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RECONSIDERING TECHNOLOGICAL CHOICES, THE TRANSMISSION OF KNOWLEDGE AND THE ROLE OF MOBILITY IN SHAPING LOCAL POTTERY PRODUCTION TRADITIONS IN THE LATER 1ST MILLENNIUM BC ON THE EASTERN ADRIATIC

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Abstract. – The Iron Age, especially its final centuries, was without doubt a time of profound changes within the communities of the eastern Adriatic, mainly due to shifts within the cultural and political geography of the area, often interpreted through scant and ambiguous historical sources. Nevertheless, varied social processes, induced by increased connectivity and appropriation, are starting to be evidenced, shedding light on the ways in which locals and newcomers adapted to and exploited these newly generated cultural landscapes and the kinds of mobility and local interactions they engaged in. The organization of autochthonous communities during this time is not well understood due to a lack of archaeological knowledge. Most of the data available comes from funerary contexts, which makes it difficult to interpret developments within a broader social framework. However, analyzing certain objects and their related practices through different theoretical models can help us to understand different social implications that arise when a more current, relational methodology is applied. Pottery of the later 1st millennium BC on the eastern Adriatic will be used here as a case study, with the aim to deconstruct aspects of its production by observing its technical features and understanding, through them, the social organization behind the technological choices of both autochthonous and colonial societies. In this way, pottery production will be employed to shed light on the interaction of the various eastern Adriatic communities within the last centuries BC, ending with the set up of Roman pottery workshops during the period of late 1st century BC – early 1st century AD.

Key words. – Eastern Adriatic, pottery production, *chaîne opératoire*, transfer of knowledge, late Iron Age, Hellenistic pottery.

Introduction

For the better part of the 20th c. the introduction and use of foreign (Greek and Roman) objects within an archaeologically or historically defined space or social group has been the base for defining phenomena such as "Hellenization" or "Romanization", while within recent scholarship, postcolonial and more recent frameworks interpret them from the standpoint of mobility, connectivity, hybridity, entanglement, globalization, colonial encounters, etc., re-evaluating them now and again from different theoretical standpoints.[1] While elements of attire (and other objects of more personal use) mostly served as markers of identities,[2] import of foreign wares opened up discussions on the appropriation of not only objects (and goods), but possibly also associated practices, with consequences on the whole societal and thus communal identitarian system.[3] In fact, through appropriation, foreign objects become, in multi-fold ways, a part of the local material culture. In protohistory and early history of the eastern Adriatic, such imports mostly relate to fine wares and amphorae,[4] firstly associated with the consumption of liquids and their transport,[5] and later expanded to include the "full" dining set, functional objects and containers transporting more varied contents.[6] Similarly, proveniences shift to subsequently include different areas.[7] They are, thus, seen as markers of shifts within the cultural and political geography of the area, otherwise often interpreted through scant and ambiguous historical sources,[8] but they do not automatically signify transmission of cultural knowledge.[9]

A different story is told by the introduction of foreign technology and production practices,[10] which is indicative of different phenomena and

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[1] The debate, theoretical approaches and tools utilized are evolving at a fast pace, see e.g. Lomas 2004; Stockhammer 2012; Hodos 2014; Versluys 2014, 1–6; Gordon, Kouremenos 2020; Kistler 2023, all with earlier bibliography; Riva, Mira 2022. See also Budić 2022, 103–109; Vranić 2022, 183–185.

[2] Bibliography, both theoretical and applied, is massive, see e.g. Brøns 2012; Foulds 2014; Inall 2014; more recently: Gomes et al. 2024.

[3] E.g. the concept of "Middle Ground", Malkin 2002; see also Pitts 2007; Antonaccio 2013; Dimitrijević 2018; Vranić 2022, 183–185.

[4] At least based on current data, but see exception in Govorčin 2021, T. 4. Attire and other metal objects will not be discussed.

[5] Not much is known about the actual content of most amphorae types of the last centuries BC, as analyses have not been carried out, and some data indicates that it might have been varied (Bevan 2014; Domines Peter 2024, 148).

[6] E.g. Miše 2017; Miše 2019; Čelhar et al. 2023; Konestra, Ugarković 2025.

[7] Šešelj, Ilkić 2015; Čelhar et al. 2023; e.g. Ugarković, Šegvić 2019; Ugarković, Starac 2022.

[8] Čače, Milivojević 2017, 442–443; Barnett 2017, 67–68; Tonc 2022.

[9] Van Oyen 2017, 56.

[10] Basically, the difference between *things* and *techniques* as in Dietler, Herbich 1998, 235; cf. Van Oyen, Pitts 2017, 14; Dzino, Boršić 2020.

can be more telling on aspects of agency,[11] mobility and knowledge transfer.[12] In this paper, with the object of study being pottery observed through the technical knowledge deployed for its production and not the modes of its functional appropriation, these latter phenomena will be addressed and correlated in an attempt to delve into topics such as cultural and technological choices and the transmission of knowledge and foreign practices, as well as to evaluate if and how such transfers might have occurred and, crucially, assess how production practices can be interpreted in the context of the social systems[13] of the eastern Adriatic communities in the last centuries BC. This should allow us to test hypotheses regarding technological transfers and understand social interactions within the area in the chosen timeframe through a relational approach,[14] without the bias of the natives vs. colonist dichotomy[15] that might hinder a more nuanced understanding.[16] Rather, the dual role that social context and individual actors play in cultural reproduction or transformation will be explored,[17] so that the specificities of the eastern Adriatic "colonial encounters" might be assessed more contextually.[18]

Pottery production in the Greek-founded settlements[19] along the eastern Adriatic, roughly during the 4th–1st c. BC, and that dated after the onset of Roman rule in the area of Liburnia (late 1st c. BC), present specific case studies when observed in relation to contemporary Iron Age pottery production carried out within the native settlements of central Dalmatia and the northeastern Adriatic. This emerges from new data, especially stemming from archaeometry applied to Mediterranean-style fine wares and amphorae, and recent suggestions that, in short, Iron Age potters, while aware of different production styles,[20] were uninterested in choosing different technologies from those that had been traditionally employed by their crafting communities.[21] This "inertia", or rather *habitus*,[22] has been attributed to the limited relocation of the native population to the Greek settlements.[23] Nevertheless, since the technological traditions of both native and colonial communities were not analyzed in detail, certain

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[11] As in Dietler, Herbich 1998, 245; Dietler 2010, 55–56; Dobres 2014, 60.

[12] E.g. Van Oyen 2017, 57; Bernardo-Ciddio 2022; Robinson 2022.

[13] *Sensu* Salisbury, Rebay-Salisbury 2017, 21. See also Gosselain 1998, 99; Gosselain 2016, 199. Cf. Costin 1991.

[14] Duistermaat 2016.

[15] E.g. Versluys 2014; Vranić 2019, 158–159.

[16] See e.g. Rebay-Salisbury, Brysbaert, Foxhall 2014, 2; Winter 2017; cf. Budić 2022.

[17] See e.g. Cipolla 2020, 8855.

[18] See Dietler 2010, 55.

[19] Gaffney et al. 2002.

[20] For the different intended meanings of "style" cf. Dietler, Herbich 1998.

[21] Budić 2022.

[22] Briefly in Cipolla 2020, 8857 with earlier bibliography. See also Dietler, Herbich 1998, 246–247 with earlier bibliography.

[23] Budić 2022, 129–130.

nuances were not identified, which are, in view of the modes of knowledge transmission within craft communities, but also cross-craft interactions, crucial for a more in-depth understanding. The latter is further necessary since it would seem that (at least) two seemingly distinct potting traditions were operating in the area at the same time. Moreover, it appears that this dichotomy was maintained throughout the last centuries BC and into the new era.

The role of imported wares in the construction of social practices by the local Iron Age communities (first and foremost, the consumption of alcoholic beverages, both in convivial and funerary contexts) has been addressed on several occasions,[24] and the possibility that some of the mentioned wares were produced in other areas of the region, that is, on territories outside of the insular Greek colonies and their costal outposts, has been brought forth in recent years, assessing appropriation and rejection of technological styles.[25] Nevertheless, these discussions did not sufficiently consider the mechanism of transfer of foreign technologies and the complexities of both the introduction of new technologies within a craft and the process of apprenticeship.[26] In fact, appropriation and rejection within a craft cannot occur solely on the basis of indirect or casual contact or through observation of the finished products. Therefore, we will here examine in greater detail the technical features of imported wares and pottery produced within the native milieu by looking at the material evidence – that is, the objects themselves – which will allow us to test the various above delineated hypotheses within the framework of innovation, technological transfers, mobility and communities of practice.[27]

Geographical and archaeological context

The above delineated topics will be explored through the case study of the eastern Adriatic, narrowed down to its northern (Kvarner and nor-

[24] Dzino 2006; Dzino 2012; Barnett 2014; Miše 2019; Budić 2022; Borzić 2022; Ugarković, Starac 2022; Čelhar et al. 2023, 306–307; Čelhar, Borzić 2024, 174. The topic, extremely popular in other colonial contexts (e.g. Gaul, see e.g. Dietler 2010), has surprisingly seldom been dealt with more in-depth on the eastern Adriatic, probably due to a lack of contextual evidence. On the other hand, the role of these objects has often been, perhaps too rigidly, interpreted in the context of symposiac practices, although most of the materials stem from graves, and the vessels never seem to form a full symposiac set (e.g. Ugarković, Starac 2022, 275), but do contain other types of vessels, too (e.g. Borzić 2022), thus possibly signalling somewhat different local practices (cf. Kaiser, Forenbaher 2012, 272) which exhibit not only appropriation, but also rejection or "selective incorporation" (Dietler 2010: 59 and 64 for the transfer of symposiac practices).

[25] Šegvić et al. 2012; Šegvić et al. 2016; Miše et al. 2020; Čargo, Kamenjarin 2020; Budić 2022; Ugarković, Starac 2022; Čelhar et al. 2023; Konestra, Ugarković 2025.

[26] For the latter see e.g. Melko 2017, 218–219 and bibliography therein.

[27] Cf. Knappett, van der Leeuw 2015, 67–68 with bibliography therein; Bernardo-Ciddio 2022, 111.

thern Dalmatia) and central part (central Dalmatia), while at times specific areas will be dealt with more in-depth. Such a somewhat inconsistent approach is necessary due to partial, state-of-the-art biased data availability, so on occasion comparative examples will be drawn from the wider eastern Adriatic (e.g. Istria, southern Dalmatia) (Fig. 1).

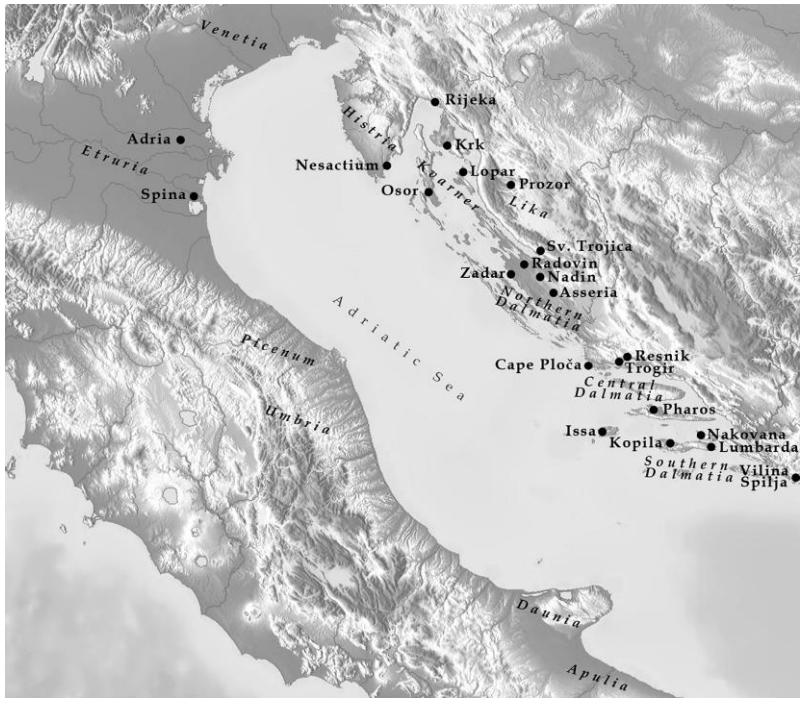

Fig. 1. Map of the Adriatic with the mentioned regions and sites (base map: https://maps-for-free.com/, © OpenStreetMap and its contributors, H. Braxmeier, edited by: A. Konestra)

Broadly defined, the study area features a diverse geomorphology, where islands and coastal environments intertwine with inland fertile fields and mountainous areas, creating diverse landscapes of habitation and interaction. Nevertheless, all autochthonous communities in the given timeframe functioned within enclosed settlements located on higher or prominent ground (hillforts), which are a key feature of the later prehistory in this area, and in some cases were the seats of the first proto-urban developments.[28] In the time-frame under study, the communities[29] inhabi-

[28] Čučković 2017; Glavaš, Glavičić 2017; Čelhar, Zaro 2018; Glavaš, Glavičić 2019; Čelhar, Zaro 2023.

[29] Applying traditional ethnic nomenclature based on a culture-historical reasoning for the timeframe of 4th–1st c. BC for the whole area under study might prove to be misleading and not represent the still-under-debate situation conveyed by the historical sources (see e.g.

ting the above delineated areas start to make their way in the historical sources,[30] though biased by the traditional scantiness and imprecisions that these convey, but which often served to name the different groups identified archaeologically.[31] These were mostly defined on the basis of the material culture (mostly attire) and funerary customs, while certain phenomena, such as imports of foreign wares, seem to have been shared throughout the area, though with nuances in their appearance and features. For example, in northern Dalmatia and Kvarner, the import of eastern Adriatic Mediterranean-style fine wares, and their consumption within the studied contexts, differs from that of other eastern Adriatic areas,[32] and more massive imports can be followed only from the 2nd c. BC.

The import of fine wares of foreign production to the eastern Adriatic can be followed from roughly the 8th c. BC, when vessels of matt-painted pottery with a geometric decoration of broad southern Italian origin (mostly Daunian/Apulian)[33] started to appear within the local communities, especially in the northern Adriatic (Istria and Kvarner) and northern Dalmatia.[34] While data from central Dalmatia is still rather scant (in terms of publication, at least), a paucity of imports is supposed.[35] With the onset of the 6th c. BC and the foundation of the northwestern Adriatic emporia[36] of Spina and Adria,[37] Corinthian and Athenian pottery starts to sporadically appear in the area of the northeastern Adriatic.[38] Imports of more numerous western Adriatic[39] and more sporadic Greek pottery will continue throughout the late Iron Age.[40] Alongside transmarine imports, products

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Tonc 2022 with bibliography therein) which seem to indicate the presence of Japodian communities in the northern part of what is traditionally understood as Liburnia (i.e., Roman-era Liburnia) and which do mention other groups as well (e.g. Blečić Kavur 2024, 18–19). Thus, geographical referencing will be used throughout.

[30] Čače 2002, 97; Matijašić 2009, 30–47; Barnett 2016; Čače, Milivojević 2017, 442–443.

[31] Barnett 2017; D'Ercole 2018; Tonc 2022; Konestra, Ugarković 2025, 47–48.

[32] E.g. most recently Čelhar, Borzić 2024, 174–175.

[33] Yntema 1990.

[34] Glogović 1989, 37; Batović 2004, 604, 632; Turk, Murgelj 2008, Fig. 10, Fig. 12; Blečić Kavur 2015, 197–200; Čelhar, Borzić 2016, 72–73, n. 25, Fig. 2; Govorčin, Borzić 2018, 35–36; Ugarković, Starac 2022, 257–258; Čelhar et al. 2023; Škoro 2023; for earlier trans-Adriatic interactions visible within pottery assemblages see e.g. Arena 2020; Arena et al. 2020, both with earlier bibliography.

[35] Petrić 1999; Brkić Drnić, Borzić, Drnić 2024.

[36] Though never called as such by the sources, their role in trade is undeniable, see D'Ercole 2018.

[37] See D'Ercole 2018.

[38] Glogović 1989, 38; Kirigin 2000; Mihovilić 2002; Mihovilić 2004; Šešelj 2009, 478–483; Ugarković 2019; Ugarković, Starac 2022. For southern Dalmatia see e.g. Borzić 2022 with earlier bibliography.

[39] Batović 2004, 604, 632.

[40] Major centers for redistribution of goods within the territories considered here are deemed to be Zadar, Osor and Gradina on Murter island (Šešelj 2009, 481), as well as Nesactium in Istria (Mihovilić 2001; Mihovilić 2002; Čelhar, Borzić 2016).

of eastern Adriatic workshops will start to circulate after the onset of production within the Greek colonies[41] on the central Adriatic islands of Vis (Issa) and Hvar (Pharos),[42] their number further increasing with the expansion of the Roman influence in the region.[43] From the 4th c. BC, a more massive circulation of amphorae is ascertained.[44] In the same timeframe, production of various shapes of coarse ware continued within the Iron Age communities of the eastern Adriatic.[45]

Production of a wider array of ceramics and pottery has been, more or less, firmly linked with the *apoikiai* of Issa[46] and Pharos,[47] though mostly on indirect production indicators or features in secondary deposition.[48] On the other hand, local/regional production of certain fine wares in the area of northern Dalmatia or other communities of the central eastern Adriatic has been ascertained on morphological and archaeometric grounds,[49] as well as on limited indicators of production.[50] Finally, an actual foreign setup of conclusively identified pottery workshops in Kvarner and northern Dalmatia can be dated to the last decades of the 1st c. BC, and have been ascertained in two cases:[51] in Crikvenica (Kvarner) and Plemići Bay

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[41] The term "colony" is used here bearing in mind all the nuances emerging from recent scholarly discussions (e.g. Hodos 2014, 25–26; Guggisberg et al. 2022). As the debate is ongoing, and not necessarily crucial for the analyzed matters in this paper, it will be used throughout, and alternated with *apoikiai*, settlements, urban centers, to indicate "Greek" foundations. The latter term would necessitate a more nuanced counter-phrase, too (Hodos 2014), though overseas settlers at Issa and Pharos are mostly termed "Greeks" in modern scholarship (e.g. Kirigin, Barbarić 2019). However, as far as Issa is concerned, at least, the organization of their arrival occurred in another colonial setting (thus, Issa is sometimes defined as a subcolony, later having its own sub-colonies, see Lombardo 2009). As such, their Greekness can be rightly questioned (but first a definition of Greekness would be necessary). Thus, though aware of the terminological pitfalls, we choose to use the aforementioned terms consciously and refer to a wider bibliography contained in e.g. Hodos 2014; see Donnellan, Nizzo 2016 for a discussion on the nuances of *colonies* and *Greekness*.

[42] Šešelj 2009; Miše 2015; Borzić 2017b, 63–64; Ugarković 2019; Govorčin 2021, 16.

[43] Lipovac Vrkljan, Konestra 2018 with bibliography therein; Ugarković, Starac 2022; Čelhar et al. 2023.

[44] Kirigin, Katunarić, Šešelj 2005; Radić Rossi 2017; Borzić 2017; Glavaš, Konestra, Tonc 2020.

[45] Batović, Batović 2013; Barbarić 2016; Borzić 2017, and references cited below.

[46] Several kilns were found in a sub-urban area of Issa, though their dating is uncertain, Miše, Čargo 2010, 9–11; Ugarković, Šegvić 2018, both with earlier bibliography.

[47] Katić 2001; Kirigin et al. 2002; Kirigin 2004, 151–173; Jeličić Radonić, Katić 2015, 140–145; Kirigin 2018, 405; Ugarković, Šegvić 2018.

[48] E.g. fragments of kiln structures walled in more recent architecture or overfired sherds found within levelling dumps. Lipovac Vrkljan, Konestra, Ugarković 2018 with previous bibliography; lastly Ugarković, Šegvić 2017; Kirigin 2018; Ugarković, Šegvić 2018; Miše et al. 2020; Charlton, Miše 2024.

[49] Brusić 1999, 14; Šegvić et al. 2012; Šegvić et al. 2016; Ugarković, Šegvić 2017; Ugarković, Šegvić 2018; Miše et al. 2020; Ugarković, Starac 2020, 260–261.

[50] Mostly finds of moulds and/or a concentration of finds. Brusić 1999, 14; Lipovac Vrkljan, Konestra, Ugarković 2018 with previous bibliography.

[51] Lipovac Vrkljan, Konestra, Ugarković 2018; Konestra, Kurilić, Lipovac Vrkljan 2021.

(northern Dalmatia). These can be linked to wider landed estates and were, in all probability, set up by Italic immigrants/landowners.[52] Moreover, in both cases the production repertoire is quite varied (amphorae, ceramic building materials, fine and common ware, etc.), and it can be typologically linked to the Po Valley, the western Adriatic, or, more in general, Italic productions.[53] Similarly, early Roman pottery workshops in Istria are connected to senatorial (and later Imperial) landed estates.[54]

The evidence – recognizing technological traditions

As is usually stated, from the fifth phase of the Liburnian culture (4th–1st c. BC),[55] pottery, mostly imported fine wares (see *infra* for their provenance), started to be more widely employed in the funerary rituals of the communities of northern Dalmatia.[56] A general preference towards the research of funerary contexts,[57] but mostly their better documentation and publication, allowed the collection of an array of vessels related to the so-called Hellenistic graves associated with the hillforts of northern Dalmatian communities, and dominated by the mould-made krater (Fig. 2).[58] Still insufficient data from Kvarner precludes any firm conclusions on this, though a few excavated sepulchral contexts indicate the use of fine wares within the funerary ritual at least from the 4th c. BC.[59] In recent years, contextual publications of finds from several northern Dalmatian hillforts provided new data on the consumption of imported fine ware in a settlement context.[60] Similarly, in Kvarner, a well-stratified dump from the town of Krk (island of Krk)[61] provided the first piece of data on the circulation of the various wares in this area, as well as their ample use within the settlement context. Other, unfortunately, stray finds stem from Rijeka and Osor (island of Cres), and preliminary settlement data is now available from Lopar (island of Rab), Sv. Trojica on the Velebit Littoral, and a few other occurrences elsewhere.[62]

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[52] Lipovac Vrkljan, Konestra, 2018; Konestra, Kurilić, Lipovac Vrkljan 2021; Konestra, Lipovac Vrkljan, Welc 2022.

[53] Ožanić Roguljić 2012; Lipovac Vrkljan, Konestra, 2018.

[54] Bulić, Koncani Uhač 2018.

[55] Batović, Batović 2013, 51, 59.

[56] Brusić 2000a; Brusić 2000b; Batović 2004, 613, 629; Batović, Batović 2013; Blečić Kavur, Podrug 2014; Brajković 2018; Kukoč, Čelhar 2019; Čelhar, Borzić 2024.

[57] Batović 2004, 591; Čelhar, Borzić 2024.

[58] Brusić 1999; Brusić 2000a, b; Batović 2004, 632; Miše 2017; Kukoč, Čelhar 2019; Miše 2019; Borzić 2022; Čelhar, Borzić 2024, 175.

[59] See Konestra, Ugarković 2025 with earlier bibliography.

[60] Zemunik: Čelhar, Borzić 2016; Asseria: Govorčin, Borzić 2018; Iader: Čondić, Vuković 2017; Govorčin 2021 with bibliography.

[61] Ugarković, Starac 2022.

[62] Blečić Kavur 2015; Tonc, Radman Livaja 2017; Konestra, Ugarković 2025.

Fig. 2. Mould-made krater from the "vrt Šinigoj"/Krk necropolis (Inv. No. PPMHP 103855, The Maritime and History Museum of the Croatian Littoral Rijeka, with permission; drawing published in Brusić 1988, T. V. 1)

Within these assemblages, but especially if we expand the field of investigation, we may ascertain the circulation of several western Adriatic, and more conclusively defined eastern Adriatic productions. Though the latter are sporadically distributed in northern Dalmatia and the northeastern Adriatic,[63] where a clear preference towards Apulian vessels was noticed,[64] imports of eastern Adriatic products did start with Issaean Gnathia (mid-3rd c. BC)[65] and its later, so-called Late Hellenistic painted ware development.[66] Later production at Issa included black-, red-, brown-, and white-coated wares, grey ware[67] and its relief-decorated variant,[68] and so-called plain-painted ware, which finds its models in Italian-banded ware,

[63] The ware is most common in central Dalmatia (Miše 2015, 41, 64, Map 7), though recent finds do indicate it reached other areas, as well, see: Govorčin, Borzić 2018; Ugarković, Šegvić 2018, 92; Govorčin 2021; Čelhar et al. 2023; Konestra, Ugarković 2025.

[64] Ugarković, Starac 2022, 259.

[65] Miše 2015, 36. Production of other wares and ceramics at Issa probably started earlier, most recently in Ugarković, Šegvić 2018, 92–93.

[66] Kirigin 1990; Miše 2015

[67] Ugarković, Šegvić 2017.

[68] Testified to by the find of a mould, Brusić 1999, Fig. 22: A121.

as well as *stile misto* pottery.[69] The circulation of these later wares in the area under study was more substantial, in some cases massive (i.e. mould-made ware).[70]

Actual evidence of Issaean workshops is limited; it includes mentions of kilns, of uncertain date and character, and finds of dumps with wasters and moulds.[71] In any case, the findspots of these indicators allow us to place them in the sub-urban, *extra muros* areas of Issa (in concomitance with its necropolises),[72] possibly suggesting the existence of potters' quarters.[73] The latter might be further explored in the case of the Mala Banda site, a micro position within the western Issaean necropolis of Martvilo. Here, overfired pottery, several moulds for grey relief ware production, and structures datable to the Greek-Hellenistic period would suggest the existence of a potter's workshop(s).[74]

Within the Greek settlement of Pharos, production of fine ware is supposed,[75] though not directly ascertained, while several indicators point to the production of amphorae, coarse ware, ceramic building materials, pithoi, terracottas, and loom weights during two phases of pottery workshops spanning the 4th–3rd and 2nd–1st c. BC respectively.[76] Some Pharian pottery has been tentatively recognized further north along the Adriatic.[77] Within the assemblages of the Greek colonial centers of the eastern Adriatic, cooking and common ware do appear,[78] and their local production is mentioned in regard to both Pharos and Issa.[79]

A somewhat different case is that of the settlement at Resnik, identified as the Siculi known from historical sources,[80] where production of grey- and brown-coated ware, as well as grey relief ware, was inferred based on the quantity of finds, the discovery of a mould and a mould stamp, and the archaeometric characterization of pottery.[81] The connection of Si-

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[69] Šegvić et al. 2016, 48; Ugarković, Šegvić 2017, 163; most recently in Ugarković 2019, 100–106, 111–115 with extensive earlier bibliography, Miše et al. 2020.

[70] E.g. Brusić 1999; Batović, Batović 2013; Ugarković, Starac 2022.

[71] Certain indicators clearly belong to the Roman period, e.g. a mould for Firmalampen production, and thus possibly also the kiln in whose vicinity it was discovered (Miše, Čargo 2010, 21–25, Fig. 10; Čargo, Kamenjarin 2020).

[72] Miše, Čargo 2010, 31–32, Fig. 1; Ugarković, Šegvić 2018.

[73] Čargo 2002; 2007; Lipovac Vrkljan, Konestra 2018, 15; Kamenjarin, Čargo 2020.

[74] Čargo 2002, 408–409; Čargo 2007, 52–56; Čargo, Miše 2010; Čargo, Kamenjarin 2020. The site was later overlaid by a Late Antique necropolis, thus, earlier remains were severely disturbed.

[75] Ugarković, Šegvić 2018; Miše et al. 2020 with earlier bibliography.

[76] Kirigin et al. 2002; Katić 2001; Jeličić Radonić, Katić 2015, 140–145; Kirigin 2018, 405; Ugarković, Šegvić 2018, 93; Miše et al. 2019; Miše et al. 2020.

[77] Konestra, Ugarković 2025, 57, n. 397.

[78] E.g. Ugarković et al. 2022, T. 5.

[79] Kirigin 2018, 405; Miše et al. 2019; Čargo, Kamenjarin 2020, 329.

[80] Plin. *HN.* 3.26.

[81] Brusić 1999; 14, Fig. 22, A120, A122; Šegvić et al. 2012; Kamenjarin 2014; Miše 2015, 42, 59; Kamenjarin 2017; Ugarković, Šegvić 2018; *contra* Miše et al. 2020; Čargo,

culi with Issa is highlighted by several indicators, including that of pottery production.[82]

The only so far ascertained indicator of Mediterranean-style fine ware production within an Iron Age community of northern Dalmatia is a mould related to relief ware manufacture found in Zadar, which was, in all probability, used for the shaping of kraters and can be stylistically linked to a vessel discovered at Resnik.[83]

Conclusively identified pottery production centers (that is, those where workshop infrastructure is preserved *in situ*) can, nevertheless, be dated only to the last decades of the 1st century BC (Crikvenica, Plemići Bay), i.e., after the onset of Roman administration in the area. The distribution of their products, with few exceptions, seems to be limited to the area of Roman Liburnia.[84] Both workshops produced a wide range of classes and shapes (amphorae, ceramic building material, common ware, ceramic implements, etc.),[85] including, in the case of Crikvenica, fine tableware (certainly thin-walled ware, possibly red slip ware).[86]

Archaeometry, which has begun to be applied to fine wares over the past few decades, has yielded interesting – though somewhat contrasting – results. In any case, several production *loci* have been ascertained, some congruent with the Greek settlement, while other compositional groups might be indicative of workshops outside Issa and Pharos, perhaps on the mainland of central Dalmatia or even further afield.[87] This data gave rise to the term "Dalmatian production" of Hellenistic tableware,[88] though at the current stage of research, the results are still somewhat inconclusive.[89] On the other hand, archaeometry of autochthonous coarse ware is in its infancy, and thus far only Bronze Age assemblages have been tackled, evidencing chronological and related social differentiation between the early and late phases of production. As such, the results cannot be automatically applied to later production, though one constant seems to be the use of locally sourced clay resources.[90] Aspects of clay sourcing have recently been addressed for regionally produced Hellenistic fine wares as well, indicating

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Kamenjarin 2020; Production at Gnathia was also assumed by archaeometry, see Šegvić et al. 2012 *contra* Miše 2015, 42, as well as of red-coated ware, Miše 2015, 60.

[82] Ugarković, Šegvić 2018, 103; Čargo, Kamenjarin 2020.

[83] Brusić 1999, 14, Fig. 21, the author identified Zadar to be a branch of the Resnik workshop, though both are supposed only on indirect indicators; Ugarković, Šegvić 2018, 101; Govorčin, Borzić 2018, 54.

[84] Lipovac Vrkljan, Konestra, Ugarković 2018; Lipovac Vrkljan, Konestra 2018; Konestra, Kurilić, Lipovac Vrkljan 2021.

[85] Ožanić Roguljić 2012; Lipovac Vrkljan, Konestra 2018, 16–19.

[86] Ožanić Roguljić 2011.

[87] Šegvić et al. 2012; Šegvić et al. 2016; Ugarković, Šegvić 2017; Ugarković, Šegvić 2018; Miše et al. 2020.

[88] Šegvić et al. 2012.

[89] Latest in Ugarković, Šegvić 2018; Miše et al. 2020; Čargo, Kamenjarin 2020.

[90] Kudelić et al. 2023

a possible multi-workshop use of the same clay beds and maritime transport of raw materials.[91] This opens up a whole new aspect on the interrelation of multiple communities of practice, which requires further detailed exploration.

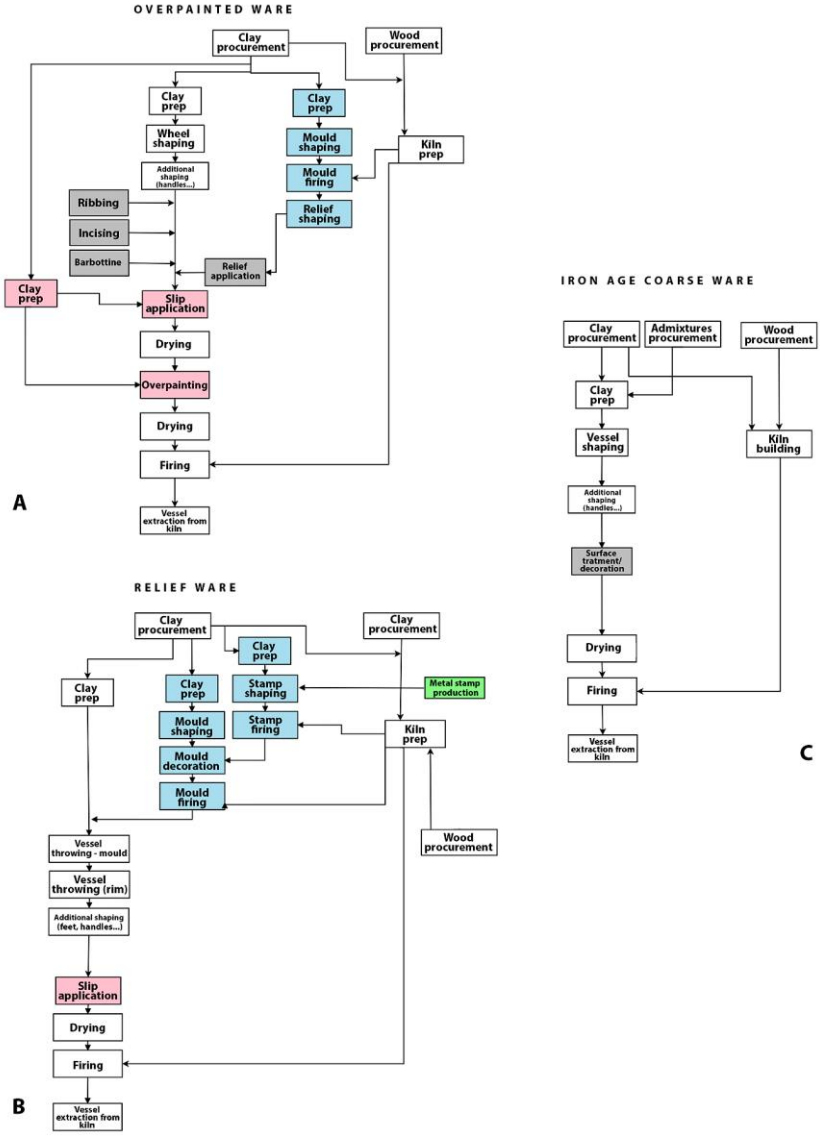

Fig. 3. *Chaîne opératoire* of: A – overpainted slipped ware, B – mould-made ware, C – Iron Age coarse ware (author: A. Konestra)

[91] Šegvić et al. 2016; Miše et al. 2020.

When discussing pottery production tradition, craft specialization and its evolution through innovation, two aspects should be kept distinct – one is the morphological, and, thus, functional, similarity, and the other is the actual transfer of all (or most) aspects of the pottery production technology to other areas, i.e. communities. An analysis of the pottery assemblage is necessary to assess such processes, aimed not only at the reconstruction of the morphological repertoire, but also of the *chaîne opératoire* of each pottery class.[92] While, as noted above, both aspects of the eastern Adriatic (late) Iron Age pottery have so far been only preliminarily dealt with, a clear technological difference between wares produced within a colonial setting and vessels produced by native communities can be ascertained. Thus, notwithstanding the difficulties posed by the described state of the art, a *chaîne opératoire* model can be proposed (Fig. 3), i.e., a general model of the operational steps undertaken for pottery produced within the local communities, and that for two distinct classes of imported wares – Gnathia- and mould-made wares – which were, in all probability, produced in the colonial settlements of the eastern Adriatic, as well as in the wider central Mediterranean area, and for which production in other eastern Adriatic areas has been tentatively proposed.[93] Data on pottery produced by the autochthonous Iron Age communities is limited and mostly descriptive, with varied attention given to technical details.[94] The technical data regarding Gnathia and Hellenistic relief ware is more comprehensive and is supported by archaeometric analyses.[95] Since detailed analytical data is, in most cases, still missing, only those operations that can be reconstructed based on autoptic observation were plotted,[96] thus, necessary simplification was applied, while the main distinctive operations were, nevertheless, identified.

Pottery production within the autochthonous communities

Pottery and its production have rarely been the focus of research related to the Iron Age of the eastern Adriatic. Nevertheless, based on evidence from several excavations, Š. Batović proposed common traits of locally produced mostly coarse ware pots, and defined their main shapes, advancing the hypothesis of the existence of multiple production centers, probably related to single communities or settlements,[97] since each site pre-

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[92] Dietler, Herbich 1998; Rebay-Salisbury, Brysbaert, Foxhall 2014; Salisbury, Rebay-Salisbury 2017, 20–21; Bernardo-Ciddio 2022, 100–101; Porqueddu et al. 2023.

[93] Green 2001.

[94] See below for references.

[95] For Gnathia data is mostly based on: Green 2001; Miše 2015; Charlton, Miše 2024, and data for Hellenistic relief ware is based on Rotroff 1982; Rotroff 2006; Kamenjarin 2017.

[96] For a full methodological procedure used in pottery *chaîne opératoire* reconstruction, see Roux 2016.

[97] Batović 2004, 631; Barbarić 2016, 129; Borzić 2017b, 82.

sents local specificities, as has been ascertained in Kvaner as well.[98] Further research on northern Dalmatian coarse ware, in particular stemming from the dwelling features at the Radovin hillfort, identified several additional features and defined the most common shapes, confirmed by data provided by the analyses of finds from other sites.[99] Shapes of the local repertoire include food preparation, storage, and food and liquids consumption vessels, i.e., cooking (storage?) pots, bowls, cups, trays, baking covers, and lids.[100] Generally, the fabric of the majority of the vessels is coarse, with mostly calcite inclusions of various shapes,[101] while the surface was often covered with a clay slip, sometimes additionally smoothed.[102] The vessels were mainly shaped by hand,[103] though a single group of possibly wheel-made vessels has been singled out on the basis of the fabrics, as well as the method of firing, though no additional data is available on this group.[104] Many of the mentioned shapes often contain various forms of decoration in multiple parts of the vessels. Most often, the decoration is applied, impressed, incised, or ribbed, while the handles may also be spiral and the rims faceted.[105] The firing is believed to have been carried out in pit kilns or in the open,[106] with temperatures between 600–800°C, and predominantly in an oxidizing atmosphere.[107] Similar characteristics have been established for locally produced pottery throughout the 1st millennium BC along the northern and central eastern Adriatic, though some differences could be noted in the decorations and the addition of organic clay admixture, while a generalized lack of modelling on the potter's wheel and a lack of painted decoration is highlighted.[108] In addition, a generally non-homogeneous morphology has been observed, meaning that while shapes can be generally compared, specific types usually appear at individual or nearby settlements at most. Only a few forms are more widely distributed, and these often show parallels with types from the western Adriatic.[109]

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[98] Glogović 1989, 36–37.

[99] Šešelj, Vuković 2013; Vuković 2014, e.g. Zadar: Čondić, Vuković 2017.

[100] Vuković 2014, 22–23; Čondić, Vuković 2017, 51.

[101] Batović, Batović 2013, 48.

[102] Šešelj, Vuković 2013, 337; Čondić, Vuković 2017, 51.

[103] Batović, Batović 2013, 48.

[104] Šešelj, Vuković 2013, 337.

[105] Vuković 2014.

[106] In the whole area of the northern and central eastern Adriatic, no firing installations or areas have been discovered so far (Barbarić 2016, 125), with the exception of Istria (Mihovilić 2014, 304–312; Mihovilić 2021, 520, fig. 4).

[107] In fact, probably not controlled, see Barbarić 2016, 125; Šešelj, Vuković 2013, 338–339; Čondić, Vuković 2017, 51.

[108] Mihovilić 2014, 304; Barbarić 2016, 124–125. Similar features appear on other ceramic objects as well, such as spindle whorls, loom weights, portable hearts, etc. (Šešelj, Vuković 2013; Mihovilić 2014, 304).

[109] Barbarić 2016, 129–131, 136

Pottery production within colonial (and related) centers in central Dalmatia

Thus far, as mentioned above, no pottery production center outside of the Greek cities of central Dalmatia has been ascertained with even a remote level of certainty in the areas under scrutiny. This is assuredly true for the timeframe of the 4th–2nd c. BC and fine ware production, i.e., during the circulation of black slipped and overpainted wares. Nevertheless, certain shapes and overpainted decorative motifs seem to be alien to the central Dalmatian repertoire and that of the most widely imported Italic workshops (finds from Krk, Asseria, Cape Ploča, Trogir, and Prozor in Lika), and another production area was assumed for them (Fig. 4).[110] Similarly, it has recently been proposed that it was not only Issaean overpainted wares, though in limited quantity, which circulated in the northeastern Adriatic, but also possibly products of Pharian workshops.[111] In the last phase of the

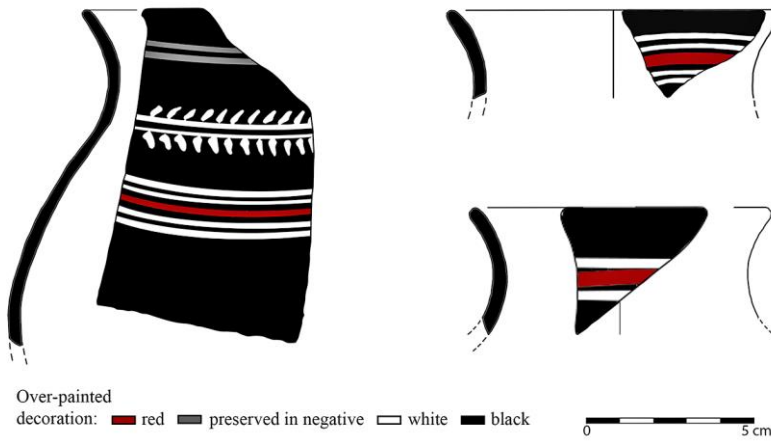

Fig. 4. Overpainted black slip ware jugs from Krk – Porta Pisana
(according to: Ugarković, Starac 2022, T. 1/4–6; drawing: M. Korić, A. Konestra)

local Iron Age, a more massive production of relief ware can be assumed on the basis of its widespread distribution,[112] especially in the mentioned graves of certain communities.[113] Its main production center is thought to have been Issa;[114] however, due to its widespread distribution, as well as

[110] Govorčin, Borzić 2018, 42; Ugarković, Starac 2022, 560–261; Konestra, Ugarković 2025, 55.

[111] Konestra, Ugarković 2025, 55–56.

[112] The ware was ascertained in northern Italy as well, Dobreva, Mantovani 2017.

[113] Brusić 1999. For northern Dalmatia: Batović, Batović 2013; Čelhar, Borzić 2024; Histria: Mihovilić 2014, 278; Kvarner: Konestra, Ugarković 2025.

[114] Lastly Čargo, Kamenjarin 2020.

mould finds and preliminary archaeometric data, production outside the Greek insular cities has also been proposed – particularly at Resnik (Siculi), and tentatively at Zadar.[115]

Since data on possible production *loci* is missing, we will attempt to assess the possible modes of technological transfers,[116] starting from the first fine ware class definitively produced on the eastern Adriatic, i.e. Gnathia ware from Vis.[117] On the basis of the material from the tombs of Martvilo (later backed by data from the eastern Issaean necropolis of Vlaška Njiva as well),[118] a ware assimilable to southern Italian Gnathia production has been defined and linked more directly with the RPR group of late Canosan production.[119] As suggested,[120] the possibility of the potters' relocation should be considered, especially if no other fine ware production did indeed exist at Issa before.[121] In fact, if the *chaîne opératoire* of Gnathia production is assessed (Fig. 3), and if the morphology and other features of the products are considered, foreign knowledge must have been involved in the setup of the Issaean workshops. Similarly, an Apulian influence on Issaean coroplastic production has also been suggested.[122]

Although no production structures have so far been studied in detail,[123] the technological features of Issaean Gnathia allow us to infer some details on its production organization. The vessels were wheel-thrown, with the clay lacking inclusions, and possibly with a restricted use of moulds (e.g. moulded elements on the handles). Tools were likely used to produce the fine ribbing on the lower part of the vessels, smooth the surfaces, and make incisions, among other things. Depurated liquid clay – slurry – was used for the slip, applied either by brush or through immersion,[124] as well as for the application of coloured decorative elements. In Italian Gnathia the foot was thrown separately.[125] Based on recent research, it has been ascertained these, and other slipped wares, were fired in a strictly controlled environment, making adjustments to the firing atmo-

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[115] Šegvić et al. 2012; Ugarković, Šegvić 2018; Miše et al. 2020; Čargo, Kamenjarin 2020. For the various instances of production indicators, see Lipovac Vrkljan, Konestra, Ugarković 2018. For moulds as sole indicators of production location, the interpretations are varied, see e.g. Hoffmann 2023, 51; Guldager Bilde 2024, 38–46.

[116] Salisbury, Rebay-Salisbury 2017, 24.

[117] Production of pottery in the Alto Adriatico style has been assumed at Issa as well, and is also indicated by the archaeometry, see Šegvić et al. 2016, 46 with earlier bibliography.

[118] Čargo 2010; Ugarković 2019.

[119] Miše 2015

[120] Green 2001, 70; Miše 2015, 40; Miše et al. 2020, 2.

[121] Cf. Zuchtriegel 2017, 197–215.

[122] Čargo 2008, 194 with earlier bibliography.

[123] All kiln finds are only descriptively reported and/or date to the end of the 19th – first half of the 20th century, most recently in Miše, Čargo 2010.

[124] Charlton, Miše 2024.

[125] Green 2001, 58.

spheres so as to obtain different body and slip colouring.[126] Based on archaeometrical analyses, it has been proposed that the potters of Issa fired their wares at slightly lower temperatures compared to the Italic workshops, evidencing a possible local development within the overpainted ware industry.[127]

Similarly, the production of relief ware of (central?) Dalmatian origin and widely distributed in northern Dalmatia and the northeastern Adriatic[128] presupposes a set of technical features and operations that can be inferred from the objects themselves (Fig. 2, 3), though, in this case, data on production *loci* seems to be less sporadic, at least where Issa is concerned (see above). In fact, moulds and a stamp, among other items, have been found there, associated to structural remains supposedly belonging to a workshop,[129] and, more recently, archaeometrical analyses have confirmed the primary role of Issa in mould-made production.[130] Drawing on data from Athens and Pnyx,[131] we can assume that the Dalmatian production of mould-made ware followed the same manufacturing process.[132] As opposed to the *chaîne opératoire* of Gnathia pottery, the production of these vessels required, firstly, the manufacture of the mould, also wheel thrown, prior to which the stamps used to decorate it must have been made (either in clay, wood or metal).[133] The application of certain parts of the decoration might have been done freehand, as well. Once decorated, the mould had to be fired, and only then could production of the vessel start. After wheel-throwing within the mould, some decorative motifs could be added using additional stamps, while other features were finished freehand or vessel parts were added. Finally the vessel was slipped and fired. Based on the archaeometry, the firing temperatures of Issaean and mainland/unknown pottery production have been ascertained, indicating generally lower firing temperatures for the latter.[134]

While thus far no *in situ* kiln dating to the timeframe of production of Gnathia or Hellenistic relief ware has been researched in detail in central Dalmatia, though possible fragments and other faint traces of such installations were recovered at Pharos[135] and, as mentioned, Issa, the infrastructure of later, early Roman workshops discovered in Dalmatia offer a glimpse into the highly specialized setup of kilns, adapted in their dimensi-

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[126] Charlton, Miše 2024.

[127] Most recently in Ugarković, Šegvić 2018, 92–93.

[128] Most recently in Ugarković, Paraman 2020, 302–304.

[129] Brusić 1999, 14; Čargo 2002, 408–409; Čargo 2007, 52–56.

[130] Miše et al. 2020; most recently in Ugarković, Paraman 2020, 303; Čargo, Kamenjarin 2020, all with bibliography therein.

[131] Rotroff 1982, 4–5.

[132] Čargo 2007, 52–53; Kamenjarin 2017, 8–9.

[133] See Rotroff 1982, 4–5 and Rotroff 2006 for other details as well.

[134] Šegvić et al. 2012: 84.

[135] Kirigin, Barbarić 2019, Fig. 13.

ons to fire different classes of objects, and carefully laid within the workshop so as to allow a smooth workflow of the different specialists involved in production.[136] Apart from that, the use of a mould within fine ware production introduced a set of new conceptual novelties within the industry, such as modular production,[137] which allowed a standardized and mass production of these vessels.[138]

Technological transfer vs. emulation

The appropriation of features of foreign pottery by the craftspeople operating within the Iron Age communities of the areas under study has been noted through the identification of what might be defined as morphological or material imitation and emulation.[139] This has, in fact, been ascertained in various areas of the eastern Adriatic and its hinterland throughout the Iron Age, and several vessels from mostly Istrian and northern Dalmatian funerary contexts, as well as some from a southern Dalmatian sanctuary context serve as interesting examples. The appropriation of technological features of Iron Age pottery by colonial potters has not been explored at all, partly due to the fact that the various assemblages from the Adriatic *apoikiai* have not been thoroughly published,[140] and partly since within those that have been published (again mainly from funerary contexts),[141] the material produced in the Iron Age tradition was very seldom identified. When this occurred, as in Pharos, where 20% of the ceramic material dating to the 4th–3rd c. BC was assigned to "calcite-tempered wares in the local Iron Age tradition", it was interpreted in the context of contacts with native communities,[142] and not as an indicator of hybridity within the technological tradition of this *apoikia*. Similarly, within the ascertained Roman pottery workshops on the eastern Adriatic, no "hybrid" shape inspired by local shapes (or by shapes typical of the central Dalmatian Greek settlement repertoire) was identified.

Locally produced pots related to imported matt-painted pottery have been tentatively identified only in the regions of Dolenjska and Bela

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[136] Lipovac Vrkljan, Konestra 2018. For workshop layout and labor organization, see Murphy 2016.

[137] Rotroff 1982, vii.

[138] For the complexities in the production of mould-made ware, where "mass production does not necessarily imply large-scale" and the possible organization of the workshop, see most recently Guldager Bilde 2024, 38–46.

[139] See in: Balco 2019; Blanco-González et al. 2023, 14–17. Some authors define this process as material entanglement, Stockhammer 2012, 54–56.

[140] Even when publications exist, scholarly attention was mostly caught by the (decorated) fine wares, which are more chronologically sensitive and can be easily studied within established typologies, while coarse and common wares received much less attention in general. This bias characterizes Roman pottery studies, as well.

[141] E.g. Ugarković 2019.

[142] Kirigin, Hayes, Leach 2002, 250.

Krajina,[143] as well as in Istrian Nesactium, where they are defined as "more or less successful" imitations, being only vaguely morphologically related to the imported ware, and are manufactured in two different pottery classes.[144] Š. Batović notes more or less the same regarding the Liburnian pottery production, i.e., a morphological emulation of certain traits of imported vessels occurring within the timeframe of the 7th–5th c. BC.[145]

As noted by V. Barbarić,[146] only a few vessels produced in the autochthonous tradition with foreign morphology have thus far been ascertained within eastern Adriatic (late) Iron Age grave assemblages, mostly within the area of northern Dalmatia,[147] as well as further south,[148] and in Istria.[149] These can be roughly described as vessels for pouring (jugs) and consuming liquids (cups), possible lighting devices (somewhat resembling a *kothon*), and a shape interpreted as a scented oil container—though it may more closely resemble a *guttus*,[150] despite lacking a strainer. At a morphological level, these vessels are a part of a repertoire which was commonly used within the funerary rites at least by some communities of the eastern Adriatic,[151] but for which imported wares were usually selected. Similarly, a range of miniature and handmade vessels recovered from several shrines in the eastern Adriatic (Nakovana, Vilina špilja)[152] may point to a similar phenomenon. They were all produced in the tradition of Iron Age autochthonous pottery, and while some are clearly a smaller sized variant of a large, and, in this case, fine ware vessel, others represent an equifunctional counterpart.

Other than the introduction of shapes which are foreign to the local repertoire, the *chaîne opératoire* of these vessels, i.e., their manufacturing technology, does not drastically differ from that of the local communities of potters. In fact, it was only within the shaping that certain innovations had to be made. Such vessels might, thus, be interpreted as evidence of a mixed-style[153] or a change in *habitus*, created as a local response to new social stimuli,[154] where the only innovation was the adoption of a new morphological trait, while the technological style remained unaltered, meaning

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[143] Turk, Murgelj 2008, 169; Mihovilić 2014, 166–168; 180, 312; Budić 2022.

[144] Mihovilić 2001, 96–98.

[145] Batović 2004, 631; on this aspect, see also Budić 2022, 114.

[146] Barbarić 2016, 134–135, Fig. 15

[147] Glogović 1989, 37.

[148] E.g. Radić, Borzić, Eterović Borzić 2017, Cat. No. 1/12; Borzić 2017b, Fig. 36.

[149] Mihovilić 2014, 174–176

[150] For a possible, though rather distant, analogy, see: https://catalogo.beniculturali.it/detail/ArchaeologicalProperty/iccd_minp_8531336516161

[151] E.g. *gutti* from Kopila on the island of Korčula, Čelhar, Borzić 2024. See also Glogović 1989, 37.

[152] Forenbaher, Kaiser 2003, 78; 2012, 267–268; Perkić 2022.

[153] As in Balco 2019, 193, but in a slightly different context.

[154] Bernardo-Ciddio 2022, 110 with earlier bibliography.

that the local tradition built through its particular *chaîne opératoire*[155] was basically maintained.[156] Actually, the selected vessels mostly correspond to liquid consuming vessels, which evidences a "stylistic alignment"[157] perhaps occurring to fulfil a growing demand for objects that, at that moment, were in short supply. In this way, an equifunctional set was created using traditional manufacturing technology to produce vessels which are morphologically foreign to the local manufacturing repertoire, but are used within local practices. Apart from shape, in fact, no other feature of these vessels can be compared to their imported counterpart, thus, we might assume that decorative, tactile and general aesthetic features were much less relevant than the need to obtain a vessel destined for a specific use (in this case, drinking? libation?).[158]

On the other hand, the described technological features and sets of operations deployed to produce Mediterranean-style fine wares as opposed to pottery manufactured within the autochthonous Iron Age communities clearly illustrate different production traditions within which the artisanal communities involved in the production of each ware operated. These differences are primarily evident in the complexity of the production process (number and sequence of operations), the technological features used (tools, kilns, etc.), as well as in the selection of raw materials.[159] We must, therefore, assume several differences in the tools and implements utilized, but, crucially, in the infrastructure present within the production setting, as well as a more complex organization of human resources, and different levels of their specialization. This is evident from the topography of the possible production *loci* in Issa and Pharos, which do suggest the setup of potters' quarters active over a longer time span, located in sub-urban or marginal areas within the town.[160] The different distribution span of these broadly defined pottery classes implies a different output, hinting at a radically different production organization, i.e., different modes of production and distribution. The *chaîne opératoire* proposed for mould-made ware further suggests the possibility of cross-craft interaction[161] in the production of certain implements, such as decorating stamps,[162] while the transmarine transport of clayey materials,[163] which arises from the

[155] Pauketat 2001, 11.
[156] Gosselain 2016, 203.
[157] Balco 2019, 193.
[158] Balco 2019, 193.
[159] Cf. de Groot 2021, 338.
[160] Cf. Kirigin 2018, 405; Ugarković, Šegvić 2018, 90–93; Čargo, Kamenjarin 2020 for the location and organization of the potters' quarters, see e.g. various contributions in Esposito, Sanidas (eds) 2022; Stissi 2002, 36–73.
[161] Rebay-Salisbury, Brysbaert, Foxhall 2014, 2.
[162] Rotroff 2006.
[163] Both short-distance and longer distance transport have been proposed: Šegvić et al. 2016, 46, 48; Miše et al. 2020, 14.

archaeometry, would point to additional interactions between communities of practice.[164]

This kind of technical complexity and levels of interaction within the production process are indicative of the social background[165] within which the communities of practice working in a colonial setting operated. Long apprenticeship[166] necessary to master wheel throwing, multi-step forming, and more complex firing procedures are indicative of the social and knowledge networks in place within the urban crafting communities of the Greek and, later, urban centers,[167] where Mediterranean-style fine wares had been, in all likelihood, produced over an extended period. They are also indicative of the investment[168] of both time and funds necessary to master the craft and to set up shop. Quick adoption of innovations, such as the introduction of relief ware production, extends these networks beyond the local and regional level,[169] indicating connectivity with the wider Mediterranean world. It also indicates that means to invest and develop these innovations existed on the local level as well.[170] On the other hand, production within the Iron Age communities of the central and northeastern Adriatic functioned within different knowledge networks, perhaps restricted to a site or a microregion, with limited (if any) intersite distribution.[171] As noted above, introduction of innovation within the production practices of these communities was limited, so while it did bring novelties into their *habitus*, it did so within an existing tradition, as limited or no change to the *chaîne opératoire* occurred.

Potters' communities of practice within their social systems

The previously identified, limited appropriation of foreign technologies and production traditions by the Iron Age communities of the eastern Adriatic raise several questions, as elsewhere so-called colonial encounters often led to hybrid objects developed through innovation within local traditions. Apparently, the local traditions did not influence the repertoire or technology of the Roman era pottery workshops in the region either.

Clearly differentiated cultural choices[172] and distinct knowledge networks that have, thus, emerged call for an explanation, which we suggest[173]

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[164] Bernardo-Ciddio 2022, 111.
[165] Bernardo-Ciddio 2022, 99.
[166] Roux, Corbetta 1990; Hasaki 2012a, 257–258; Hasaki 2012b; Melko 2017.
[167] E.g. Šegvić et al. 2016, 46. See also Nikolakopoulou, Knappett 2017, 112–113.
[168] Knappett, van der Leeuw 2014, 81–82
[169] Cf. Ugarković, Šegvić 2018, 93.
[170] Cf. Rotroff 2006, 371 with earlier bibliography.
[171] Barbarić 2016, 136
[172] As in Salisbury, Rebay-Salisbury 2017, 20.
[173] E.g. Thér and Mangel 2024, especially p. 25. For the relationship of production systems and economic systems, see Costin 1991, 2–3; for technical systems as dependent on social processes and relations, see Dietler, Herbich 1998, 238.

to look for at the social and economic level. Firstly, heightened mobility within the craft communities of the insular colonial urban centers can be observed from the onset of production,[174] though these seem to be unilateral and trans-Adriatic, perhaps intra-insular, but certainly excluding the Iron Age coastal communities from knowledge transfer.[175] The recognized phases of Issaean pottery production might signal an influx of not only new stylistic stimuli, but also of an actual craftsmen relocation,[176] i.e. technological transfer through mobility and the transmission of knowledge. Secondly, though data is limited, the urban setting proposed for both Issaean and Pharian pottery workshops opens questions related to the procurement of raw materials and the deployment of labour,[177] as well as to the economic role this craft had. The latter was clearly not insignificant, as product commercialization testifies to a generation of surplus, and targeted commercial production of some vessels, such as amphorae,[178] must also be considered, pointing to its functioning with product commercialization in mind.

Entrepreneurial craftsmen were, in all probability, the leaders of this industry, interacting with other communities of practice when procuring raw materials or tools, and organzing the commercialization of products,[179] while those involved in the latter area might have acted as brokers between the various communities involved.[180] They identified with their peers as a group[181] through a shared technical identity,[182] or even within more formal modes of association.[183] On the other hand, not much is known about the social organization of pottery production within the Iron Age communities, though the existence of small-scale workshops is inferred,[184] possibly organized within a domestic setting,[185] clearly pointing to different technical identities. Private ownership of land testified at Pharos, inferred for Issa, and proved by the Psefizm of Lumbarda on the island of Korčula[186] beg the questions of the ownership of clay beds and woodland from which raw materials were extracted, as well as on the relationship (lease, commercial acquisition, etc.) of these by the workshops.

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[174] Green 2001, 70; Miše 2015, 40; Miše et al. 2020, 2. Cf. Zuchtriegel 2017, 197–205.

[175] A good analogy is provided by the movements of potters in southern Italy and Sicily in the 5th c. BC, Robinson 2022, Fig. 5.1

[176] Cf. Brecciaroli Taborelli 2017, 35–41. For Issa, see: Miše 2015, 35–37.

[177] Bentz 2018.

[178] Kirigin 2018, 407–408.

[179] Archibald 2013, 152; Bentz 2018, 108–109, Fig. 11.

[180] Knappett, van der Leeuw 2014, 73

[181] See e.g. Murray 2024.

[182] Gosselain 1998.

[183] Arnaoutoglou 2021.

[184] Mihovilić 2014, 304; Barbarić 2016, 136.

[185] Cf. de Groot 2021, 338.

[186] Zuchtriegel 2017, 113–114, 126–128; Kirigin 2018; Marohnić 2022 with earlier bibliography.

Similarly, the seemingly enormous (observed on a local scale) output of the Roman pottery workshop in Crikvenica might be, in part, explained with its setting within a *saltus*, where all raw materials were available and directly owned, lowering the costs of their acquisition and transport. Conversely, nothing is known about landownership within the late Iron Age communities of the eastern Adriatic, though some evidence of territorial boundaries[187] does suggest communal ownership within the extra settlement areas.

The different social roles within their communities,[188] but mainly the different economic and social backgrounds[189] within which the two broadly defined crafting communities operated, created a strong bias against their interaction through the transmission of knowledge. Simply put, the social organization of the late Iron Age communities, within which the potters did not operate within an economy centered on longer-distance trade, and did not make use of a complex network of attached specialists, precluded the possibility of craftsmen mobility within the two distinct communities of practice operating in the pottery industry of the eastern Adriatic. In our opinion, it is for this reason that for the better part of the period under study there was no transfer of knowledge, which was necessary to introduce the technology of wheel-throwing,[190] and, therefore, of all other operations required for Mediterranean-style fine ware production within the late Iron Age communities of the eastern Adriatic. For the same economic and social reasons, "hybrid" products, for which novel production strategies should have been deployed, never seem to have emerged, and only morphological emulation occurs as equifunctional vessels appear within certain Iron Age contexts.

The mould for relief ware production uncovered in Zadar,[191] and the possible existence of workshops at Siculi, might prove the point. Unfortunately, given the absence of a clear archaeological context, the object from Zadar remains both intriguing and questionable, as its portability raises numerous questions about its originally intended function within the late Iron Age community of Iader.[192] It might, however, be a very faint indicator of social change bringing forth artisanal mobility (perhaps from

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[187] Čače 2006; Čače 2007; Glavaš 2018; Čelhar and Zaro 2023.

[188] Bernardo-Ciddio 2022, 110–111. For the changing role of craftspeople within colonial settlements, see Zuchtriegel 2017, 197–215.

[189] Cf. Zuchtriegel 2017, 197–215.

[190] For wheel-throwing technological transmission see e.g. Bettelli 2009, 29; Nikolakopoulou, Knappett 2017, 111–112. The object is, in its own right, a complex tool or mechanism whose production technology should also be transmitted, as well as the knowledge of the various kinds of wheels necessary for different vessels throwing, Hasaki 2012a, 258–259.

[191] On the basis of archaeometric and distributional data, Zadar was noted as a possible production center for the supply of grey ware to a variety of sites, see Ugarković, Šegvić 2018, 101.

[192] Hoffmann 2023, 51; Guldager Bilde 2024, 38–46.

Siculi?)[193] and occurring in the latter part of the hereobserved period (2nd–1st c. BC) within a rapidly developing proto-urban center.[194] Similarly, technological transfer from insular communities to Siculi, and perhaps to other newly established central Dalmatian coastal settlements, is indicative of a "geography of practice"[195] with *loci* where the same technological styles could be easily deployed.[196] At this point, though, we must already seriously consider the Roman involvement in the economy of the soon-to-be province, and especially in the major cities of northern Dalmatia, such as Zadar, as well as their constant negotiations with Issa.[197] In fact, a strong reliance on mobility and actual craftsmen relocation as a necessity for technological transfer is exemplified, at least in the areas under scrutiny, by the setup of ascertained Roman pottery workshops in Dalmatia. These developed within properties belonging to Italic entrepreneurs or the aristocracy, as an industry catering to the needs of the estate and the commercialization of its products,[198] fully integrated into the new economic model introduced by the Roman conquest. The technological choices deployed by their craftsmen were equally foreign to the local milieu (or that of the central Dalmatian *apoikiai*), while the morphology of their products was fully in line with the Italic imports that flooded the markets in the same timeframe.[199] They did not foster "hybridity", nor did they generate local innovation.[200]

In conclusion, the seeming lack of technological transfer between the two broadly identified potters' communities of practice can, thus, be explained through their operating within distinct political and social settings and networks which did not encourage artisanal mobility necessary to foster innovation through the transfer of knowledge and trigger change within technical processes of pottery production. At the current stage of research, the hypothesis that fine ware production occurred within Iron Age communities in this area should only be expected in its later phases and primarily in regions where a significant influx of outsiders can be confirmed. In fact, other social actors, such as merchants and mariners, and a heterarchical organization[201] of the communities of northern Dalmatia and

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[193] Brusić 1999, 14.

[194] Ugarković, Šegvić 2018, 101; Govorčin, Borzić 2018, 54.

[195] In Gosselain 2016, 201 after Wenger 1998.

[196] For e.g. historical sources testify to the potters' mobility between Athens and Ephesos in the 4th c. BC. Such transfers led to the marked development of the Ephesian Hellenistic pottery industry, Davies 2011, 188 with earlier bibliography.

[197] Kuntić-Makvić 2002; Šešelj 2009, 638–639; Šuta 2011, 21–22; Milivojević 2021, 252–255; Ugarković, Starac, 275.

[198] Lipovac Vrkljan, Konestra 2018; Konestra, Kurilić, Lipovac Vrkljan 2021.

[199] Ožanić Roguljić 2012.

[200] Konestra, Lipovac Vrkljan 2018.

[201] Budić 2022, 128; Konestra, Ugarković 2025, 61; see also Thurston 2009, 360–361 with earlier bibliography and Vranić 2022, 39–40.

the northeastern Adriatic, might have played a crucial role in further isolating the two crafting communities, precluding elite investment in innovation,[202] incentivizing trade and goods exchange[203] while indirectly encouraging the maintaining of distinct technical traditions. A more permanent and invested presence of Rome in this part of the Adriatic, and especially its new economic model, might have changed the social systems of both communities, facilitating mobility and technological transfers, which are still only hinted at and need to be further explored. Rapidly developing (proto)urban centers might have played a key role in these transfers, and a differentiation between (sub-)urban and rural pottery production may have also emerged as early as the late 1st century BC.

Further research on the pottery, especially through archaeometry and fieldwork aiming at identifying and understanding craft spaces,[204] will certainly provide additional data to finetune the proposed models of interaction, helping to build a more nuanced discourse. The social implications highlighted above might, on the other hand, provide food for thought on other aspects of interaction and connectivity between the here considered communities. However, we mainly hope to have shown that the late Iron Age potting industry was not uninterested in innovation or too bound in tradition;[205] it was simply active within social constraints that did not provide it with the means, the contacts, and the networks that would foster the transfer of knowledge.[206] In fact, we might even propose that it is the colonial pottery crafting community that was indifferent to this kind of interaction,[207] functioning within its own social system and technical identity, and its own networks.[208] It is through these networks, as it seems, that fine ware production was initiated there in the first place.[209] The provenance and distribution of the earliest pottery here dealt with points to this, as well.

In turn, this does not mean that the craftspeople working within other industries (e.g. metals) of the here considered area failed to establish more permanent connections with other, distant communities of practice. In fact, the late Iron Age communities of the eastern Adriatic (and

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[202] At least in certain industries. For the role of the "state" and elites in technological transmission, see e.g. Blake 2016; Bernardo-Ciddio 2022, 109–110.

[203] Zuchtriegel 2017, 210–212. An interesting connection might be the contemporary changes in naval construction, interpreted through an upsurge in naval enterprises, see Dzino, Boršić 2020, 193.

[204] E.g. Murphy 2016, 136–167; Padovani, Flahaut, Willems *in press*. Equally, in-depth publication and re-evaluation of old excavations might bring more valuable data to the surface.

[205] Cf. Budić 2022, 127, 130.

[206] Cf. Gosselain 2016, 195

[207] E.g. Gosselain 2016, 200–201.

[208] E.g. Zuchtriegel 2017, 197–215.

[209] Zuchtriegel 2017, 197–215.

the same might be said of the colonial ones) were quick in adopting numerous innovations and foreign social practices, negotiating them each time through specific models of interaction, most of which still need to be evaluated more precisely, but all of which were strongly marked by mobility and connectivity.[210] One of these might be some architectonic solutions, such as the erection of so-called megalithic enceinte walls built with ashlar masonry.[211]

To understand the shaping of local (both "colonial" and "native") pottery production traditions in the later 1st millennium BC on the eastern Adriatic, we posed several questions, such as: Whose technological choices? Is there evidence for the transmission of knowledge? What role did mobility play in ancient interactions and what was its scale?[212] Was it restricted to objects or certain members of society (e.g. traders or craftspeople), and how did it change over time? If we are to identify the specificities of each ancient industry, then similar questions should be considered within each craft separately to achieve more nuanced reconstructions of ancient crafts interaction and organization. In fact, it is through such a material turn and bearing in mind the difference between things and techniques that a move beyond representation (of only users' identities) might be achieved, leading towards a truly unbiased understanding of all aspects of cultural contact.[213]

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[210] Gosselain 2016, 204; Robinson 2022.
[211] Cf. Zuchtriegel 2017, 208–210; Vranić 2019, 46–49.
[212] Or its "kinds and degrees", as in Van Oyen 2017, 62.
[213] Dietler, Herbich 1998; Versluys 2014.

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