as well as Palermo and its surroundings, where most of these ceramic containers must have been produced. In fact, wasters of these new Sicilian amphora types were found in Norman buildings at Palermo (e.g. the Zisa Palace, and the Church of S. Maria dell'Ammiraglio or La Martorana), where they were re-used as construction material to lighten the vaults of these structures.<sup>39</sup>

In the late ninth to early tenth century, a few amphorae were still imported to Palermo, but the excavated pottery assemblages seem to be uneven with a mix coming from the Byzantine territories in southern Italy

<sup>37</sup> Ardizzone *et al.*, 'Aghlabid Palermo', 363.

<sup>38</sup> Ardizzone *et al.*, 'Aghlabid Palermo', 366 and map 18.1; Arcifa and Bagnera, 'Palermo', 383 and map 19.1.

<sup>39</sup> Franco D'Angelo, 'Ceramica d'uso domestico della Sicilia medievale proveniente dalla Zisa (Palermo XII secolo)', in *Atti IX convegno della ceramica, Albisola 28–31 maggio 1976* (Albisola: Centro Ligure per la storia della ceramica, 1976), 58–61; Fabiola Ardizzone, 'Le anfore recuperate sopra le volte del palazzo della Zisa e la produzione di ceramica comune a Palermo tra la fine dell'XI ed il XII secolo', *Mélanges de l'École française de Rome. Moyen-Âge* 111 (1999), 7–12, figs. 3–5.

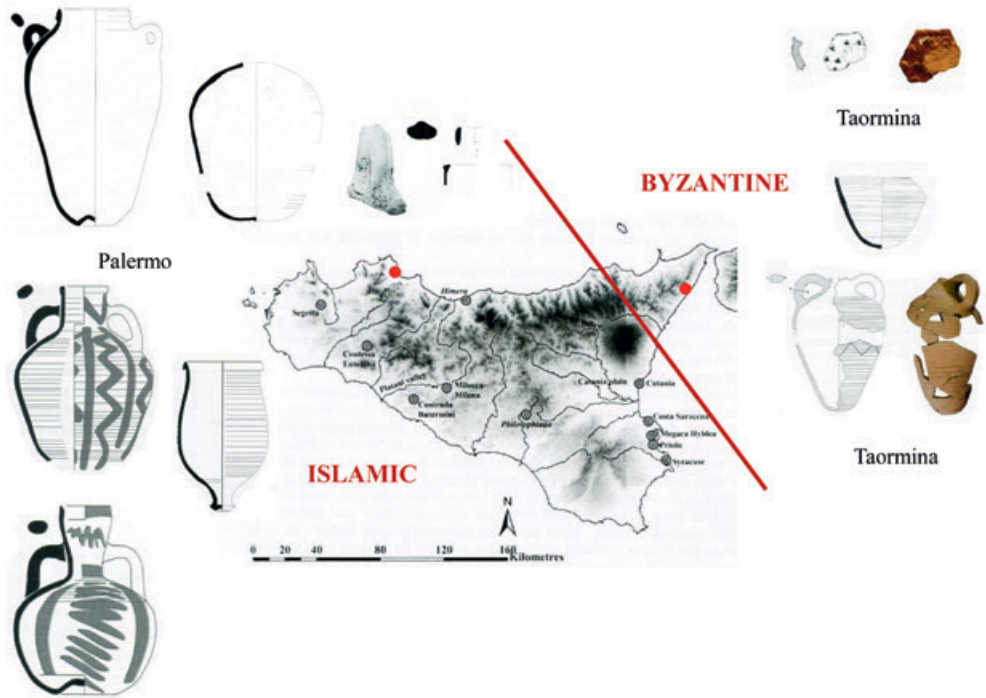


Figure 17.5 Map of Sicily, late ninth–early/mid tenth century (map after Vaccaro, ‘Sicily in the Eighth and Ninth Centuries AD’, fig. 3; images after Arcifa, ‘Contenitori da trasporto’, fig. 8; Sacco, ‘Produzione e circolazione’, figs. 4–5).

(among which sherds of ‘globular amphorae’ and of the so-called ‘Otranto amphora 1’ from Apulia)<sup>40</sup> and examples coming from Muslim Sicily and North Africa (Ifriqiya).<sup>41</sup> The city continued to develop its own amphora production with many different shapes and specific Islamic decoration styles painted in red or brown (see Fig. 17.7, top-left).<sup>42</sup> Furthermore, certain pottery shapes started to be produced that were unattested in Sicily prior to the Islamic conquest. These include *noria* pots for a traditional water-lifting wheel, showing the introduction of new practices in water management on the island.<sup>43</sup> Similar archaeological contexts also yielded

<sup>40</sup> Sacco, ‘Produzione e circolazione’, fig. 7, nos. 1–2; see for a short description of this ‘Otranto amphora 1’ type, Vroom, *Byzantine to Modern Pottery*, 102–103.

<sup>41</sup> Sacco, ‘Produzione e circolazione’, fig. 7, no. 4 and fig. 8.

<sup>42</sup> Sacco, ‘Produzione e circolazione’, figs. 2, 4–5.

<sup>43</sup> The word ‘*noria*’ comes from the Arabic term, *nā‘ūra*, an onomatopoeic word which evokes the creaking of the water wheel. See for the archaeological evidence on Sicily, Lucia Arcifa and Elisabeth Lesnes, ‘Primi dati sulle produzioni ceramiche Palermitane dal X al XV secolo’, in *La céramique médiévale en Méditerranée. Actes du VIe congrès de l’AIECM2, Aix-en-Provence*,

moulds and containers (molasses pots) for the production of sugar cane at Palermo after the Islamic conquest.<sup>44</sup>

Taormina, by contrast, as one of the last Byzantine strongholds on the eastern part of the island, remained within the Byzantine sphere of economic influence (Fig. 17.5, right: Taormina). In this period, the city still received imports of glazed chafing dishes and amphorae from the Byzantine territories (among them, the 'Otranto 1 amphora' from workshops in Apulia).<sup>45</sup> Taormina was located opposite the 'toe' of the Italian Peninsula and only separated from Calabria by the narrow Strait of Messina. Hence, it makes sense that the city still received imports from the Byzantine territories in southern Italy in the late ninth to early tenth century.

Finally, in the second half of the tenth to early eleventh century, in the last phase of the conquest when the whole island was taken over by the Muslim armies, a new ceramic repertoire was acquired from Palermo to Syracuse, finds of which can be supplemented with those from contemporary shipwrecks off the Sicilian coast (Fig. 17.6).<sup>46</sup> Among these were various amphora types with painted decoration-styles in standardized shapes.<sup>47</sup> Up to that point, these painted vessels were mostly found in western Sicily, on the western (Tyrrhenian) coast of Italy, Sardinia, southern France and North Africa.

13–18 novembre 1995, ed. Gabrielle Démians d'Archimbaud (Aix-en-Provence: Narrations Éditions, 1997), 411, fig. 3.5; Arcifa, 'Nuove ipotesi', fig. 16a (from Castello San Pietro at Palermo); see also: Amedeo Tullio, 'Strumenti per la lavorazione dello zucchero a Mareddolce (Palermo)', in *Archeologia e territorio*. (Palermo: G.B. Palumbo Editore, 1997), fig. 4, nos. 9–10; Franco D'Angelo, 'La ceramica islamica in Sicilia', *Mélanges de l'École française de Rome – Moyen Âge* 116 (2004): fig. 1.1; Alessandra Molinari, "'Islamisation" and the Rural World: Sicily and al-Andalus. What Kind of Archaeology?' in *New Directions in Early Medieval European Archaeology: Spain and Italy Compared. Essays for Riccardo Francovich*, eds. Sauro Gelichi and Richard Hodges (Turnhout: Brepols Publishers, 2015), fig.12, nos. 3–4 (from the complex of Mareddolce or Favara at Palermo); Adriana De Miranda, 'Alcune considerazioni sulle norie nella tradizione siciliana', *Sicilia Archeologica* 103 (2005): 137–44.

<sup>44</sup> Tullio, 'Strumenti', fig. 4, nos. 2 and 6; D'Angelo, 'La ceramica islamica', fig. 1.2A–B; Molinari, 'Islamisation', fig. 12, nos. 3–4 (from the complex of Mareddolce or Favara at Palermo).

<sup>45</sup> Arcifa, 'Nuovi dati', fig. 3 and tables III–IV; Arcifa, 'Nuove ipotesi', figs.7–8; Arcifa, 'Contenitori da trasporto', fig. 8, nos. 1–2 (imported bronze jug and glazed chafing dish from the eastern Mediterranean), nos. 3–4 (imported Otranto amphora 1 from southern Italy) and nos. 5–6 (local/regional painted amphorae); cf. for similar finds of the bronze jug, Joanita Vroom, 'Tea and Ceramics: New Perspectives on Byzantine Pottery from Limyra', in *40 Jahre Grabung Limyra. Akten des Symposions, Wien, 3–5 Dezember 2009*, ed. Martin Seyer (Vienna: Österreichisches Archäologisches Institut, 2012), 346–48 and fig. 9 (from Ephesus in western Turkey).

<sup>46</sup> Cacciaguerra, 'Città mercati', fig. 2 no. 7 (from Villa Maria, Syracuse) and fig. 12 (Piazza Minerva, Syracuse).

<sup>47</sup> Sacco, 'Produzione e circolazione', figs. 4–5.

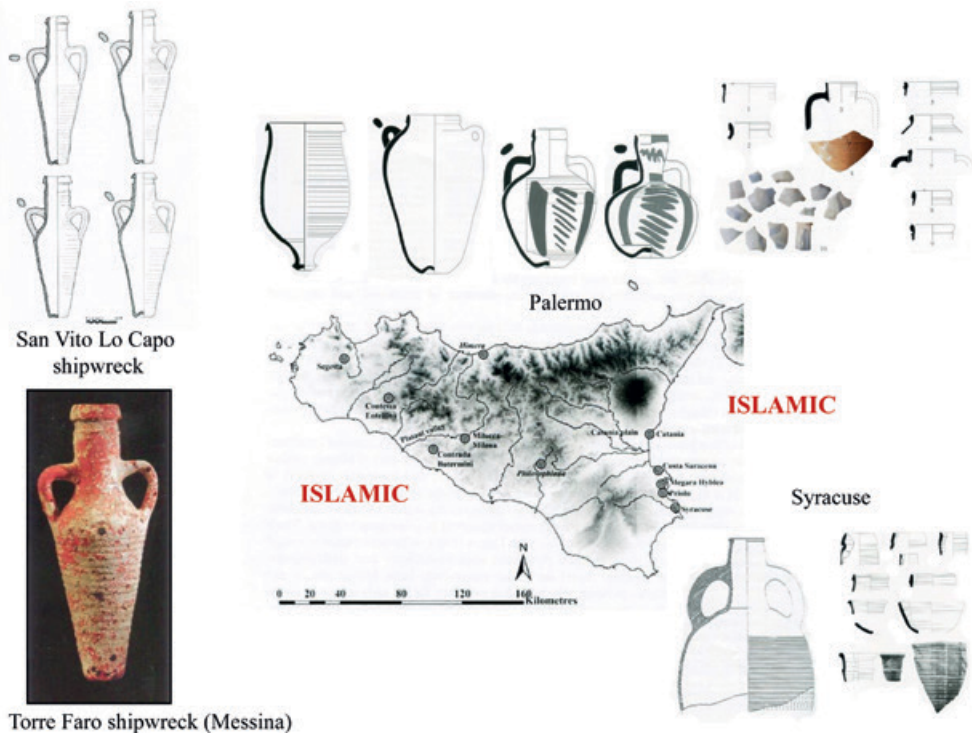


Figure 17.6 Map of Sicily, second half of tenth-early eleventh century (map after Vaccaro, 'Sicily in the Eighth and Ninth Centuries AD', fig. 3; images after Cacciaguerra, 'Città mercati', fig. 2 no. 7 and fig. 12; Sacco, 'Produzione e circolazione', figs. 4–5).

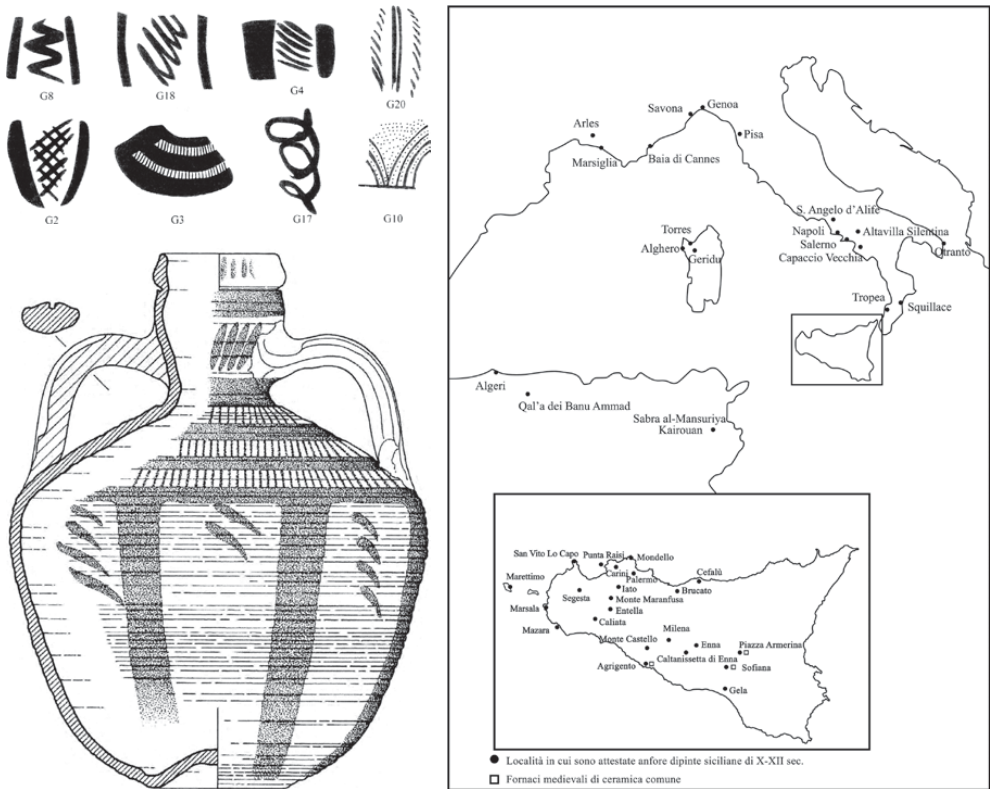
Figure 17.7 (top-left) shows the most common painted motifs on the Palermo amphorae. They functioned, perhaps like modern barcodes, as indicators of contents such as foodstuffs kept in the containers. On the bottom-left, one local amphora type from Palermo ("Type 6.1") with a painted decoration in vertical lines is depicted, which occurred in the tenth-eleventh centuries.<sup>48</sup> This last amphora type was not only recovered at various sites in western Sicily but also found in southern France (Beaulieu-sur-mer), northern Italy (Pisa), on the island of Pantelleria off the Sicilian coast and in southern Tunisia (Qaşr al-<sup>c</sup>Aliyya).<sup>49</sup> Its production started in the first half of the tenth century and reached its peak in the second half of that century.

New in the Sicilian repertoire were amphorae (Fig. 17.6, left; and Fig. 17.8) with a ribbed carrot-shaped body, a long narrow neck and a small

<sup>48</sup> Sacco, 'Produzione e circolazione', fig. 6a (her 'tipo 6.1').

<sup>49</sup> For an example from Pisa, see Antonino Meo, 'Anfore, uomini e reti di scambio sul "mare Pisano" (VIII–XII secolo)', *Archeologia Medievale* 45 (2018): 226, fig. 6, no. 2.





**Figure 17.7** Distribution map of painted amphorae from Palermo (map after Ardizzone, *Anfore in Sicilia*, fig. 48; images after Ardizzone, *Anfore in Sicilia*, fig. 37; Sacco, 'Produzione e circolazione', fig. 2). Credit: Map redrawn by Sofia Kane.

domed base, which became known under various names among which are 'Faccenna A', 'Ardizzone E.1/2', 'Siculo-Maghrebine amphorae', 'Arabo-Norman amphorae' or more recently 'Type N' or 'Type 11.1' in the Palermo series.<sup>50</sup> These vessels had no painted decoration, and their volume capacity ranged between 2.5 and 5.0 litres. They started to be produced at Palermo (as is shown by wasters in the Zisa Palace) and its hinterland, at rural sites in western Sicily, in the late tenth and early eleventh century (Fig. 17.8).<sup>51</sup>

<sup>50</sup> E.g. Soundès Gragueb *et al.*, 'Jarres et amphores de Şabra al-Manşuriya (Kairouan, Tunisie)', in *La céramique maghrébine du haut Moyen Âge (VIIIe-Xe siècle). État des recherches, problèmes et perspectives*, eds. Patrice Cressier and Elizabeth Fentress (Rome: École française de Rome, 2011), 207–11.

<sup>51</sup> Hellen Patterson, 'Analisi mineralogiche sulle ceramiche medievali di alcuni siti della Sicilia occidentale', in *Attes du Vème colloque sur la céramique en Méditerranée occidentale, Rabat 11–17 novembre 1991* (Rabat: Institut National des Sciences de l'Archéologie et du Patrimoine, 1995), 219–20 (her 'gruppo 1').

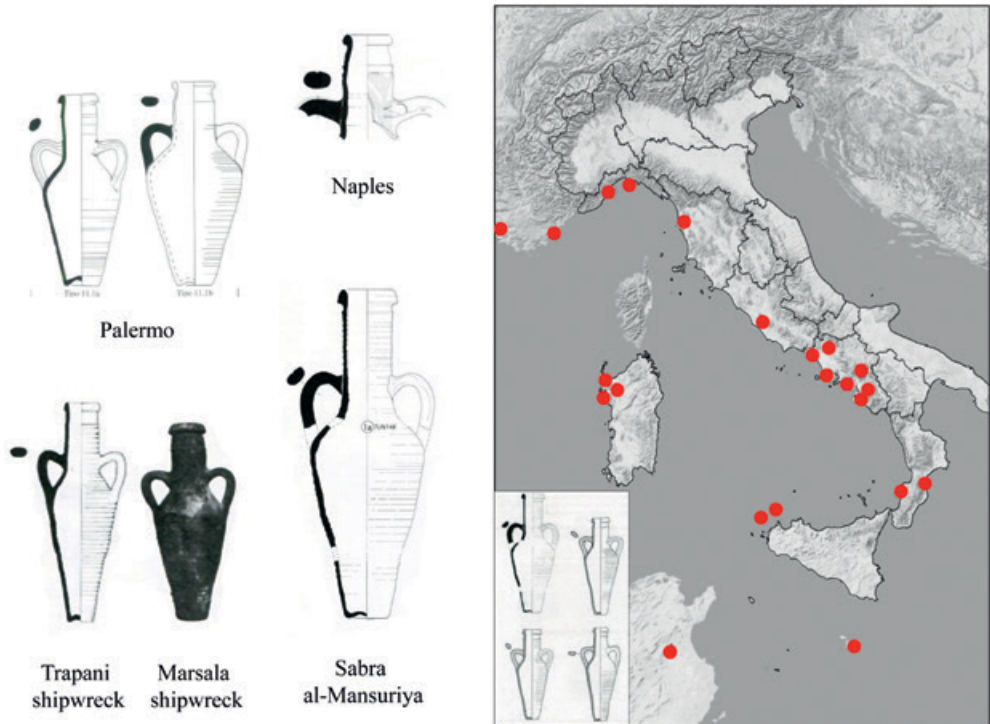


Figure 17.8 Distribution map of carrot-shaped amphorae (“Type N”, or “Type 11.1”) from Palermo (map after Molinari, ‘Paesaggi rurali’, fig. 8; images after Faccenna, *Il relitto*, 39, fig. 30; Ardizzone, *Anfore in Sicilia*, fig. 47; Gragueb *et al.*, ‘Jarres et amphores’, figs. 8–9).

The shipwrecks of San Vito Lo Capo (near Trapani), of Marsala, and of Torre Faro (near Messina) and finds along the Palermo coast at Mondello showed that these amphorae were transported by boat from Muslim Sicily to other regions in the Mediterranean.<sup>52</sup> Apart from shipwreck finds near the Sicilian coastline, it is clear that they mostly circulated along the Tyrrhenian coasts until at least the twelfth century.<sup>53</sup> These carrot-shaped containers

<sup>52</sup> E.g. Gianfranco Purpura, ‘Un relitto di età normanna a Marsala’, *Bolletino d’Arte, Suppl. Archeologia Subacquea* 2 (1985): fig. 9; Angela Maria Ferroni and Costantino Meucci, ‘I due relitti arabo-normanni in Marsala’, *Bollettino di Archeologia Subacquea* 2–3 (1995–96): figs. 29–30; Philippe Tisseyre, ‘De middeleeuwse scheepswrakken bij West-Sicilië’, in *Sicilië en de zee*, eds. Diederik Burgersdijk *et al.* (Zwolle/Amsterdam: WBooks and Allard Pierson Museum, 2015), 146 and 148.

<sup>53</sup> For their distribution, see Fabio Faccenna, *Il relitto di San Vito lo Capo* (Bari: Biblioteca archeologica, 2006), 41; Ardizzone, ‘Le anfore recuperate’, 18–19 and figs 1–2; Alessandra Molinari, ‘Paesaggi rurali e formazioni sociali nella Sicilia islamica, normanna e sveva (secoli X–XIII)’, *Archeologia Medievale* 37 (2010): fig. 8.

were recovered in the Bay of Cannes (e.g. Arles, Marseilles, shipwreck of Batéguier), Savona, Genoa, Pisa, Rome, Naples, Altavilla Silentina, Salerno, Capaccio, Tropea, Squillace and on the islands of Sardinia (Geridu, Sassari, shipwreck of Alghero) and Malta (Mdina).<sup>54</sup> Furthermore, they were common finds at Şabra al-Manşūriyya in Tunisia (founded in 947), to which they were undoubtedly transported from the nearby harbour of al-Mahdiyya, thus indicating major contacts between Tunisia and western Sicily at this period.<sup>55</sup> It is therefore worth finding out what these ceramic vessels from Palermo could have contained.

### The Cultivation and Distribution of Foodstuffs

South of the city of Palermo is a large fertile plain, known as Conca d'Oro ('Golden Shell'), with orchards of citrus trees, groves of olive trees and vineyards. An old photograph (dated to 1906) shows indeed labourers picking lemons in a grove on the Conca d'Oro.<sup>56</sup> The Abbasid geographer Yāqūt (d. 1229) described Sicily in his *Lexicon geographicum* as a fertile island with abundant water resources and all kinds of fruit (and even saffron). In addition, he noted that Mount Etna was above all covered with large trees (hazelnut, pine, cedar) and various types of fruit trees.<sup>57</sup> It has been assumed that citrus fruits, pistachio and sugar cane were brought to the island by the Muslims, together with improved irrigation systems (including the introduction of the water wheel and the *qanat* system; see Fig. 17.9 below).<sup>58</sup> That sugar cane (*Saccharum officinarum*) was grown around Islamic Palermo is suggested by the discovery of molasses pots and sugar moulds during restoration work at the complex of Maredolce (or Favara) in 1992–93 (Fig. 17.9).<sup>59</sup> These ceramic vessels, which were used during the processing of sugar cane, were found together with noria pots which were

<sup>54</sup> Brunella Bruno, *Roman and Byzantine Malta. Trade and Economy* (Malta: Midsea Books, 2009), fig. 47, nos. 1–3; Bruno and Cutajar, 'Malta', fig. 6 (from an eleventh-century deposit at the Mdina excavations).

<sup>55</sup> Gragueb *et al.*, 'Jarres et amphores', figs. 8–9, who also distinguished a variant with a different rim (known as 'Type Maccari-Poisson') within this group from Sabra al-Mansuriya.

<sup>56</sup> See Broadus R. Littlejohn, Jr. Collection, Special Collections, Wofford College.

<sup>57</sup> See Lemma Şiqiliyya in Yāqūt, *Muʿjam al-buldān*, ed. Muḥammad ʿAbd al-Raḥmān al-Marʿashli (Beirut: Dār Iḥyāʾ al-Turāth al-ʿArabī 2008), 5/6:196–99. I would like to thank Georg Leube for sending me a German translation of this text.

<sup>58</sup> Andrew Watson, *Agricultural Innovation in the Early Islamic World: The Diffusion of Crops and Farming Techniques, 700–1100* (Cambridge: Cambridge University Press, 1983), 28–29 and 42–50.

<sup>59</sup> Tullio, 'Strumenti', fig. 4, nos. 2, 6 and fig. 5.

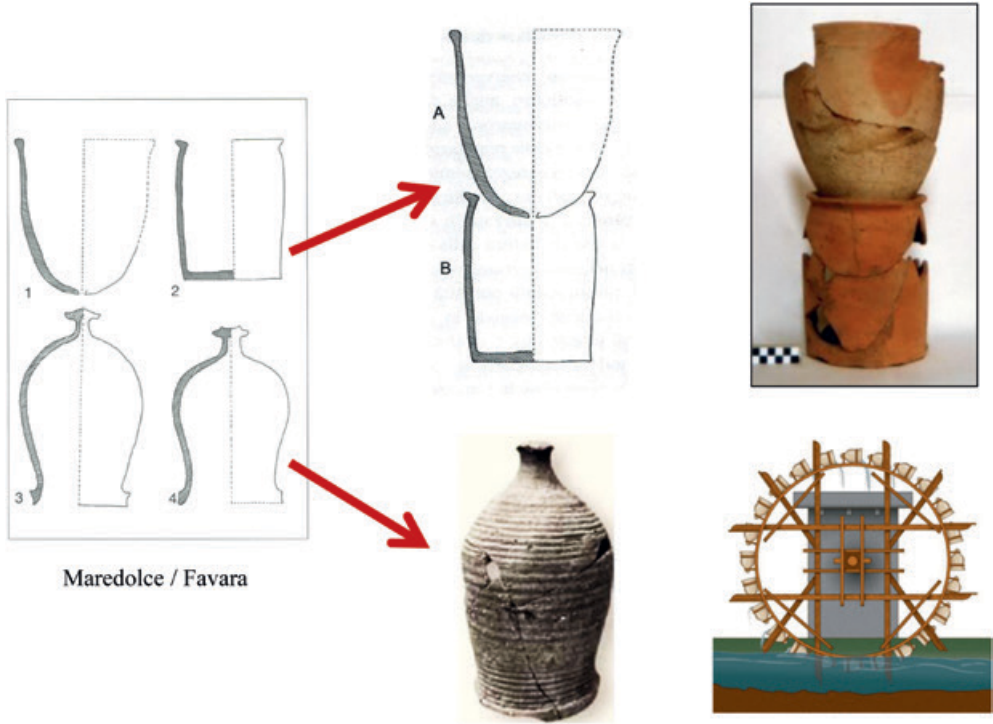


Figure 17.9 Drawings of sugar pots and moulds (above) and of noria pots for a water wheel (below) from the complex of Maredolce/Favara at Palermo (after Tullio, 'Strumenti', fig. 4, nos. 2, 6, 9–10 and figs. 5 and 9).

tied to the outside of an open-framed water-raising device or wheel to improve the irrigation of sugar cane plantations (Fig. 17.9 below).<sup>60</sup>

Recent archaeobotanical research has been carried out on plant macro-remains collected from excavated silos (dated to between the tenth and thirteenth centuries) at Mazara del Vallo, an important port on the southern shore of Muslim Sicily. Apart from wheat (*Triticum aestivum/durum*), that was omnipresent in these silos, the assemblages from eleventh- to twelfth-century Islamic-Norman contexts included citrus (*Citrus* sp.), grape (*Vitis vinifera*), pomegranate (*Punica granatum*), fig (*Ficus carica*), peach (*Prunus persica*), pear (*Pyrus* sp.), sorbo (*Sorbus* sp.) and hazelnut

<sup>60</sup> Tullio, 'Strumenti', fig. 4, nos. 9–10 and fig. 9. For finds of noria pots at Agrigento, see also Fabiola Ardizzone, 'Trasformazione dello spazio pubblico ad Agrigento: La Valle dei Templi tra tardoantico e altomedioevo', in *From Polis to Madina. La trasformazione delle città siciliane tra Tardoantico e Alto Medioevo*, eds. Lucia Arcifa and Mariarita Sgarlata (Bari: Edipuglia, 2020), 266, table VI,2.

(*Corylus avellane*), as well as aubergine (*Solanum melongena*), cucurbitaceae (*Citrillus* sp., *Cucumis* sp.), linen fibres (*Linum usitatissimum*) and cotton seeds (*Gossypium arboretum/herbaceum*).<sup>61</sup> In addition, later thirteenth-century contexts yielded mostly olive (*Olea europaea*), grape (*Vitis vinifera*), fig (*Ficus carica*), spinach (*Spinacia oleracea*) and water melon (*Citillus lanatus*).<sup>62</sup> These finds showed the first occurrence of some vegetables (such as aubergine) and the oldest archaeobotanical evidence of other plants (such as spinach) in the western Mediterranean in general and on Sicily in particular. Remarkable also is the presence of various fruit types (among citrus) in these silos.

Written documents such as those found in the Cairo Geniza<sup>63</sup> give us further information on how such foodstuffs were purchased, sold and transported between Muslim Sicily and North Africa (Ifriqiya).<sup>64</sup> Some of these documents provide us with interesting information. An eleventh-century court decision at Fustāt refers to a shipment of sixty jars of oil purchased by Sicilian merchants in Qayrawān (Tunisia). A contemporary letter from Alexandria (dated to 1056) mentions the shipment of a hundred containers of oil, which were loaded together with textiles onto a ship in the coastal city of al-Mahdiyya (Tunisia). While on its way to southern Sicily, the ship was attacked by enemy forces and its cargo of textiles stolen, but the merchants were able to retain the oil. In fact, the oil jars arrived safely at Mazara del Vallo, from where they were loaded onto two different ships for transport to Egypt.<sup>65</sup> These texts show that oil from Tunisia was distributed in jars (also known as *zir*, *jarra* or *qulla*) through cabotage trade to Sicily and afterwards to Egypt,<sup>66</sup> where the oil was undoubtedly used for food consumption, lamps and the manufacture of cosmetics and soap. Apparently,

<sup>61</sup> Milena Primavera, 'Introduzione di nuove piante e innovazioni agronomiche nella Sicilia medievale: il contributo dell'archeobotanica alla rivoluzione agricola araba di Andrew Watson', *Archeologia Medievale* 45 (2018), 442, pl. I, nos. 1–4, pl. II, no. 7.

<sup>62</sup> Primavera, 'Introduzione', 443, pl. II, nos. 5–6.

<sup>63</sup> A collection of around 400,000 manuscript fragments, letters and administrative documents found in the Ben Ezra Synagogue at Fustāt, Egypt dating mainly from the Fatimid and Ayyubid periods.

<sup>64</sup> E.g. Shelomo D. Goitein, *A Mediterranean Society: The Jewish Communities of the Arab World as Portrayed in the Documents of the Cairo Geniza*, Vol. 1 *Economic Foundations* (Berkeley/Los Angeles: The University of California Press, 1967); Jessica L. Goldberg, *Trade and Institutions in the Medieval Mediterranean: The Geniza Merchants and Their Business World* (Cambridge: Cambridge University Press, 2012).

<sup>65</sup> Davis-Secord, *Where Three Worlds Met*, 151–52.

<sup>66</sup> For these names of earthenware containers of oil, soap or vinegar, see Goitein, *A Mediterranean Society*, 1:485 n. 8. Goitein also mentions three *jirār* with kosher oil which were transported from Sicily to Egypt.

Sicily did not produce much oil during the eleventh century and depended heavily on imports from Tunisia.<sup>67</sup>

More shipments with ceramic containers seem to have been made between Sicily and North Africa. Another Geniza letter (dated to 1030) mentions thirty containers of cheese that had been shipped from Palermo on a ship that took twenty-nine days to make the voyage to Alexandria. Furthermore, a Jewish merchant in Mazara del Vallo wrote about a bale of rice together with twelve bottles of fruit juice, probably for transport to North Africa. According to a list of prices given by a Sicily-based Jewish merchant, fruits and nuts were indeed sold in the island's markets, as well as spices, flax, indigo, perfumes, metals, shelled almonds and prunes.<sup>68</sup> In short, these two texts show the importance of fruits and fruit juices for local use and as export products to Egypt.

### Suggestions for Foodstuffs in the Sicilian Amphorae

To date, a considerable number of locally made amphorae have been identified during excavations in Sicily, both in the East (e.g. Rocchicella di Mineo) and in the West (e.g. Palermo). However, there is as yet not much definitive evidence for the contents of these amphorae. The shapes of the local Byzantine-style amphorae (e.g. 'Type 10' of ca. 15.0 litres) suggest they were probably used for wine produced on the island, although they could also have been used for fresh water which was much appreciated in Muslim society and sometimes purified and flavoured with various substances.<sup>69</sup> Their porous fabrics, which allowed evaporation, were convenient for keeping liquids cool because they lowered drinking temperatures by a few degrees. The Geniza documents mentioned the Arabic term *jarra* (ceramic jar) for a container holding liquids, and the word *tamawiya* (deriving from Greek) as a standard term for a wine container.<sup>70</sup>

<sup>67</sup> Ardizzone, 'Le anfore recuperate', 39 n. 121 with further literature.

<sup>68</sup> Davis-Secord, *Where Three Worlds Met*, 153.

<sup>69</sup> Paulina B. Lewicka, *Food and Foodways of Medieval Cairenes. Aspects of Life in an Islamic Metropolis of the Eastern Mediterranean* (Leiden/Boston: Brill, 2011), 457–60 mentions for instance chalk, vinegar, almonds, ground beans, although the most favourite flower aroma added to water was made of rose petals.

<sup>70</sup> Shelomo D. Goitein, *A Mediterranean Society: The Jewish Communities of the Arab World as Portrayed in the Documents of the Cairo Geniza*, Vol. 4 *Daily Life* (Berkeley/Los Angeles/London: The University of California Press, 1983), 256, who calculated that the average price for ten *tamawiyas* was roughly between 0.8 and 0.88 dinars.

The smallest vessels with a painted decoration ('Type 4.1'), which started to be manufactured at Muslim Palermo, have only a volume capacity of ca. 3.0 litres (see Fig. 17.10).<sup>71</sup> Apart from the fact that their domed bases show stability, their small forms suggest they were used for the short-term storage and serving of liquids. Their long and narrow necks help minimise spillage during transport and pouring. In addition, their painted surfaces show an investment in appearance, which means that they could also have been used as tableware for domestic use. It is conceivable that they contained special liquids, such as good-quality sweet wines,<sup>72</sup> spiced aromatic wines (Islamic imitations of the ancient *conditum*)<sup>73</sup> or even juices made of lemons, pomegranates, apples, plums and unripe grapes. In fact, there existed a recipe of Muslim Sicily for long-lasting sweet grape must prepared in a ceramic jar.<sup>74</sup>

However, the largest containers within the Palermo series ('Type D2', or 'Type 7') have a different shape (with a wide-rim neck) and more volume capacity of ca. 17.0–18.0 litres (see Fig. 17.10). Their domed bases again suggest stability, but their wider upper parts enabled easy access. Two short triangular handles on squat shoulders give less hold during the transport of these containers. Consequently, they could have been used for medium-term transport or storage of (semi-)solid foodstuffs such as olives, cheese, cereals, dried fruits, legumes, pickles or even salted fish (tuna).<sup>75</sup> This amphora type has two different sizes: one of ca. 35.0 cm high ('Type D1') and another of circa 55.0 cm high ('Type D2'). This last container was even exported beyond Sicily, as shown by finds on the San Vito Lo Capo shipwreck (near Trapani) as well as at Salerno and Pisa.<sup>76</sup>

Some scholars connect the carrot-shaped amphorae ('Type N', or 'Type 11.1' in the Palermo series) to sugar trade (linked to the Sicilian sugar cane plantations), because a shipwreck near Marsala yielded these transport jars together with a ceramic cone-shaped mould that perhaps was used for the

<sup>71</sup> Sacco, 'Produzione e circolazione', 182 and figs. 4–5.



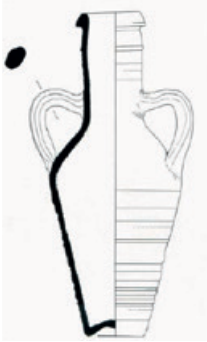
<sup>72</sup> Sicily has mineral-rich soils (because of the presence of Mount Etna on the island) which are an ideal growing environment for the grapevine. Furthermore, due to a warm and dry climate along its shores (with sometimes high temperatures) most Sicilian grape types have high degrees of natural sugar content and, thus, higher alcohol percentages.

<sup>73</sup> See Goitein, *A Mediterranean Society*, 4:260–61 for two recipes in Fatimid Egypt for wine enriched by either bee honey or by pepper, spices and ferments.

<sup>74</sup> For this twelfth-century recipe from Ibn al-Awwan's *Book of Agriculture*, see Michele Amari, *Biblioteca arabo-sicula*, 2 vols. (Turin/Rome: Ermanno Loesher, 1880–81), 307. Perhaps these small vessels from Muslim Palermo contained such a kind of *defrutum* (sweet grape must) to help preserve and sweeten wine.

<sup>75</sup> Purpura, 'Un relitto di etti normanna'; Ardizzone, 'Le anfore recuperate', 38 and note 116.

<sup>76</sup> E.g. Ardizzone, 'Le anfore recuperate', 26–27; Meo, 'Anfore, uomini', 227, fig. 6 (left).

Amphora type	Drawing	Average height	Volume capacity	Potential contents	Date
Type 4.1		?	Circa 3 litres	Liquids: among which sweet wines; spiced aromatic wines; fruit juices/syrups	Late 9th/10th to 1st half 11th c.
Type D2, or Type 7.2-7.3		Circa 50-55 cm	Circa 17-18 litres	Semi-solid food stuffs: among which olives, cheese, cereals, dried fruits, pickles, legumes, salted fish	Late 9th-10th (to 12th c.?)
Type N, or Type 11.1		Circa 16 cm, or 50-67 cm	Circa 2.5-3.5 litres, or circa 4-5 litres	Liquids: among which wine in various qualities	2nd half 10th - 1st half 11th to 12th c.

**Figure 17.10** A selection of three amphora types with potential contents from Muslim Palermo, as mentioned in the text (images after Vacco, 'Produzione e circolazione', fig. 5).

refinement of sugar.<sup>77</sup> However, this hypothesis remains dubious since sugar was normally transported on ships in a different manner (e.g. as loaves in wooden containers),<sup>78</sup> unless it circulated perchance as a more liquid substance (like sugar cane molasses). Furthermore, this so-called 'sugar mould'

<sup>77</sup> Purpura, 'Un relitto di età normanna', 134, fig. 14; see also Ardizzone, *Anfore in Sicilia*, 130-31 and fig. 49b for a sugar mould from Palermo.

<sup>78</sup> Mohamed Ouerfelli, *Le sucre: Production, commercialisation et usages dans la Méditerranée médiévale* (Leiden/Boston: Brill, 2007), 141-228 and 360-73.



from the Marsala shipwreck could also have functioned as a wine funnel for pouring wine into the amphorae which were part of the ship's cargo.

In fact, the shape of the carrot-shaped vessels with domed bases from the same wreck must have given stability for the transport or storage of liquids such as wine on ships (see Fig. 17.10).<sup>79</sup> In addition, these containers were made with long narrow necks to minimise spillage during transport and to facilitate more precise control during the pouring of liquids. Their conspicuous everted rims probably accommodated a stopper or were used for wrapping a piece of cloth with some rope around the top. The smaller examples with a volume capacity of ca. 2.5–3.5 litres could have contained different (perhaps better-quality or sweetened) wine variants than the larger ones with a capacity of ca. 4.0–5.0 litres.

Noteworthy also is the fact that the Italian underwater archaeologist Gianfranco Purpura, who excavated the Marsala shipwreck, mentioned a creamy residue of dark red colour (*rosso ruggine*) in the interior of several amphorae.<sup>80</sup> Later restoration of some of the Marsala pots yielded at least fifteen samples of yellow-golden residues which, after spectrometric analyses, turned out to be natural resins (including pine resin) close to pitch; that is to say, substances that were generally associated with the conservation of wine during transport. In addition, one amphora was still sealed with a cork stopper with a diameter of 5.0 cm and a thickness of 1.5 cm.<sup>81</sup> Apparently, when some sealed Islamic amphorae from the San Lo Vito La Capo shipwreck were opened, they still had the bouquet of wine inside.<sup>82</sup>

These observations coincide well with organic residue analyses that were carried out on Islamic ceramic vessels from late ninth- to tenth-century shipwrecks off the Provence coast (e.g. Agay, Batéguier, Marseille 3). These analyses showed that the foodstuffs detected in the interior walls and bottoms of these ceramic containers included (conifer) pitch, vegetal oil, beeswax, grapes and red wine.<sup>83</sup>

<sup>79</sup> Cf. Filippo Pisciotta and Nicolas Garnier, 'Nuovi dati sulle anfore di XI secolo del relitto 'A' di Lido Signorino alla luce delle ultime revisioni crono-tipologiche delle anfore medievali', *Quaderni di Archeologia postclassical* 12 (2018): 169–86.

<sup>80</sup> Purpura, 'Un relitto di etti normanna', 134.

<sup>81</sup> Ferroni and Meucci, 'I due relitti', 313.

<sup>82</sup> Ardizzone, 'Le anfore recuperate', 37 n. 104.

<sup>83</sup> Catherine Richarté-Manfredi, 'Navires et marchandises islamiques en Méditerranée occidentale durant le haut Moyen Âge. Des épaves comme témoignages des échanges commerciaux entre domaines chrétiens et musulmans (IXe–Xe siècle)', *Mélanges de l'École française de Rome – Moyen Âge* 129 (2017): 14–15; Catherine Richarté-Manfredi, Claudio Capelli and Nicolas Garnier, 'Analyses archéométriques et nouvelles contributions à l'étude des récipients de transport des épaves islamiques de Provence (fin IXe–Xe s.)', *Archeologia Medievale* 45 (2018): 246–48.

Despite the Qu'ranic prohibition against wine, its production must have continued in several Sicilian sites because its consumers were not only Muslims but also local Christians and Jews. Seemingly, the Islamic conquest did not attempt to interfere in the status quo on the island and allowed the locals to continue with their usual business.

From the Geniza documents and from medieval Arabic texts, we learn that alcohol consumption in Fatimid Egypt not only included wine and beer but also quasi-alcoholic fizzy drinks such as *fuqqa* (a kind of beer, or 'sparkling drink').<sup>84</sup> Good wine was considered a delicacy and could have been stored and sold in smaller vessels; for instance, 'a little jug of wine' was sometimes offered as a gift.<sup>85</sup> Wine cellars stocking large amounts of jars (up to 3,000) were not unusual and were arranged in four rows of jar sizes and categories, ranging from 150–280 *ṭāmawiyas*, 17–29 *lājiyās* and 5–40 'small ones'.<sup>86</sup> Most wines were described as *muwallad* (cross-bred), which seem to have been mixed with an inferior type of wine,<sup>87</sup> and only a few as *khamr* (real wine).<sup>88</sup>

Apart from good-quality (spiced) wines, the smaller-sized painted amphorae from Islamic Palermo could also have contained more refined non-alcoholic beverages, such as fruit-, vegetable- and grain-based concoctions, known in Arabic-Islamic culinary manuals as *ashriba* (sing. *sharab*).<sup>89</sup> These soft drinks were made of fruit juices (mostly of lemon, citron and quince), which were mixed with sugar or julep. Afterwards, they were cooked to the consistency of syrups, which could have been perfumed with rose water, flower petals, musk, saffron, vinegar or spices.<sup>90</sup> These 'lemonades' or 'orangeades' were not only drunk on a routine basis in Muslim society but were also used as syrups with medicinal and tonic properties.<sup>91</sup>

## Concluding Remarks

The archaeological evidence clearly indicates that eastern Sicily, where the Byzantine army and fleet were stationed throughout the period of Muslim expansion, remained economically connected or tied to the eastern

<sup>84</sup> Goitein, *A Mediterranean Society*, 4:253–61; Lewicka, *Food and Foodways*, 465–82.

<sup>85</sup> Goitein, *A Mediterranean Society*, 4:255.

<sup>86</sup> Goitein, *A Mediterranean Society*, 4:258–59.

<sup>87</sup> We must keep in mind that most military forces would not have consumed high-quality wines.

<sup>88</sup> Goitein, *A Mediterranean Society*, 4:259.

<sup>89</sup> Lewicka, *Food and Foodways*, 460–63.

<sup>90</sup> Goitein, *A Mediterranean Society*, 4:254 and 264; Lewicka, *Food and Foodways*, 461.

<sup>91</sup> Lewicka, *Food and Foodways*, 460.

Mediterranean, and to the Aegean in particular, until the final moment of the Islamic takeover of the island. Amphorae loaded with bulk goods (most probably wine and/or olive oil from church estates in the eastern Aegean) and other ceramic products (including glazed chafing dishes) were imported from the Byzantine territories to this part of the island during the entire two-century demise of the empire's hold over Sicily. This trade system continued functioning until the very end of the Islamic conquest, when the last Byzantine strongholds (such as Taormina) came under Muslim rule in 965.

In western Sicily, however, the situation was quite different. During the eighth and ninth centuries, this part of the island was at first connected via its northern shores to a south-Tyrrhenian exchange system, which was eventually replaced by a North African trade network via its southern coast. The latter exchange system probably provided the Muslim forces in the first conquered areas (including Pantelleria and the south-western coast of Sicily) with bulk goods in Byzantine-style manufactured amphorae from Umayyad Egypt or Tunisia. This southern network gradually changed in character after the establishment of Palermo as capital of Muslim Sicily during the ninth century, not least because the city started to produce its own amphorae. At first these were still influenced by Byzantine decoration styles and shapes, but eventually new ceramic shapes (connected with different daily practices, including novel water-management systems) were introduced, as were new manufacturing techniques and new decoration styles unattested in the pre-Islamic tradition on Sicily.

From the late ninth century onwards, the production and circulation of ceramics clearly show the close relationship and political and economic integration between western Sicily and North Africa (Ifriqiya). These ties were in particular strengthened during the Aghlabid and early Fatimid periods (although some amphorae were by then still Byzantine influenced), and they became even more solid during the Fatimid and Kalbid periods on the island. The pottery finds underline the function of Palermo and its harbour as a significant bridgehead and commercial hub between Sicily, Tunisia, Egypt and western Italy.

In addition, population growth in Sicily after the Islamic conquest may have given an extra impulse to pottery production in specialized workshops for the new (Islamic) urban markets with new (Muslim) culinary and drinking habits, such as the consumption of sugar cane, sweet syrups and fruit-juice drinks. Archaeobotanical evidence proves that, among the principal food products used in eleventh- and twelfth-century Sicily, wheat and grapes were still important as before, but now there was also substantial consumption of new foodstuffs such as citrus fruit, pomegranate, fig, peach, pear,

hazelnut and certain vegetables. In addition, written documents tell of Jewish merchants who shipped oil in jars, cheese in containers and fruit juices in bottles through cabotage trade along the Sicilian–Maghreb–Egyptian network.

If the archaeological evidence which we can date between the eighth and the eleventh centuries makes anything clear, it is that Sicily was truly a borderland with permanently shifting complex ties with two empires and cultural powers, one on the rise and the other in decline, which resulted in an ever-changing military, economic and cultural frontier. In this shifting balance of military and cultural dominance, and related fluctuating trade networks, the amphora finds show that the island functioned throughout the entire period of the Islamic conquest as a connective hub at the crossroads of different regional economies and different cultural regional influences. In other words, Sicily was during this historical process a genuine frontier society with a rather clear borderline gradually moving from West to East.

## Bibliography

- Abulafia, David and Nora Berend (eds). *Medieval Frontiers: Concepts and Practices*. Aldershot: Ashgate, 2002.
- Amari, Michele. *Biblioteca arabo-sicula*. 2 vols. Turin/Rome: Ermanno Loesher, 1880–81.
- Amato, Rosalba, Concetta Ciurcina and Angela Maria Manenti. 'I dati di età bizantina ed altomedievale da recherche di archeologia urbana in Ortigia (Siracusa)'. In *From Polis to Madina. La trasformazione delle città siciliane tra Tardoantico e Alto Medioevo*, edited by Lucia Arcifa and Mariarita Sgarlata, 87–95. Bari: Edipuglia, 2020.
- Arcifa, Lucia. 'Nuovi dati riguardanti la ceramica di età islamica nella Sicilia orientale'. *Mélanges de l'École française de Rome – Moyen Âge* 116 (2004): 205–30.
- Arcifa, Lucia. 'Nuove ipotesi a partire dalla rilettura dei dati archeologici: La Sicilia orientale'. In *La Sicile de Byzance à l'Islam*, edited by Anneliese Nef and Vivien Prigent, 15–49. Paris: De Boccard, 2010.
- Arcifa, Lucia. 'Rocchicella di Mineo: Il sito tra età proto bizantina e età tematica'. In *Dopo l'Antico. Ricerche di archeologia medievale*, edited by Lucia Arcifa and Laura Maniscalco, 17–28. Palermo: Regione Siciliana, Assessorato regionale dei beni culturali, Dipartimento regionale dei beni culturali, 2016.
- Arcifa, Lucia. 'Contenitori da trasporto nella Sicilia bizantina (VIII–X secolo): Produzioni e circolazione'. *Archeologia Medievale* 45 (2018): 123–48.
- Arcifa, Lucia and Alessandra Bagnera. 'Palermo in the Ninth and Early Tenth Century: Ceramics as Archaeological Markers of Cultural Dynamics'. In *The Ahglabids and Their Neighbours*, edited by Claire D. Anderson, Corisande Fenwick and Mariam Rosser-Owen, 382–404. Leiden: Brill, 2018.

- Arcifa, Lucia and Élisabeth Lesnes. 'Primi dati sulle produzioni ceramiche Palermitane dal X al XV secolo'. In *La céramique médiévale en Méditerranée. Actes du VIe congrès de l'AIECM2, Aix-en-Provence, 13–18 novembre 1995*, edited by Gabrielle Démians d'Archimbaud, 405–18. Aix-en-Provence: Narrations Éditions, 1997.
- Arcifa, Lucia and Laura Maniscalco (eds.). *Dopo l'Antico. Ricerche di archeologia medievale*. Palermo: Regione Siciliana, Assessorato regionale dei beni culturali, Dipartimento regionale dei beni culturali, 2016.
- Arcifa, Lucia and Mariarita Sgarlata (eds.). *From Polis to Madina. La trasformazione delle città siciliane tra Tardoantico e Alto Medioevo*. Bari: Edipuglia, 2020.
- Ardizzone, Fabiola. 'Le anfore recuperate sopra le volte del palazzo della Zisa e la produzione di ceramica comune a Palermo tra la fine dell'XI ed il XII secolo'. *Mélanges de l'École française de Rome – Moyen-Âge* 111 (1999): 7–50.
- Ardizzone, Fabiola. 'Nuove ipotesi a partire dalla rilettura dei dati archeologici: La Sicilia occidentale'. In *La Sicile de Byzance à l'Islam*, edited by Anneliese Nef and Vivien Prigent, 51–76. Paris: De Boccard, 2010.
- Ardizzone, Fabiola. *Anfore in Sicilia (VII–XII sec. d. C.)*. Terra di Vento: Torri del Vento, 2012.
- Ardizzone, Fabiola. 'Trasformazione dello spazio pubblico ad Agrigento: La Valle dei Templi tra tardoantico e altomedioevo'. In *From Polis to Madina. La trasformazione delle città siciliane tra Tardoantico e Alto Medioevo*, edited by Lucia Arcifa and Mariarita Sgarlata, 249–70. Bari: Edipuglia, 2020.
- Ardizzone, Fabiola, Elena Pezzini and Viva Sacco. 'Aghlabid Palermo: Written Sources and Archaeological Evidence'. In *The Aghlabids and Their Neighbours*, edited by Claire D. Anderson, Corisande Fenwick and Mariam Rosser-Owen, 362–81. Leiden: Brill, 2018.
- Bruno, Brunella. *Roman and Byzantine Malta. Trade and Economy*. Malta: Midsea Books, 2009.
- Bruno, Brunella and Nathaniel Cutajar. 'Malta between the Ninth and Tenth Century – Two Early Medieval Contexts'. *Archeologia Medievale* 45 (2018): 111–22.
- Cacciaguerra, Giuseppe. 'Cultura materiale e commerci in Sicilia fra Bizantini e Arabi (VIII–metà X secolo): Nuovi dati sulle ceramiche fini e le anfore dai contesti altomedievali di Siracusa'. In *VII Congresso nazionale di archeologia medievale*, Vol. 2 edited by Paul Arthur and Marco Leo Imperiale, 367–72. Florence: All'Insegna del Giglio, 2015.
- Cacciaguerra, Giuseppe. 'Città mercati in transizione nel Mediterraneo altomedievale: Contenitori da trasporto, merci e scambia a Siracusa tra l'età bizantina e islamica'. *Archeologia Medievale* 45 (2018): 149–73.
- D'Angelo, Franco. 'Ceramica d'uso domestic della Sicilia medieval proveniente dalla Zisa (Palermo XII secolo)'. In *Atti IX convegno della ceramica, Albisola 28–31 maggio 1976*, 53–61. Albisola: Centro Ligure per la storia della ceramica, 1976.

- D'Angelo, Franco. 'La ceramica islamica in Sicilia.' *Mélanges de l'École française de Rome – Moyen Âge* 116 (2004): 9–143.
- Davis-Secord, Sarah. *Where Three Worlds Met. Sicily in the Early Medieval Mediterranean*. Ithaca/London: Cornell University Press, 2017.
- De Miranda, Adriana. 'Alcune considerazioni sulle norie nella tradizione siciliana.' *Sicilia Archeologica* 103 (2005): 137–44.
- De Rossi, Gianfranco. 'Indicatori archeologici della produzione e diffusione del vino della Baia di Napoli in età altomedievale.' In *Paesaggi e insediamenti rurali in Italia meridionale fra Tardo Antico e Altomedioevo*, edited by Giuliano Volpe and Maria Turchiano, 541–50. Bari: Edipuglia, 2004.
- Faccenna, Fabio. *Il relitto di San Vito lo Capo*. Bari: Biblioteca archeologica, 2006.
- Ferroni, Angela Maria and Costantino Meucci. 'I due relitti arabo-normanni in Marsala.' *Bollettino di Archeologia Subacquea* 2–3 (1995–96): 283–349.
- Gayraud, Roland-Pierre and Jean-Christophe Trégliat. 'Amphores, céramiques culinaires et céramiques communes omeyyades d'un niveau d'incendie à Fustat-Istabl 'Antar (Le Caire, Égypte)'. In *LRCW 4: Late Roman Coarse Wares, Cooking Wares and Amphorae in the Mediterranean. Archaeology and Archaeometry*, edited by Natalia Poulou-Papadimitriou, Eleni Nodarou and Vassilis Kilikoglou, 365–75. Oxford: Archaeopress, 2014.
- Goldberg, Jessica L. *Trade and Institutions in the Medieval Mediterranean: The Geniza Merchants and their Business World*. Cambridge: Cambridge University Press, 2012.
- Goitein, Shelomo D. *A Mediterranean Society: The Jewish Communities of the Arab World as Portrayed in the Documents of the Cairo Geniza*, Vol. 1 *Economic Foundations*. Berkeley/Los Angeles: The University of California Press, 1967.
- Goitein, Shelomo D. *A Mediterranean Society: The Jewish Communities of the Arab World as Portrayed in the Documents of the Cairo Geniza*, Vol. 4 *Daily Life*. Berkeley/Los Angeles/London: The University of California Press, 1983.
- Gragueb, Soundès et al. 'Jarres et amphores de Şabra al-Manşūriya (Kairouan, Tunisie)'. In *La céramique maghrébine du haut Moyen Âge (VIIIe–Xe siècle). État des recherches, problèmes et perspectives*, edited by Patrice Cressier and Elizabeth Fentress, 197–220. Rome: École française de Rome, 2011.
- Granara, William. *Narrating Muslim Sicily. War and Peace in the Medieval Mediterranean World*. London/New York/Oxford/New Delhi/Sydney: I. B. Tauris, 2019.
- Kennedy, Hugh. *The Byzantine and Early Islamic East*. Aldershot: Variorum, 2006.
- Lewicka, Paulina B. *Food and Foodways of Medieval Cairenes. Aspects of Life in an Islamic Metropolis of the Eastern Mediterranean*. Leiden/Boston: Brill, 2011.
- Longo, Roberta. 'Le produzioni ceramiche di Rocchicella in età bizantina.' In *Dopo l'Antico. Ricerche di archeologia medievale*, edited by Lucia Arcifa and Laura Maniscalco, 29–66. Palermo: Regione Siciliana, Assessorato regionale dei beni culturali, Dipartimento regionale dei beni culturali, 2016.

- McCormick, Michael. *Origins of the European Economy: Communications and Commerce, A.D. 300–900*. Cambridge: Cambridge University Press, 2001.
- Meo, Antonino. ‘Anfore, uomini e reti di scambio sul “mare Pisano” (VIII–XII secolo)’. *Archeologia Medievale* 45 (2018): 219–38.
- Molinari, Alessandra. ‘Paesaggi rurali e formazioni sociali nella Sicilia islamica, normanna e sveva (secoli X–XIII)’. *Archeologia Medievale* 37 (2010): 229–45.
- Molinari, Alessandra. “Islamisation” and the Rural World: Sicily and al-Andalus. What Kind of Archaeology? In *New Directions in Early Medieval European Archaeology: Spain and Italy Compared. Essays for Riccardo Francovich*, edited by Sauro Gelichi and Richard Hodges, 187–220. Turnhout: Brepols Publishers, 2015.
- Nef, Anneliese. ‘Croissance urbaine et modalités d’habitat dans la Palerme islamique: Retour sur les acteurs et les facteurs’. In *From Polis to Madina. La trasformazione delle città siciliane tra Tardoantico e Alto Medioevo*, edited by Lucia Arcifa and Mariarita Sgarlata, 329–41. Bari: Edipuglia, 2020.
- Ouerfelli, Mohamed. *Le sucre: Production, commercialisation et usages dans la Méditerranée médiévale*. Leiden/Boston: Brill, 2007.
- Patterson, Hellen. ‘Analisi mineralogiche sulle ceramiche medievali di alcuni siti della Sicilia occidentale’. In *Actes du Vème colloque sur la céramique en Méditerranée occidentale, Rabat 11–17 novembre 1991*, 218–23. Rabat: Institut National des Sciences de l’Archéologie et du Patrimoine, 1995.
- Pisciotta, Filippo and Nicolas Garnier. ‘Nuovi dati sulle anfore di XI secolo del relitto ‘A’ di Lido Signorino alla luce delle ultime revisioni crono-tipologiche delle anfore medievali’. *Quaderni di Archeologia postclassical* 12 (2018): 169–86.
- Primavera, Milena. ‘Introduzione di nuove piante e innovazioni agronomiche nella Sicilia medieval: il contributo dell’archeobotanica alla rivoluzione agricola araba di Andrew Watson’. *Archeologia Medievale* 45 (2018): 439–44.
- Purpura, Gianfranco. ‘Un relitto di età normanna a Marsala’. *Bollettino d’Arte, Suppl. Archeologia Subacquea* 2 (1985): 129–36.
- Rapoport, Yossef and Emilie Savage-Smith. *Lost Maps of the Caliphs. Drawing the World in Eleventh-Century Cairo*. Chicago/London: The University of Chicago Press, 2018.
- Reynolds, Paul. ‘From Vandal Africa to Arab Ifriqiya: Tracing Ceramic and Economic Trends through the Fifth to the Eleventh centuries’. In *North Africa under Byzantium and Early Islam*, edited by Susan T. Stevens and Jonathan P. Conant, 129–71. Washington, D.C.: Dumbarton Oaks Research Library and Collection, 2016.
- Reynolds, Paul. ‘Amphorae in Beirut from the Umayyads to the Crusaders: A Guide to Trends in Local and Imported Products’. *Archeologia Medievale* 45 (2018): 91–110.
- Richarté-Manfredi, Catherine. ‘Navires et marchandises islamiques en Méditerranée occidentale durant le haut Moyen Âge. Des épaves comme témoignages des échanges commerciaux entre domaines chrétiens et musulmans (IXe–Xe siècle)’. *Mélanges de l’École française de Rome – Moyen Âge* 129 (2017): 1–20.

- Richarté-Manfredi, Catherine, Claudio Capelli and Nicolas Garnier. 'Analyses archéométriques et nouvelles contributions à l'étude des récipients de transport des épaves islamiques de Provence (fin IXe–Xe s.)'. *Archeologia Medievale* 45 (2018): 239–50.
- Sacco, Viva. 'Produzione e circolazione delle anfore palermitane tra la fine del IX e il XII secolo'. *Archeologia Medievale* 45 (2018): 175–91.
- Schmidt, Stefanie. 'Messengers in Byzantine and Early Muslim Egypt: Small Cogs, but Systemically Relevant. With Some Remarks on the Dossier of Menas, *Stratiôtēs*', chapter 6 in this volume.
- Tisseyre, Philippe. 'De middeleeuwse scheepswrakken bij West-Sicilië'. In *Sicilië en de zee*, edited by Diederik Burgersdijk *et al.*, 146–49. Zwolle/Amsterdam: WBooks and Allard Pierson Museum.
- Tullio, Amedeo. 'Strumenti per la lavorazione dello zucchero a Mareddolce (Palermo)'. In *Archeologia e territorio*, 471–79. Palermo: G. B. Palumbo Editore, 1997.
- Vaccaro, Emanuele. 'Sicily in the Eighth and Ninth Centuries AD: A Case of Persisting Economic Complexity?' *Al-Masaq* (2013): 34–69.
- Vroom, Joanita. 'Dishing up History: Early Medieval Ceramic Finds from the Triconch Palace in Butrint'. *Mélanges de l'École française de Rome – Moyen Âge* 120 (2008): 291–305.
- Vroom, Joanita. 'From One Coast to Another: Early Medieval Ceramics in the Southern Adriatic Region'. In *From One Sea to Another. Trading Places in the European and Mediterranean Early Middle Ages, Proceedings of the International Conference Comacchio, 27th–29th March 2009*, edited by Sauro Gelichi and Richerd Hodges, 337–52. Turnhout: Brepols Publishers, 2012.
- Vroom, Joanita. 'Tea and Ceramics: New Perspectives on Byzantine Pottery from Limyra'. In *40 Jahre Grabung Limyra. Akten des Symposions, Wien, 3–5 Dezember 2009*, edited by Martin Seyer, 341–55. Vienna: Österreichisches Archäologisches Institut, 2012.
- Vroom, Joanita. *Byzantine to Modern Pottery in the Aegean. An Introduction and Field Guide. Second and Revised Edition*. Turnhout: Brepols Publishers, 2014.
- Vroom, Joanita. 'The Byzantine Web: Pottery and Connectivity between the Southern Adriatic and the Eastern Mediterranean'. In *Adriatico altomedievale (VI–XI secolo): Scambi, porti, produzioni (Studi e Ricerche 4)*, edited by Sauro Gelichi and Claudio Negrelli, 285–310. Venice: Edizioni Ca' Foscari, 2017.
- Watson, Andrew M. *Agricultural Innovation in the Early Islamic World: The Diffusion of Crops and Farming Techniques, 700–1100*. Cambridge: Cambridge University Press, 1983.
- Yāqūt. *Muʿjam al-buldān*, ed. Muḥammad ʿAbd al-Raḥmān al-Marʿashli. Beirut: Dār Iḥyāʾ al-Turāth al-ʿArabī 2008.
- Zavagno, Luca. "Islands in the Stream": Toward a New History of the Large Islands of the Byzantine Mediterranean in the Early Middle Ages ca. 600–ca. 800, *Mediterranean Historical Review* 33 (2018): 149–77.